Towards universal access to diagnosis and treatment of multidrug-resistant and extensively drug-resistant tuberculosis by 2015

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Abbreviations

ADR ..... adverse drug reaction

CI ..... confidence interval

DMC ..... designated microscopy centre

DRS ..... drug resistance survey

DST ..... drug susceptibility testing

EQA ..... external quality assurance

FDC ..... fixed-dose combination

FIND ..... Foundation for Innovative New Diagnostics

GDF ..... Global Drug Facility

Global Fund .. The Global Fund to Fight AIDS, Tuberculosis and Malaria

HCW ..... health-care worker

IPT ..... isoniazid preventive therapy

IRL ..... intermediate reference laboratory

LPA ..... line probe assay

MDR-HBC .... high MDR-TB burden countries

NSA ..... national strategy application

IC ..... infection control

MCLA ..... Ministry of Corrections and Legal Assistance (of Georgia)

MGIT ..... Mycobacteria growth indicator tube

MoH ..... Ministry of Health

MoJ ..... Ministry of Justice

MSF ..... Médecins Sans Frontières

M/XDR-TB ... multidrug-resistant tuberculosis (see MDR-TB) and extensively drug-resistant tuberculosis (see XDR-TB).

NRL ..... national reference laboratory

NGO ..... nongovernmental organization

NTP ..... national TB control programme (or equivalent)

PBSP ..... Philippine Business for Social Progress

PIU ..... Programme Implementation Unit (of UNDP)

PMDT ..... programmatic management of drug-resistant tuberculosis

PPM ..... public–private mix

PT ..... proficiency testing

RNTCP ..... Revised National TB Control Programme (India)

SLD ..... second-line anti-TB drug

SRL ..... supranational reference laboratory

TB ..... tuberculosis

TDF ..... Tropical Disease Foundation

UNDP ..... United Nations Development Programme

UNITAID ..... International facility for the purchase of diagnostics and medicines for diagnosis and treatment of HIV/AIDS, malaria and TB.

USAID ..... United States Agency for International Development

Glossary

The definitions given below apply to the terms as used in this document. They may have different meanings in other contexts.

Countries
WHO Member States

DOTS
The internationally-recommended approach to basic TB control.

DRS
Drug resistance survey is a discrete study measuring the proportion of drug resistance among a sample of patients representative of an entire patient population in a country or geographical area.

DST
Drug susceptibility testing (defined as the testing of a strain of *Mycobacterium tuberculosis* for its susceptibility or resistance to one or more anti-TB drugs).

GLC
Green Light Committee is an initiative of WHO and the Stop TB Partnership that helps countries gain access to high-quality second-line anti-TB drugs so they can provide treatment for people with multidrug-resistant tuberculosis (MDR-TB) in line with the WHO guidelines.

MDR-TB
Multidrug-resistant tuberculosis (defined as TB caused by strains of *Mycobacterium tuberculosis* that are resistant to at least isoniazid and rifampicin).

New case
A newly registered episode of TB in a patient who, in response to direct questioning, denies having had any prior anti-TB treatment (for up to one month), and in countries where adequate documentation is available, for whom there is no evidence of such history.

PPM
Public–private mix is a comprehensive approach for systematic involvement of all relevant health-care providers in TB control to promote the use of international standards for TB care and achieve national and global TB control targets.

Previously treated case
A newly registered episode of TB in a patient who, in response to direct questioning admits having been treated for TB for one month or more, or, in countries where adequate documentation is available, there is evidence of such history. Chemoprophylaxis should not be considered treatment for TB.

Relapse case
A patient previously treated for TB who was declared cured or successfully completed treatment, and is again diagnosed with bacteriologically positive (smear or culture) TB.

XDR-TB
Extensively drug-resistant tuberculosis (defined as MDR-TB plus resistance to a fluoroquinolone and at least one second-line injectable agent: amikacin, kanamycin and/or capreomycin).

Executive summary

Introduction

As recently as 10 years ago, few options for treatment and care were available to those affected by multidrug-resistant tuberculosis (MDR-TB) and extensively drug-resistant tuberculosis (XDR-TB).[a] Later, accumulating evidence indicated that the programmatic management of M/XDR-TB was not only feasible but also cost effective. The World Health Organization (WHO) has recognized M/XDR-TB as a major challenge to be addressed as part of the Stop TB strategy, launched in 2006. In April 2009, WHO convened a ministerial meeting of countries with a high burden of MDR-TB in Beijing, China, paving the way in May 2009 for the 62nd World Health Assembly to adopt resolution WHA62.15 on prevention and control of MDR-TB and XDR-TB. The resolution urges Member States to take action on multiple fronts towards achieving universal access to diagnosis and treatment of M/XDR-TB by 2015.

Despite the important progress being made, severe bottlenecks are limiting the response to the M/XDR-TB epidemic. Indeed, only 10% (24 511/250 000) of the estimated MDR-TB cases among notified TB cases in 2009 in the high MDR-TB countries, and 11% (30 475/280 000) globally were enrolled on treatment. Some countries are making progress by implementing policy changes that rationalize the use of hospitals, such as South Africa, or treating patients through community-based models of care, such as the Philippines. However, diagnostic capacity remains limited. Furthermore, the price of some quality-assured second-line drugs has not fallen, and shortages of drugs still occur. Overall, there is recognition that the response to MDR-TB must be built across health systems, and corresponding plans have been made. Human and financial resources are grossly insufficient and frequently inadequate. If domestic funding is not urgently mobilized, The Global Fund to Fight AIDS, Tuberculosis and Malaria, as well as UNITAID, may become the main – if not only – source of funding for programmatic management of MDR-TB in several countries, demonstrating that commitment in endemic countries and domestic funding are hardly mobilized for this public health priority.

Developing and adopting new tools may help accelerate the scale up of adequate M/XDR-TB management; the introduction of new rapid diagnostic tests is promising in Ethiopia, India and South Africa, for example. Although the Xpert MTB/RIF test introduced in 2010 may bring diagnosis closer to patients, it is not a point-of-care assay, and the need for increased research investment into novel rapid tests therefore remains. Five candidate anti-TB drugs are being evaluated in clinical trials, and preliminary results are encouraging: a new anti-TB drug is anticipated on the market in a few years. However, no technological or managerial innovation will make a meaningful difference to the response if access to care for the poorest and most vulnerable groups is not increased through strengthened and properly funded health-care systems. Beyond more rapid implementation of available tools, there is an urgent need to fully fund a robust and comprehensive research portfolio that ranges from basic science to efforts to develop new vaccines, diagnostics and treatments. New and more effective tools will likely facilitate care and control of MDR-TB, as long as they become accessible to the poorest populations worldwide. MDR-TB is one of the greatest areas of unmet need for TB research. Besides scaling up implementation of available and new tools, research providing evidence that countries can use to reach the global target of achieving universal access to MDR-TB care in line with resolution WHA62.15 is equally needed.

The involvement of civil society organizations and communities in global and national responses to M/XDR-TB also remains very limited. In October 2010, WHO organized a consultation meeting to strengthen their active involvement in the response to TB, highlighting MDR-TB as an urgent priority. It is time to focus advocacy efforts at country level, and not only global level, to ensure that the health sector receives the necessary resources and the M/XDR-TB response remains high on the global health-policy agenda.

[a] Multidrug-resistant TB (MDR-TB) is caused by bacteria that are resistant to at least isoniazid and rifampicin, the most effective anti-TB drugs. MDR-TB results from either primary infection with resistant bacteria or may develop during the course of treatment. Extensively drug-resistant TB (XDR-TB) is a form of TB caused by bacteria that are resistant to isoniazid and rifampicin (i.e. MDR-TB) as well as any fluoroquinolone and any of the second-line anti-TB injectable agents (amikacin, kanamycin and/or capreomycin).

These forms of TB do not respond to the standard six-month treatment with first-line anti-TB drugs and can take up to two years or more to treat with drugs that are less potent, more toxic and much more expensive.

This report describes the progress being made globally towards achieving universal access to diagnosis and treatment of M/XDR-TB since the ministerial meeting of high M/XDR-TB burden countries in April 2009 in Beijing, China, and the adoption of WHA62.15 on prevention and control of M/XDR-TB, with special focus on progress in 27 countries where the MDR-TB burden is high.[a] The report aims to increase awareness of achievements and gaps and, more importantly, to draw global attention to the need for more decisive action on overcoming bottlenecks to progress, especially at the country level. While there is clarity and consensus on what to do, as the 62nd WHA resolution indicates, the international community should no longer hesitate to fully implement the resolution.

Country progress in responding to the M/XDR-TB epidemic

This report presents the key findings of data provided by countries to WHO on progress achieved on the two major fronts in the response to M/XDR-TB: (i) diagnosis, treatment and care of people affected by M/XDR-TB; and (ii) prevention of M/XDR-TB through basic TB control.

Diagnosing, treating and caring for people with M/XDR-TB

Planning and funding the response to M/XDR-TB. Of the 27 high MDR-TB burden countries, 26 have updated the MDR-TB component of their TB national plans. The *Global Plan to Stop TB 2011–2015*[2] estimates that US$ 0.9 billion is needed in 2011 to address MDR-TB (excluding the costs associated with laboratory scale-up). Funding for MDR-TB care and treatment has increased fivefold since 2009, from US$ 0.1 billion to US$ 0.5 billion in 2011 in 23/27 countries. Despite this important progress, the Global Fund may become the sole source of funding for second-line drugs and MDR-TB management in seven high MDR-TB burden countries in 2011, if domestic funding is not mobilized. In Estonia, Latvia, the Russian Federation and South Africa, domestic sources will provide most if not all of this funding.

Expanding diagnostic capacity. WHO has set a target of having at least one laboratory with capacity to perform culture per 5 million population, and one laboratory with capacity to perform drug susceptibility testing (DST) per 10 million population. However, only 5 of the 22 high TB burden countries and 16/27 high MDR-TB burden countries had achieved this goal by the end of 2009. The Global Laboratory Initiative, a powerful global partnership around TB laboratory diagnostics, has proven crucial in accelerating uptake of new diagnostic technologies, including Xpert MTB/RIF, the most recent tool recommended by WHO. The EXPAND-TB project (EXPanding Access to New Diagnostics for TB), established in 2008, aims to accelerate uptake of new TB diagnostic technologies and is benefiting 15 of the 27 high MDR-TB burden countries. Laboratory networks are established in all 27 countries; all have capacity to perform DST of at least first-line anti-TB drugs at the central or national reference laboratory and at regional level in some countries. This substantive progress in expanding diagnostic capacity should now be reflected in increasing numbers of patients being enrolled on treatment in the next years.

Improving drug resistance surveillance. Major progress has been made in surveillance of anti-TB drug resistance worldwide in 2008–2010. In the 27 high MDR-TB burden countries, the number of new drug resistance surveys under way or planned increased from 1 in 2008 to 10 in 2011; the number of countries with representative drug resistance data increased from 19 to 22. It is expected that by mid-2012, all 27 countries will have representative information on drug resistance. The number of countries providing testing services and reporting HIV status among MDR-TB cases is also increasing. As of February 2011, a total of 69 countries worldwide reported having identified at least one case of XDR-TB. New data from southern Africa indicate that MDR-TB is a growing problem in that subregion. Recent surveys in Botswana (2008) and Swaziland (2009) suggest that proportions of MDR-TB have increased over the past 15 years. This finding is likely to be associated with the growing HIV epidemic in the subregion.

Ensuring access to quality-assured anti-TB drugs. The number of finished second-line anti-TB pharmaceutical products available for procurement through the Global Drug Facility increased from 11 in 2008 to 25 in 2010; the number of suppliers of second-line drugs (SLDs) increased from 5 in 2008 to 15 in 2010. Drug management remains a major challenge, with 4/24 countries still reporting stock outs of second-line drugs in 2009. Further progress could

[a] In this report, the 27 high MDR-TB burden countries refer to those Member States estimated by WHO in 2008 to have had at least 4000 MDR-TB cases occurring annually and/or at least 10% of newly registered TB cases with MDR-TB. The countries are: Armenia, Azerbaijan, Bangladesh, Belarus, Bulgaria, China, Democratic Republic of the Congo, Estonia, Ethiopia, Georgia, India, Indonesia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Myanmar, Nigeria, Pakistan, Philippines, Republic of Moldova, Russian Federation, South Africa, Tajikistan, Ukraine, Uzbekistan and Viet Nam.

be achieved in many countries by facilitating registration and importation of drugs, conforming to quality assurance standards set by WHO, strengthening national drug management, and increasing production capacity of quality-assured products.

Treating and caring for people affected by M/XDR-TB. Of the 4.7 million TB cases notified by the 27 high MDR-TB burden countries to WHO in 2009, close to 250 000 were estimated to have MDR-TB. Only 16% of these cases were notified as MDR-TB (ranging from 90–100% in seven countries to less than 5% in six others). The proportion of notified cases enrolled on treatment ranged from 1% to 100% (median 8%). Enrolments out of expected MDR-TB among notified TB cases were 10% (24 511/250 000) in the 27 MDR-HBCs and 11 % (30 475/280 000) for all cases worldwide. There is wide variation in the performance of the programmes as far as treatment is concerned. Treatment success varied from 25% to 82% among MDR-TB patients started on treatment in 2007 in the 13 MDR-HB countries. The number of cases assessed represented 45% of all MDR-TB cases that were identified and notified by these countries in the same year. Fourteen countries reported no data on outcomes. If reports correspond to what is happening in reality, it may be that most people affected by MDR-TB are not diagnosed and that only a small proportion of those in whom the disease is diagnosed are enrolled on treatment. MDR-TB recording and reporting are substandard in most high MDR-TB burden countries, but this hardly explains the huge gap between the need for prevention and control of M/XDR-TB and the response to it.

Preventing M/XDR-TB through basic TB control

Strengthening basic TB control through DOTS. There is global progress in implementing basic DOTS – the fundamental component of the WHO Stop TB strategy. However, several indicators give reasons for concern about the performance of DOTS in the high MDR-TB burden countries. In 14/27, the case detection ratio was lower than 70%; in 17/27, treatment success among new smear-positive cases was below the target of 85% in 2008. This reflects the high frequency of failure (median 7%, range 2–26%) as well as deaths (median 5%, range 3–15%) likely due to the high MDR-TB burden, poor diagnostic coverage and inadequate treatment. Default, which can be reduced through programme efforts, ranged from 2% to 12% (median: 7%) in these 17 countries.

Engaging all health-care providers. Including hospitals in the response to M/XDR-TB is critical for timely diagnosis and appropriate case-holding. To guide and facilitate the engagement of all care providers in the response to M/XDR-TB, WHO has developed an assessment tool, which is part of the PPM toolkit launched in 2010. A task force to promote the engagement of all care providers in the programmatic management of drug-resistant TB has also been set up by the Stop TB Partnership's MDR-TB Working Group. Countries such as Bangladesh, Pakistan and the Philippines are forging successful partnerships, demonstrating both the feasibility and necessity of engaging all health-care providers.

Promoting regulated access to anti-TB drugs. In 2010, 18/27 high MDR-TB burden countries reported availability of first-line anti-TB drugs in private pharmacies; in 12/18 countries the medicines were available without prescription. Inappropriate or incorrect prescribing practices increase the risk of treatment failure and drug resistance and its amplification. Policies to regulate access to anti-TB medicines are being developed or implemented in Brazil, Ghana, India, the United Republic of Tanzania and Zambia but have not been fully introduced in most high MDR-TB burden countries. There is increasing evidence to suggest that, under appropriate conditions, countries may restrict dispensing practices to qualified providers only. Efforts are under way in Cambodia, India and the United Republic of Tanzania to promote the rational use of anti-TB drugs by engaging pharmacists and their associations.

Addressing the dual MDR-TB and HIV epidemics. Data suggest that people living with HIV have a higher risk of developing drug-resistant TB. Of the 27 high MDR-TB burden countries, 12 are listed as priorities of the Stop TB Partnership's TB-HIV Working Group and carry the brunt of the HIV-related TB epidemic. Epidemiological data on the association between HIV infection and MDR-TB are scarce. Of the 12 TB/HIV priority countries, 4 (Estonia, Latvia, the Republic of Moldova and Ukraine) reported data on MDR-TB stratified by HIV status. TB screening among people living with HIV, including those with drug-resistant TB, is expected to further increase with the implementation of WHO's 2010 guidelines for intensified TB case-finding and isoniazid preventive therapy for people living with HIV/AIDS.

Prioritizing infection control. In 2009, WHO published its recommended policy on TB infection control. A total of 14/27 high MDR-TB countries have conducted a national situation assessment of TB infection control and 11/27 have developed national action plans. Most countries are at a preliminary phase in implementing policy and have yet to begin national assessments or draft national action plans.

Introduction

Major progress has been made towards achieving global control of tuberculosis (TB) over the past two decades. During 1995–2009, a total of 49 million patients were treated in DOTS programmes worldwide, of whom 41 million were successfully treated, and up to 6 million lives were saved. Incidence rates have been declining globally and in all subregions except in certain African countries since 2004.[1] This progress is being threatened by M/XDR-TB, a form of TB that is more difficult and costly to diagnose, treat and cure than drug-susceptible TB. M/XDR-TB (multidrug-resistant TB [MDR-TB] plus extensively drug-resistant TB [XDR-TB]) is particularly lethal in people living with the human immunodeficiency virus (HIV). In 2008, the World Health Organization (WHO) estimated that 440 000 cases of MDR-TB emerged globally; 85% of its global burden occurs in 27 countries.

At the ministerial meeting of high MDR-TB burden countries (MDR-HBC) held in Beijing, China, in April 2009, countries committed to tackling the epidemic with innovation and urgency. In May 2009, the 62nd World Health Assembly urged Member States to achieve universal access to diagnosis and treatment of M/XDR-TB (Annex 1). By October 2009, 27 MDR-HBCs had begun to update their national TB control plans to include a component on drug-resistant TB in compliance with the resolution.

It is well accepted that weak health-care systems are at the root of M/XDR-TB, hampering progress on two major fronts: prevention of the M/XDR-TB epidemic and treatment of those affected. Reflecting that notion, this report has two parts: diagnosing, treating and caring for people affected by M/XDR-TB (part I); and preventing M/XDR-TB through basic TB control (part II).

Part I describes and analyses progress, remaining challenges and next steps for five elements of the health-care system as applied to the response to M/XDR-TB: planning and financing; diagnosis; surveillance; drug management; and treatment and care. It also analyses the status of the response to M/XDR-TB in 27 MDR-HBCs.

Diagnosing and treating MDR-TB are proven cost-effective health interventions. However, national budgets do not always follow need. Section 1.1 analyses the progress made by the MDR-TB high burden countries towards filling the funding gaps identified in the *Global Plan to Stop TB 2011–2015*[2] since the 62nd World Health Assembly resolution.

M/XDR-TB case-finding, unlike routine TB case-finding, requires advanced, costly and labour-intensive laboratory technology. Section 1.2 presents a comprehensive overview of the dramatic changes that have occurred during the past three years to the TB laboratory landscape. India, with the second highest burden of MDR-TB, has achieved major progress in expanding laboratory capacity and is hailed as an example of the progress being made globally.

Measuring the magnitude of and trends in the M/XDR-TB epidemic is essential for planning appropriate responses and assessing their epidemiological impact on the response being implemented by countries. Section 1.3 presents the most recent data available from drug resistance surveys and describes the actions being taken to fill the remaining gaps in the surveillance of M/XDR-TB, especially in the high MDR-HBCs.

Uninterrupted and timely supply of medicines that meet international standards of quality assurance is an essential component of the response to M/XDR-TB. Alas, most of the programmes treating M/XDR-TB experience a variety of problems to guarantee access to this essential component. Section 1.4 charts the progress of the Global Drug Facility (GDF) and its partners to correct the failures of the market of second-line anti-TB drugs.

The body of evidence on programmatic management of M/XDR-TB is quite dynamic thanks to increasing operational research being conducted in MDR-TB treatment programmes. In addition, treatment and care of people affected by M/XDR-TB raise issues that were either ignored or less relevant for treatment of drug-susceptible TB. Section 1.5 refers to the most recent policies and guidelines developed by WHO to guide countries in managing M/XDR-TB.

The programmatic management of drug-resistant TB (PMDT) is a complex intervention in public health. It needs careful planning, intensive technical assistance and mentoring during implementation, as well as regular monitoring. Section 1.6 presents and analyses the data provided by countries on MDR-TB patient enrolment and treatment outcomes; and the support being provided by the Green

Light Committee (GLC) initiative to enhance capacity for managing MDR-TB at the country level.

The target of universal access to diagnosis and treatment of MDR-TB by 2015 set by the 62nd World Health Assembly is ambitious. It requires countries to mobilize resources, build capacity and properly coordinate operations within the health-care system. Section 1.7 analyses the current capacity and major limitations in each of the 27 MDR-HBCs.

Part II describes and analyses the progress, remaining challenges and next steps in some elements of the health-care system as applied to prevention of TB and strengthening of basic TB control, including DOTS, role of all health-care providers, access to drugs, collaboration with HIV programmes, and infection control. Other elements relevant to the prevention of TB, though not discussed in this report, include co-morbidities that are emerging as major risk factors for TB and contributing to poor treatment outcomes, such as smoking, diabetes, and alcohol or substance dependency. WHO is working with partners to develop policy for collaboration with national TB control programmes (NTP) and groups addressing these conditions. Options are also being explored with some countries to pilot-test interventions that may contribute to tackling social and economic determinants that prevent access to diagnosis and treatment of MDR-TB and simultaneously increase the risk of TB.

DOTS – the cornerstone of the Stop TB strategy – is essential but not sufficient to prevent and control MDR-TB. However, success in managing MDR-TB depends to a large extent on a solid DOTS programme. Section 2.1 presents the status of DOTS in the 27 MDR-HBCs and indicates areas in urgent need of improvement.

There is compelling evidence that the public-health sector is not the first choice for those seeking care. The same applies to those affected by TB. Section 2.2 considers the role of health care providers engaged in the response to TB and MDR-TB and provides two successful country experiences.

Uninterrupted access to the right combination of anti-TB drugs meeting international quality standards is fundamental to prevent creation or amplification of drug resistance. Section 2.3 charts progress in introducing national policies to regulate access to anti-TB drugs. Successful implementation of these policies will stop the practice of irregular and self-prescribed treatment.

There are increasing reports suggesting that HIV is a risk factor for development of M/XDR-TB. Section 2.4 summarizes the advances being made to engage partners around joint TB-HIV control programmes. Full implementation of the WHO TB-HIV policy can have a major impact in preventing a major M/XDR-TB epidemic among countries where HIV is prevalent.

The high lethality observed in nosocomial outbreaks of MDR-TB, especially among those living with HIV, fuelled renewed global interest in TB infection control. Section 2.5 provides an update on the most relevant achievements in implementing the new WHO policy on TB infection control.

Methods, sources of data and derivation of indicators

The data used for this report were based on the most recent information made available by countries to WHO until 22 February 2011. The sources of this information were the following:

1) WHO's global TB database,[a] managed by the Stop TB Department's Monitoring and Evaluation Unit, which houses the historic TB data on surveillance, epidemiology, strategy and finance collected annually by WHO. Since July 2009, the department has been collecting these data through a web-based system (www.stoptb.org/tme) that allows real-time validation while data are being entered directly by national surveillance authorities and WHO staff in countries and regions.

2) Information collected by the WHO secretariat of the "Global project on anti-tuberculosis drug resistance surveillance" on survey activity and results (Section 2.3).

3) Information collected by GLC secretariat about project approvals, patient enrolment and performance as reported directly by projects to the secretariat (Section 1.6, sub-section on GLC).

4) Other information relevant to MDR-TB control available from WHO on planning, budgets, models of care, incentives, supranational laboratory linkage, systems of patient data management, and drug supply extracted from project mission reports and workshops.

5) A questionnaire applied to the 27 MDR-HBCs to collect complementary information not available elsewhere (for example, TB care in prisons), which features in the country profiles (Annex 2). All these profiles were cleared by individual countries ahead of finalization of this report.

6) Qualitative data provided by countries illustrating experience in public–private mix (PPM) approaches (Section 2.2) and box on M/XDR-TB care in South Africa.

[a] www.who.int/tb/country/data/download

The quantitative indicators used are expressed as absolute counts, simple proportions and rates per population. Methods used to derive the estimates of TB incidence and of incident episodes of MDR-TB have been described in detail elsewhere.[3,4] The estimated number of cases of MDR-TB among notified cases of pulmonary TB (Annex 3.1) were derived using the measured or modeled estimate of MDR prevalence applied to new, retreated or combined pulmonary TB cases as notified by countries in 2009. In interpreting this indicator and using it as a benchmark, the reader is referred to the note at the foot of Annex 3.1.

PART 1:

Diagnosis, treatment and care of people affected by M/XDR-TB

1.1 Planning and financing universal access to MDR-TB diagnosis, care and treatment

Planning

The target set by the 62nd World Health Assembly[5] on MDR-TB required countries to update the MDR-TB component of national TB plans. These updates and accompanying budgets, are essential to identify gaps, mobilize additional resources and monitor implementation progress. As of the end of 2010, 26 of the 27 high MDR-TB burden countries (MDR-HBC) had updated plans, which focus mainly on the operational aspects of MDR-TB management, approved or endorsed by their national governments.

The analysis of updated country plans shows promising governmental commitment and financial contributions to ensuring sustainable scale-up of MDR-TB diagnosis, treatment and care; however, not all MDR-TB components are adequately financed. *The Global Plan to Stop TB 2011–2015* (the Global plan),[2] developed by WHO and the Stop TB Partnership, has the target of achieving universal access to diagnosis and treatment of MDR-TB by 2015.

WHO, in cooperation with partners and through its regional and country offices, has provided technical assistance for most MDR-HBC in developing and implementing M/XDR-TB response plans. Five training courses for global and local consultants to further develop the necessary skills to support the planning, implementation, and monitoring and evaluation of the MDR-TB component of TB control programmes have been conducted. In addition, using a planning and budgeting tool, WHO and partners facilitated three workshops to assist 19 MDR-HBCs with developing the budget for M/XDR-TB response plans based on country scale-up targets and in line with the *Global Plan to Stop TB 2011–2015*. [2]

WHO regional offices are also developing regional plans. In the WHO European Region, for example, where 15 of the 27 MDR-HBCs are located, the WHO Regional Director has established a Special Project to Prevent and Combat M/XDR-TB in the region. In order to scale up comprehensive responses and prevent and control M/XDR-TB, a consolidated action plan is being developed to function as a road map for countries and partners. The plan is being prepared in region-wide consultations with experts, patients and communities and is aligned with the objectives of the *Global Plan to Stop TB 2011–2015*;[2] it follows the same targets set by the Global Plan and World Health Assembly resolution WHA62.15. The plan will be submitted for endorsement by the WHO Regional Committee for Europe, at its next meeting to be held in Baku, Azerbaijan, in September 2011.

Financing

To ensure universal access to MDR-TB diagnosis, treatment and care, Member States were urged by the World Health Assembly to use all possible financing mechanisms – both domestic and external – to fill the funding gaps identified in the *Global Plan to Stop TB 2011–2015*,[2] and to increase investment in M/XDR-TB. From the five main groups of funding sources, namely government, loans, grants from the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), other donors and patients themselves, it is clear that out-of-pocket payments by TB patients are not a solution for financing the scale-up of MDR-TB diagnosis, treatment and care.[6] With the costs of MDR-TB treatment typically several thousands of US dollars per patient in low- and middle-income countries, a reliance on out-of-pocket expenditures for MDR-TB diagnosis and treatment would mean catastrophic health expenditures for TB patients and their households. It may also lead to treatment of unknown quality, delivered in the private sector without a link to the national TB control programme, which in turn can increase the risk of emergence of further drug resistance, poor treatment outcomes and increased transmission of MDR-TB strains.

The *Beijing Ministerial "Call for Action"*[7] requires countries to proceed with three main actions:

- To prepare a strategy, a plan and a sound budget for addressing MDR-TB. Countries were offered the possibility of using the TB planning and

budgeting tool,[a] a comprehensive tool to help countries plan and budget comprehensively within the framework of both the Stop TB strategy and the Global Plan.[2]

- To explore government funding in middle-income countries.
- To integrate TB and MDR-TB budgets into the general health system financing strategy.

The following section analyses the cost of MDR-TB care and treatment as reported to WHO for 2008–2011 and the sources of funding for those needs since the WHA resolution and the Beijing Call for Action. It also summarizes the main funding requirements that 27 MDR-HBC countries (Annex 2) have estimated to support the plans to scale up MDR-TB care and treatment for 2011–2015. These are compared with the Global Plan funding estimates.

How much countries have budgeted for MDR-TB care and treatment for 2008–2011[b]

Since 2008, 23 MDR-HBC[c] have reported financial data to WHO, which allows assessment of trends in funding for MDR-TB care and treatment. Combined, these countries account for more than 80% of the global estimated number of incident MDR-TB cases.[d] Funding for MDR-TB care and treatment has increased fivefold since 2009, from US$ 0.1 billion to US$ 0.5 billion in 2011 (Figure 1).

How the required funding will be mobilized in 2011

While domestic funding for MDR-TB has increased since 2009, it is not expected to further increase in 2011. The Global Fund however has stepped into the financing of MDR-TB and will be accounting for around 18% of total MDR-TB control needs in 2011. Almost 21% of the MDR-TB costs are expected to be unfunded unless new sources of funding are identified (Box 1 and Figure 1). In the Democratic Republic of the Congo, Indonesia, the Philippines and Ukraine, more than half of the funding needs will not be covered (Table 1). In absolute terms, 55% of the MDR-TB care and treatment needs in 2011 are accounted for by three countries: the Russian

[a] http://www.who.int/tb/dots/planning _budgeting_tool/en/index.html

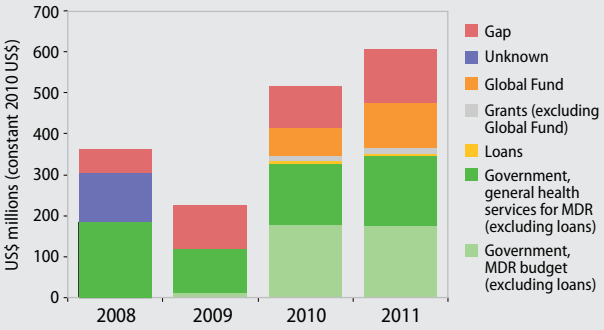
[b] The budget for MDR-TB includes two categories: second-line drugs and MDR-TB management. "MDR-TB management" in the financial section of the online WHO TB data collection form does not include second-line drugs, staff working in TB control, nor routine TB control programme management and supervision (http://www.stoptb.org/tme/)

[c] 27 MDR-TB HBC minus Belarus, Azerbaijan, Lithuania and Tajikistan.

[d] At the time of writing, latest available estimates are from 2008.

FIGURE 1

MDR-TB care and treatment costs by sources of funding. 23 high MDR-TB burden countries, 2008–2011*



Source: www.who.int/tb/data

* At the time of writing, latest available estimates are from 2008. Excludes 4 countries (Azerbaijan, Belarus, Lithuania and Tajikistan) that did not report budget data. The 23 countries account for 83% of the global estimated number of incident MDR-TB cases.

Unknown applies to South Africa, 2008.

BOX 1 Role of Global Fund in financing of the MDR-TB response, 2011–2012

Total funding needs for MDR-TB care and treatment rise to US$ 0.6 billion in the 24 MDR-HBC in 2011 (Table 1), of which US$ 0.1 billion (or 18%) is expected to be available from the Global Fund. Nineteen of the MDR-HBC will benefit from Global Fund financial support for a total of 27 749 patients; Estonia, Latvia, the Philippines, South Africa and the Ukraine, do not have a Global Fund grant for 2011 covering MDR-TB.[e] The Global Fund supports 19/24 MDR-HBC; in 10/19 countries, covers at least 90% of the total cost of SLDs and MDR-TB management. Ten of the nineteen countries supported by the Global Fund will receive funding for over 90% of their MDR-TB budget. For the remaining nine countries also supported by the Global Fund, contributions range from 4% of SLDs and MDR-TB management costs in the Russian Federation to 78% in Viet Nam.

Globally, the Global Fund will finance US$ 0.2 billion in 2011 for MDR-TB diagnosis, care and treatment. This total (up to Round 10 and National Strategy Application [NSA]) includes: a) the grants to the 20 MDR-HBC; b) the grants to other non MDR-HBC, such as Nepal, Peru and Romania (US$ 0.01 billion); and, c) two thirds of laboratory costs (Service Delivery Areas). These funds are aimed at treating 34 885 MDR-TB cases. In 2012, of the US$ 0.9 billion needed to support MDR-TB expansion plans, the Global Fund is expected to fund US$ 0.3 billion.

[e] Azerbaijan did not report financial data to WHO but according to approved proposals submitted to Global Fund rounds, they will receive funding from the Global Fund to treat 805 patients.

TABLE 1

MDR-TB budget, available funding, cost of use of general health-care services for MDR-TB, total MDR-TB control costs (all in US$ millions) and expected number of patients to treat, 24 high MDR-TB burden countries, 2011*

		Available funding							
	MDR-TB budget	Government (excluding loans)	Loans	Grants (excluding Global Fund)	Global Fund	Funding gap	Cost of utilization of general health-care services for MDR-TB	Total MDR-TB control costs	Expected number of MDR-TB patients to treat
Armenia	1	0	0	0	1	0	1	1	160
Bangladesh	5	0	0	0	5	0	1	6	776
Bulgaria	0	0	0	0	0	0	1	1	60
China**	34	3	0	0	30	0	0	34	6 706
Democratic Republic of the Congo	5	0	0	0	1	5	0	5	0
Estonia	1	1	0	0	0	0	1	1	80
Ethiopia	5	0	0	2	1	2	1	6	746
Georgia	0	0	0	0	0	0	1	2	470
Indonesia	27	1	0	1	6	19	1	29	1 000
India	54	1	5	10	35	3	9	62	15 000
Kazakhstan	18	8	0	0	10	0	42	60	4 215
Kyrgyzstan	1	0	0	0	1	0	1	2	210
Latvia	1	1	0	0	0	0	2	3	140
Republic of Moldova	2	0	0	0	2	0	1	3	450
Myanmar	2	0	0	0	1	1	0	2	600
Nigeria	4	0	0	0	2	1	0	4	0
Pakistan	7	0	0	0	7	0	2	9	1 100
Philippines	35	0	0	0	0	35	1	36	2 004
Russian Federation	129	123	0	0	5	0	2	131	0
Tajikistan	2	0	0	0	2	0	0	2	400
Ukraine	83	18	0	0	0	65	24	107	3 040
Uzbekistan	3	0	0	0	3	0	1	4	1 010
Viet Nam	1	0	0	0	0	0	0	1	910
South Africa	20	20	0	0	0	0	76	96	8 642
High MDR-TB countries	437	175	5	15	113	130	170	607	47 719

Source: www.who.int/tb/data

* Excludes 3 countries (Azerbaijan, Belarus and Lithuania) that did not report budget data. The 24 countries account for 84% of the global estimated number of incident MDR-TB cases.`

** Data in the table only apply to the Global Fund MDR-TB pilot areas in China. China government budget contributes to MDR-TB care and control through health insurance schemes and support to medical facilities and human resources

Federation, South Africa and Ukraine, mainly through domestic funding.

In 2011, the Global Fund may become the sole source of funding for second-line drugs and MDR-TB management for seven MDR-HBC: Armenia, Bangladesh, Bulgaria, Georgia, Tajikistan, Kyrgyzstan and Uzbekistan. In nine other MDR-HBC – the Democratic Republic of the Congo, Ethiopia, India, Indonesia, Kazakhstan, Myanmar, Nigeria, the Russian Federation and Viet Nam – the Global Fund is expected to contribute at least 4% of the budget needed for MDR-TB. Domestic funding for MDR-TB is expected to be extensively used in Estonia, Latvia, South Africa and the Russian Federation.

BOX 2 Strengthening planning and budgeting to scale up MDR-TB management: the experience of the Democratic Republic of the Congo

The Democratic Republic of the Congo is a high MDR-TB burden country that accounts for around 1% of the world's estimated number of incident MDR-TB cases. The *Plan d'action TB-MR DR Congo 2011–2015* envisages substantial developments in MDR-TB diagnosis, treatment and surveillance, as well as management and human resource capacity. The WHO TB planning and budgeting tool[a] was used by the national TB control programme (NTP), assisted by WHO,[b] as a basis for costing the MDR-TB expansion plan. An annual budget ranging from US$ 5 million to US$ 7 million (**Figure 3**) will be needed to carry out the five-year plan, which includes:

- a cumulative total of 4800 MDR-TB patients put on treatment throughout the country, largely employing an ambulatory model of care;
- six laboratories (1 national, 5 provincial) undertaking culture and DST on solid media by 2013, two of which will also have capacity for liquid media and three for molecular testing;
- two drug resistance surveys performed;
- 24 provincial MDR-TB focal points in place;
- related trainings and MDR-TB coordination meetings.

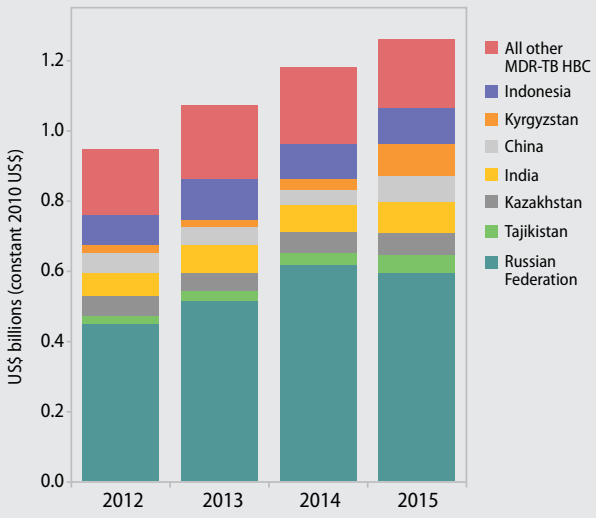
Having identified the needs to scale up MDR-TB care and treatment, the NTP should now identify sustainable funding to meet the plan needs. Of the 25 MDR-HBC reporting data to WHO in 2011, the Democratic Republic of the Congo showed the highest funding gap accounting for 85% of the MDR-TB budget (Figure 3). If the current level of funding, i.e. US$ 0.8 million in 2011, is not increased in DR Congo, the funding gap for the MDR-TB plan will range between US$ 4 million and US$ 6 million annually.

Aligning budgets for MDR-TB care scale-up 2011–2015 with the *Global Plan to Stop TB 2011–2015*

Looking ahead, to 2011–2015, the Global Plan[2] has recommended that 1 million MDR-TB patients should be treated worldwide at a cost of around US$ 7.9 billion.[c] Updates of the MDR-TB component of national TB control plans have been prepared by all 27 high MDR-TB burden countries (Annex 2), aiming to treat 448 730 patients. 25 of the MDR-HBCs,[d] accounting for over 80% the world's global estimated number of incident MDR-TB cases, have updated plans that include a budget, the amount of which is published annually[7] and appears in the MDR-TB country profiles (Annex 2 and Figure 2). They have estimated their combined funding needs for that period at US$ 5 billion, increasing annually from US$ 0.6 billion in 2011 to US$ 1.2 billion in 2015. The largest share of funding requirements for MDR-TB care and treatment is expected for China, India, Indonesia, Kazakhstan, Kyrgyzstan, Tajikistan and the Russian

FIGURE 2

Estimates of funding needed to scale up MDR-TB management, by country, 25 high MDR-TB burden countries, 2012–2015*



Source: National MDR response plans (Armenia, Bulgaria, DR Congo, Estonia, Georgia, Kazakhstan, Nigeria, Moldova, Tajikistan, China), TB control plan 2011–2015 (Bangladesh, Ethiopia), MDR-scale up workshops in Cairo 2010 (Indonesia, Philippines, Myanmar, Viet Nam, Pakistan), First Green Light Committee forum, Geneva, Switzerland 13–14 October 2009 (Azerbaijan, Belarus, India, Kyrgyzstan, Russian Federation, Ukraine, Uzbekistan).

* Excludes 2 countries (Latvia and South Africa) that did not report budget data. The 25 countries account for 82% of the global estimated number of incident MDR-TB cases.

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

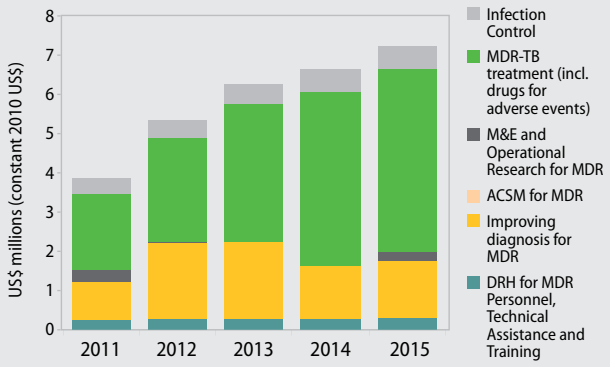
[b] Country office and headquarters

[c] Best estimate

[d] At the time of writing, Latvia and South Africa had not reported 2012–2015 budget for MDR-TB.

FIGURE 3

Budget for MDR-TB management, by line item, Democratic Republic of the Congo, 2011–2015



Federation. The costs of purchasing second-line drugs is expected to increase from 30% to 50% of the total required funding.

To achieve the Global Plan targets, countries need to persevere in their efforts to reach the remaining 0.5 million MDR-TB patients and use resources more cost effectively to reduce the economic burden on patients and health systems.

1.2 Expanding diagnostic capacity

Lack of diagnostic capacity has been a crucial barrier preventing an effective response to the challenges of HIV-associated and drug-resistant TB, with less than 5% of the estimated global burden of MDR-TB patients currently being detected. Expanded capacity to diagnose MDR-TB is therefore a global priority for TB control. To address these diagnostic challenges the Global Laboratory Initiative (GLI) was established in 2008 as a Working Group of the Stop TB Partnership; the GLI Secretariat is hosted by the Stop TB Department of WHO.[a]

The Global Laboratory Initiative

The GLI works closely with national TB control programmes, nongovernmental organizations (NGOs), technical and financial agencies, scientific and academic institutions, and WHO offices at country and regional levels in strengthening TB laboratory services. GLI activities include global policy guidance on appropriate laboratory technology and best practices, effective technology transfer and coordination of technical assistance, laboratory-related advocacy and resource mobilization, laboratory capacity development, interface with other laboratory networks to ensure appropriate integration, standardized laboratory quality assurance, as well as effective knowledge sharing. Membership of the GLI has continued to grow, and more than 100 international partners have joined forces to accelerate and expand access to quality-assured TB diagnostic services within integrated laboratory systems.

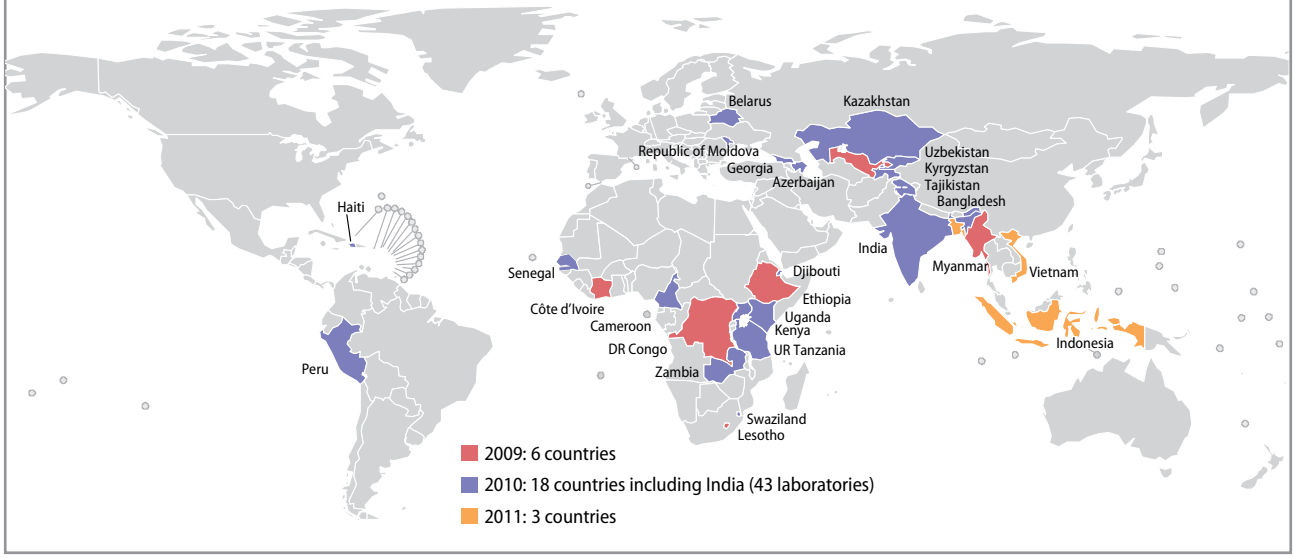
EXPAND TB

The EXPAND-TB project (EXPanding Access to New Diagnostics for TB) established in 2008 aims to accelerate uptake of new TB diagnostic technologies (commercial liquid culture systems, rapid

[a] http://www.stoptb.org/wg/

FIGURE 4

Implementation schedule for EXPAND-TB recipient countries



speciation and molecular line probe assays, recently endorsed by WHO[8]) into adequate laboratory services in 27 recipient countries (Figure 4). Project partners include WHO, GLI, the Foundation for Innovative New Diagnostics (FIND)[a] and the Stop TB Partnership's Global Drug Facility (GDF);[b] funding is provided by UNITAID and other donors.

During the first 18 months of the EXPAND-TB project, a wide range of activities was initiated in 23/27 recipient countries. These include laboratory needs assessment and gaps analyses, upgrades and renovation of laboratory infrastructure, training of staff, diagnostic policy reform and country validation of new technologies. Technology transfer has subsequently started in 16 countries, and 4 countries now routinely diagnose MDR-TB patients, paving the way for eventual routine surveillance of drug resistance.

GeneXpert MTB/RIF system

With support from the United States National Institutes of Health (NIH), FIND has partnered with Cepheid (California, USA) and the University of Medicine and Dentistry of New Jersey (UMDNJ, New York, USA) to develop a real-time, automated, molecular test for simultaneous detection of TB and rifampicin resistance. The test, called Xpert MTB/RIF, is a cartridge-based polymerase chain reaction (PCR)-based test that uses the GeneXpert device.

Evidence from laboratory validation, field evaluation and large-scale demonstration studies coordinated by FIND was reviewed by WHO in late-2010 following the systematic process for evidence assessment developed for TB diagnostics. This process confirmed that the Xpert MTB/RIF system was highly sensitive (98%) and specific (98%) in detecting TB and rifampicin resistance (a reliable proxy for MDR) directly from sputum, in less than two hours. The assay is robust enough to be performed outside of conventional laboratories, at decentralized (district and sub-district) levels of the health system but requires uninterrupted and stable power supply, with a maximum of 20 tests possible to be run in one 4-module device per day. FIND has negotiated preferential pricing for the public sector in low- and middle-income countries, as well as for donor and technical support agencies and NGOs supporting these countries.[c]

Widespread implementation of Xpert MTB/RIF would greatly advance the diagnostic capacity for TB and MDR-TB; its accuracy and ease of use represents a major milestone for global TB and MDR-TB care and control. A global consultation, convened by WHO in December 2010, outlined the operational requirements for Xpert MTB/RIF implementation.[d]

Xpert MTB/RIF is not a point-of-care test and cannot be used to monitor response to treatment. Introduction therefore needs to be accompanied by strengthening of overall laboratory services to provide the necessary laboratory back-up for patient monitoring and further drug-susceptibility testing.

Much progress has been achieved on new tools for diagnosis and treatment of MDR-TB over the past two years. The Xpert MTB/RIF test, for example, allows significant decentralization of MDR-TB diagnosis but is unfortunately not a point-of-care assay, and the need for increased research investment into novel rapid tests suitable for use at patient and community level therefore remains. Given the availability of new diagnostics and increased funding sources for laboratory strengthening, country capacity development has evolved into a complex and dynamic process, requiring much more detailed analysis of local infrastructure, diagnostic policies, and human and financial resources than before. WHO has therefore developed a framework for implementation of TB diagnostics to guide this process.[e]

The WHO-GLI Supranational Reference Laboratory Network

The TB Supranational Reference Laboratory Network (SRLN) was created in 1994 to support the WHO-International Union Against Tuberculosis and Lung Disease (IUATLD) global project on anti-TB drug resistance surveillance. The original terms of reference required that each of the Supranational Reference Laboratories (SRLs) support their own and at least two other countries with DST proficiency testing (PT), to provide external quality assurance during drug resistance surveys, and to provide training on culture and DST. In 2010, the SRLN comprised 29 laboratories, almost a doubling of the 16 original SRLs established in 1994.[f] Given the pressing need to scale up laboratory services, an expanded focus for SRL activities became urgent, especially in Africa where there are only three SRLs and where the need for laboratory strengthening is most pressing. A global consultation of the SRL network was therefore convened by WHO in 2010,

[a] http://www.finddiagnostics.org

[b] http://www.stoptb.org/gdf

[c] http://www.finddiagnostics.org/programs/tb/find-negotiated-prices/xpert_mtb_rif.html

[d] http://www.who.int/tb/laboratory/roadmap_xpert_mtb_rif_rev23dec2010.pdf

[e] http://www.who.int/tb/laboratory/whopolicyframework_july10_revnov10.pdf

[f] http://www.who.int/tb/challenges/mdr/srl_network_mar10.pdf

BOX 3 TB laboratory scale-up and engagement of private laboratories in India

The laboratory network of the Revised National TB Control Programme (RNTCP) in India currently consists of four designated NRLs at national level, 27 intermediate reference laboratories (IRLs) at the state level, and over 12 700 designated microscopy centres (DMCs) at the periphery. The IRL network was primarily intended, under the DOTS programme, for external quality assessment of sputum smear microscopy, surveillance for drug-resistant tuberculosis, and (very limited) culture and DST services for MDR-TB diagnosis.

To support the RNTCP 2012 goal to provide all acid-fast bacteria smear-positive retreatment patients with an MDR-TB assessment, and to provide follow-up cultures for an estimated 32 000 MDR-TB patients enrolled annually by 2015, the Government of India embarked on an ambitious plan to scale up laboratory capacity, with the support of several partners including private sector laboratories. Testing targets under this plan are for 160 000 people suspected of MDR-TB to have a quality-assured culture and drug-susceptibility test by 2015, and for over 330 000 follow-up cultures annually to be done to monitor MDR-TB patients receiving treatment. To achieve these service delivery targets, the national laboratory network is being strengthened substantially. In the public sector, 43 laboratories are being upgraded to accommodate high-throughput LPA, which will form the primary method for DST for patients suspected of MDR-TB. Automated liquid culture systems are being installed in 33 of these laboratories to monitor treatment.

The RNTCP has also collaborated with FIND in validation and demonstration studies of the Xpert MTB/RIF assay. In 2011–2012, India plans to introduce this newly WHO-endorsed technology at 18 sites. This should enable a diagnostic service for approximately 8 million people and aims to improve both the quality and accuracy of TB diagnosis for all TB suspects accessing healthcare services through either the private or public health sectors. The FIND-negotiated preferential pricing structure for the Xpert MTB/RIF assay is expected to favour strengthened public sector collaboration with the private health sector for TB diagnostic services.

The laboratory expansion plan for India is one of the most extensive in the world and provides a model for large-scale implementation of culture and DST services in collaboration with the private sector, a largely untapped resource in laboratory capacity development.

in Geneva. Revised terms of reference, and eligibility and inclusion criteria, were developed, endorsed and subsequently disseminated. Following this consultation, the national reference laboratories (NRLs) of Benin, Cameroon, Kenya, Madagascar, Rwanda and the United Republic of Tanzania were assessed in late-2010 as possible SRL candidates for Africa. An assessment of laboratories in Pakistan and Uganda is planned for early 2011.

Country progress in scaling up access to diagnosis of drug-resistant TB

Laboratory networks are well established in all 27 MDR-HBCs; all have capacity to perform DST of at least first-line anti-TB drugs at the central/NRL level and also at regional level in some of the countries. Most of the countries have functional links with the SRLs, which provide proficiency testing, external quality assurance and TB laboratory-related technical assistance. The exceptions are countries where the NRL is already part of the SRL (China, India, Latvia and South Africa) or the country is part of the European Union and implements sufficiently high standards for laboratory services (Estonia, Lithuania). Some of the bigger countries (such as the Russian Federation) have functional links to several SRLs based on need and technical specialty (e.g. for molecular testing).

The majority of countries report introduction of liquid culture and DST systems at least at the central level, and more than half of the 27 countries report using the newer line probe assay (LPA)-based DST as well. The extent of introduction of these newer TB diagnostic techniques varies by country. With active scale-up as a result of activities such as EXPAND-TB[a] the number of laboratory-confirmed MDR-TB cases is expected to increase dramatically over the next few years. Introduction of the Xpert MTB/RIF assay is expected to accelerate this trend and culminate in improved access to MDR-TB diagnostic services. Linking the increases in diagnostic capacity to increased access to appropriate treatment and patient management will be essential for successful MDR-TB control.

[a] The EXPAND-TB (Expanding Access to New Diagnostics for TB) Project is a collaboration between WHO, the Global Laboratory Initiative (GLI), the Foundation for Innovative New Diagnostics (FIND) and the Stop TB Partnership's Global Drug Facility (GDF). The EXPAND-TB Project aims to diagnose at least 129 000 patients with MDR-TB by 2013.

1.3 Improving surveillance of drug-resistant TB

Surveillance of anti-TB drug resistance is a crucial component of any TB control programme. Surveillance is needed to: a) measure the burden of drug-resistant TB and accurately plan treatment programmes with second-line drugs; b) assess epidemiological trends as a reflection of the effectiveness of implemented drug-resistant TB prevention and control activities; c) design effective empirical, standardized regimens for the treatment of TB, particularly for patients who have already been treated for TB and return with the disease; and d) promptly identify local outbreaks of drug-resistant TB in order to respond in a timely way.

In 2008, an estimated 390 000–510 000 cases of MDR-TB emerged globally (best estimate, 440 000 cases). Globally, 3.3% (95% confidence interval (CI: 3.0–3.6)) of incident new TB cases are estimated to have MDR-TB. Estimates by country are given in Annex 3.1.

Since the launch of the global anti-tuberculosis drug resistance surveillance project in 1994, drug resistance data have been systematically collected and analysed from 119 countries worldwide (62% of all countries of the world). Only 48 countries can rely on continuous surveillance systems based on routine diagnostic DST of all patients. The remaining 71 countries have relied on special surveys of representative samples of patients. Since 2006 WHO has also been collecting and analysing data on resistance to second-line anti-TB drugs with a total of 61 countries or settings, reporting results of DST to second-line drugs conducted during the course of surveys of surveillance activities (Annex 3.4). By March 2011, a total of 69 countries reported to have identified at least one case of XDR-TB (Map 1). Data on national trends in the drug-resistant TB epidemic are available from 83 settings worldwide. Such data are critical to understand whether TB and drug-resistant TB prevention and control measures under implementation by ncontrol programmes are effective. In two Russian oblasts, Orel and Tomsk, it was possible to document a reversal of the MDR-TB epidemic in new TB cases, believed to be due to the implementation of effective control measures. This is an important sign demonstrating that even in settings greatly affected by drug resistance, it is feasible to control and reverse the spread of the disease.

Progress in 2008–2010

In 2008–2010, great progress has been made in expanding coverage of drug resistance surveillance worldwide. Several countries, including Botswana, China, Mongolia, Mozambique, Myanmar, Namibia, Paraguay and Swaziland, have concluded country-wide surveys; Indonesia, Mexico, Tajikistan and Uganda have finished sub-national surveys (details of these surveys are given in Annex 3.5).

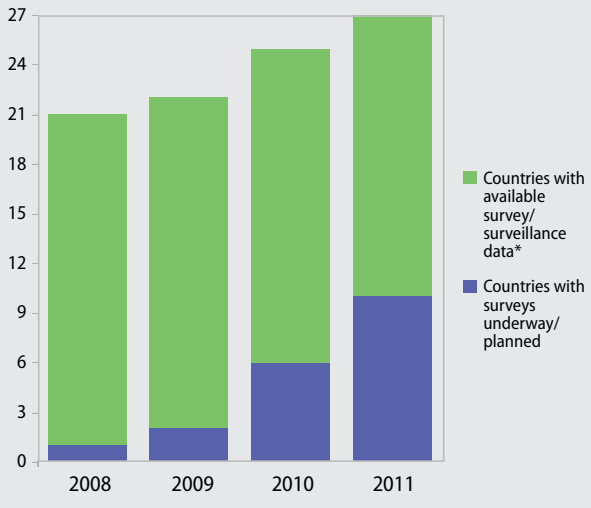
The survey in China revealed a proportion of MDR-TB of 5.7% in new TB cases (95%CI: 4.6–7.1) and 25.6% in previously treated cases (95%CI: 21.7–30.0). These findings suggest that China is the country with the greatest burden of MDR-TB globally. New data from Southern African countries indicate that MDR-TB is a growing problem in that region. Surveys in Botswana and Swaziland revealed a proportion of MDR-TB in new cases of 2.5% (95%CI: 1.5–3.5) and 7.7% (95%CI: 4.8–10.5), respectively. In both settings, the proportions of MDR-TB have increased in the past 15 years. This alarming finding is associated with the growing HIV epidemic in that region.

In 2008, representative drug resistance surveillance data were not available from 8/27 MDR-HBCs: Bangladesh, Belarus, Bulgaria, China, Kyrgyzstan, Nigeria, Pakistan and Tajikistan. By the end of 2010, China had reported results of a nationwide survey; Bulgaria and Nigeria had recently finished nationwide surveys; Bangladesh, Belarus, Kyrgyzstan and Tajikistan were in the middle of implementing nationwide surveys; and enrolment of patients into a nationwide survey was starting in Pakistan.

The number of countries or settings able to report high-quality continuous surveillance data has significantly increased in the past two years (Figure 5). Belarus, Georgia, the Former Yugoslav Republic of Macedonia, Jordan, the Republic of Moldova and

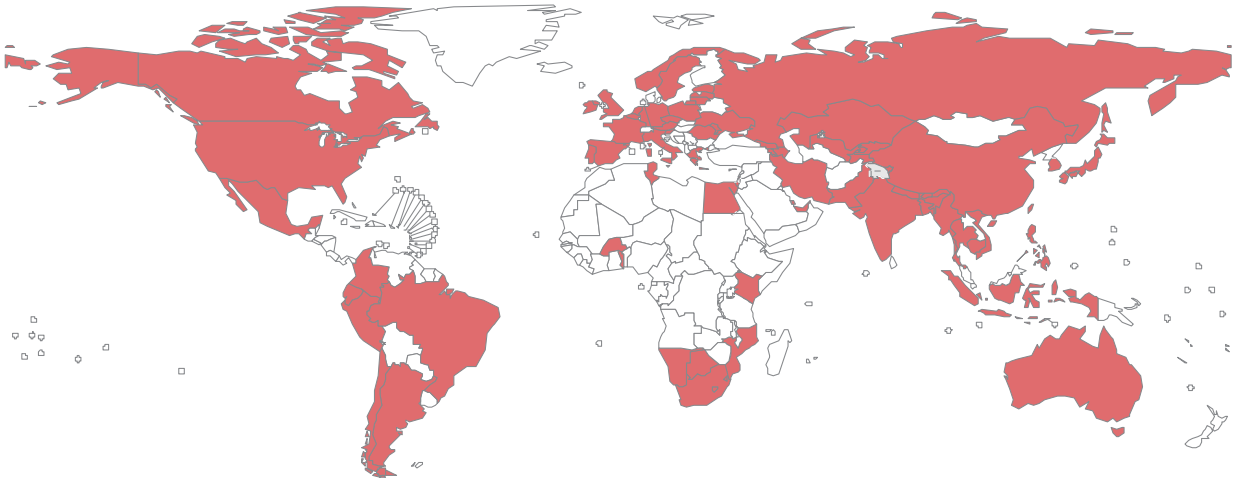
FIGURE 5

Status of drug resistance surveillance, 27 high MDR-TB burden countries, 2011



MAP 1

Global distribution of countries reporting at least one XDR-TB case by March 2011



12 oblasts of the Russian Federation now have advanced surveillance systems able to report results of routine DST conducted among all TB cases. Furthermore, a growing number of countries, including Bolivia, Chile, Colombia, El Salvador, Lebanon, Mongolia, and parts of Bangladesh have been able to routinely test previously treated TB cases and report the results for surveillance purposes. Details are provided in Annexes 3.2 and 3.3.

The importance of linking HIV information to DST results is becoming increasingly recognized by NTPs, which can use the information to determine the extent of overlap between the HIV and MDR-TB epidemics for implementation of targeted prevention and control measures. While very few settings were able to report HIV information linked to representative drug resistance surveillance data before 2008, a growing number of countries, including Botswana, Estonia, Latvia, the Republic of Moldova, Mozambique, Namibia and Swaziland, have since been able to do so.

Continuous surveillance of drug-resistant TB, which is based on DST of all TB patients, represents the gold standard for surveillance as reiterated by recent resolutions of the World Health Assembly. Several countries, including most of the MDR-HBCs, are not yet in a position to offer DST of all their TB cases and therefore special surveys still represent an important tool to measure the magnitude of drug resistance. Routine surveillance linked to patient care should be initially implemented among previously treated TB cases and gradually expanded to cover all TB cases, ultimately replacing special surveys.

However, until access to DST for all TB patients can be attained, special surveys remain the most feasible approach to investigate the magnitude of drug resistance.

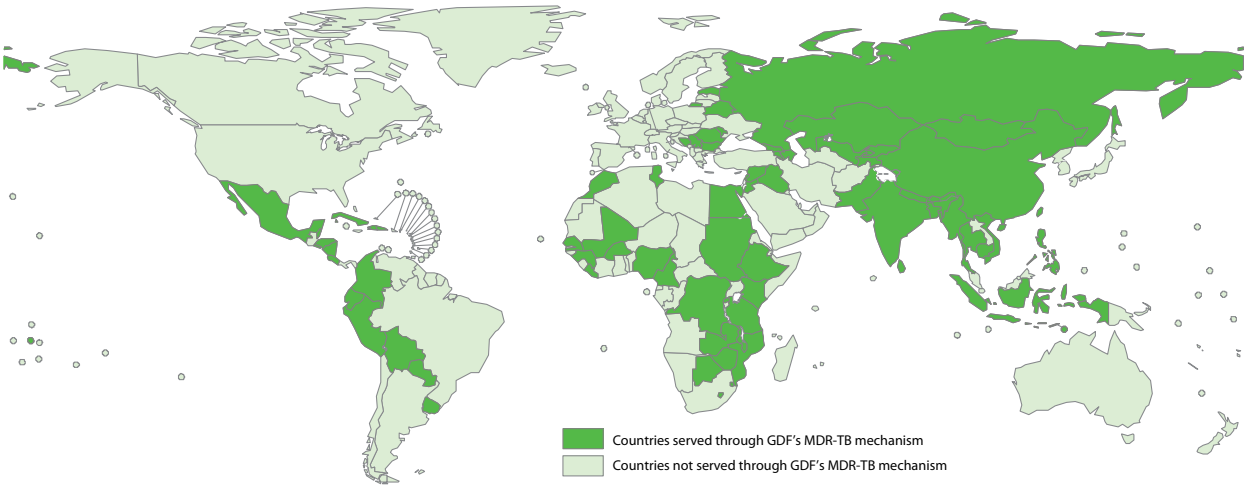
1.4 Ensuring access to quality-assured anti-TB medicines

Second-line anti-TB drugs (SLDs), the most active medicines against drug-resistant forms of TB, are expensive, toxic, and need to be taken for a long time (at least 18–21 months). Containing the spread of drug-resistant TB will be easier with drug regimens that are shorter, safer, more effective, appropriate for joint treatment with antiretroviral therapies (ART), child-friendly and amenable to routine programmatic conditions. Much progress has been made over recent years with the development of new drugs that are active against MDR-TB.[9] Five products are being assessed in clinical trials: three in Phase IIb trials (TMC207, OPC67683, Linezolid) and two in Phase 1 trials (PNU-100480, SQ109) and preliminary results are promising. In the meantime, the response to drug-resistant TB still depends on rational use of the currently available drugs.

The market of quality-assured SLDs has serious limitations for guaranteeing uninterrupted drug supply. Drug management in MDR-TB is further complicated by length of treatment, relatively short shelf-life and storage conditions for some products, and the number of drugs needed in approved regimens. The Global Drug Facility (GDF), an initiative

MAP 2

Global distribution of countries served by the Green Light Committee (GLC) or Global Drug Facility (GDF), 2007–2010



of the Stop TB Partnership that procures TB pharmaceuticals/diagnostics and related medical devices, is making strides to address the challenges of procuring second-line anti-TB drugs in a timely manner, meeting best international standards. Since 2007, GDF has procured medicines for 74 countries including 22/27 MDR-HBCs (Map 2).

The SLDs procured by GDF are WHO prequalified, approved by stringent drug regulatory authorities or, in exceptional cases, extensively assessed by an expert review panel convened by WHO. Major milestones achieved since the issue of the WHA resolution on MDR-TB are listed in Box 4.[a]

There are, however, other drug management and procurement issues that need to be addressed in order to guarantee uninterrupted delivery of quality drugs in a timely manner. Greater political commitment and action by drug registration authorities from some countries are urgently needed to facilitate and fast track the importation of WHO quality-assured drugs. Official recognition of the quality assurance standard of WHO-endorsed drugs would take away the need for extensive quality testing procedures at country level, which creates delays for drug delivery and disbursement. Strengthening national drug management and monitoring capacity continue to be priorities as evidenced by supply disruptions in some countries at both the central and peripheral levels. In addition, country programmes that do not meet or delay reporting on programmatic performance metrics will delay donor funding, leading to delays in procurement and delivery of SLDs.

The registration and/or importation of SLDs are complex issues in some countries, requiring a long time for completion. Important progress is observed in countries including the Russian Federation, for example, where recent changes in legislation limit the registration period to a maximum 210 days after submission. There were 19 countries that reported no SLD stock outs. Information on SLD stock out was unavailable for Armenia, Belarus and Pakistan. Two countries reported stock outs of at least 1 day at either central or peripheral level; two countries at central level; and one country at peripheral level. These examples clearly indicate the need for strengthening planning and drug management skills in the countries concerned. In general, a low number of countries reported stock outs at central and peripheral levels. This could be attributed to the progress in the supply system, drug management and improvements in forecasting. Still more work needs to be done to ensure sustainable supply and address growing need.

1.5 Updating WHO policies and guidelines to manage M/XDR-TB

The complexity of the programmatic management of MDR-TB and the limited body of evidence for patient management have pushed WHO to regularly

[a] Roadmap for MDR-TB management scale up: The Global Drug Facility (GDF). Increasing access to MDR-TB drugs through innovation and action. http://www.stoptb.org/assets/documents/resources/publications/plan_strategy/GDF%20ROADMAP%20FOR%20MDR%20TB%202010%20Final.pdf

BOX 4 Milestones of GDF in improving procurement of second-line anti-TB drugs

- Increased the number of finished second-line anti-TB pharmaceutical products/manufacturers available for procurement through GDF from 11 in 2008 to 25 in 2010;
- Tripled the number of suppliers of anti-MDR-TB products from 5 in 2008 to 15 in 2010;
- Negotiated stable prices for 12–24 months, for all products with no volume commitments; thus avoiding treatment cost fluctuations due to market volatility, currency fluctuations and manufacturing cost increases;
- Implemented a strategic rotating stockpile of 5 800 treatments funded by UNITAID, increasing access to drugs in emergency cases;
- Taken steps towards innovation, including a strategic revolving stockpile, a market allocation system and improved forecasting tools, all highly innovative approaches;
- Conducted trainings in MDR-TB drug management and procurement skills in Peru (March 2010), Rwanda (May), Georgia (July 2010), India (October 2010).

update guidance to countries. In 2011, new guidelines for MDR-TB management; pharmacovigilance, and ethics of prevention, treatment and care will be released, adding to the policy on infection control released in 2009.

Guidelines for the programmatic management of M/XDR-TB

The 2011 Update of the *WHO guidelines for the programmatic management of drug-resistant tuberculosis* is intended as a tool for health professionals to respond to the 62nd World Health Assembly resolution urging Member States to develop a comprehensive framework for the management and care of DR-TB.[10] The recommendations in the guidelines aim to address the most topical questions in MDR-TB control that require guidance be given to countries, using the best available evidence through appropriate review of data, and provide reference for countries developing their national guidelines and policies to scale up detection and treatment of MDR-TB. The update focuses on the detection and treatment of drug-resistant TB particularly in resource-limited settings, and is limited to topics not being covered by other WHO policy documents concurrently.

Introducing pharmacovigilance to TB control practice

Clinicians treating TB patients are usually well aware of the associated adverse drug reactions (ADR) of anti-TB drugs. The combination of drugs a patient is exposed to, and the length of treatment, increase the likelihood of ADRs, some of which are severe. Most patients on treatment for drug-resistant TB experience at least one side-effect, and a recent study has shown that two thirds of such patients have had at least one drug stopped temporarily or permanently as a result of ADRs.[11] These events affect patient adherence and damage public confidence in the national treatment programme.

Pharmacovigilance, a more systematic surveillance of drug-related problems, is urgently needed for several reasons. Firstly, as national TB control programmes are not usually measuring ADRs directly, the contribution of ADRs to death, treatment default and failure can therefore only be presumed. Secondly, the widespread recognition by health workers that anti-TB drugs often cause ADRs is poorly reflected in the published information on the subject. There is a dearth of literature about anti-TB drug-induced mortality, morbidity and loss in quality of life, particularly in low-resource settings. Thirdly, with the increasing use of more extensive regimens for drug-resistant TB, with the added use of ART in patients with HIV-associated TB, and with the imminent advent of new classes of drugs to treat TB, the case for improved pharmacovigilance becomes even stronger.

Events linked to medications need to be recognized in a timely fashion in order to implement measures to reduce harm and relieve symptoms. Health-care workers need to be informed and trained about the methodology and routes for reporting. A *Handbook on the pharmacovigilance of medicines used in the treatment of tuberculosis* due to be launched in mid-2011 will give practical advice on the subject to TB health-care workers. This handbook aims to satisfy this particular need which has been neglected in the domain of TB for too long.

Preventing, diagnosing and treating TB on solid ethical grounds

The emergence of MDR-TB has increased the visibility of ethical dilemmas that were usually neglected or marginally addressed in the past. In 2010, WHO launched the *Guidance on ethics of tuberculosis prevention, care and control*.[12] The guidance supports

countries and their national TB control programmes, TB service-providers, policy-makers and civil society to implement TB prevention, care and control efforts in an ethical manner. The document is the first of its kind to address a broad range of ethical issues arising in TB programmes, ranging from informed consent and isolation to health-care workers' rights and obligations, and clinical and epidemiological studies. Teaching and training modules, along with cases studies for interactive group discussions, will be produced in 2011 to facilitate the adoption of the guidance.

1.6 Treating and caring for people affected by MDR-TB

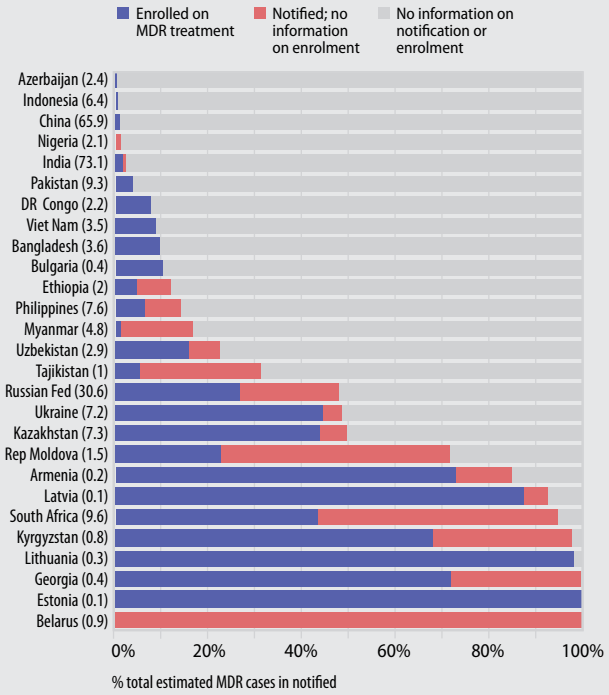
Notification of MDR-TB cases and enrolment on treatment

In 2009, among the 4.7 million new, relapsed and retreated TB patients notified by the 27 MDR-HBCs, close to 250 000 cases were estimated to have MDR-TB. These cases would be detectable if DST was more widely available, especially in the previously treated and other TB patients at risk of drug-resistant TB. However, only 16% of these cases were notified to WHO by countries; notification ranged from 90–100% in seven countries but was less than 5% in six others (Figure 6).

Twenty-five countries reported information on enrolments on MDR-TB treatment among their notified cases: the proportion of notified cases that were enrolled on treatment ranged from 1% to 100% in these countries (median 10%). The proportion of notified cases that were enrolled on treatment ranged from 1% to 100% (median 8%). Of the expected MDR-TB among notified TB cases, enrolments represented 10% (24 511/250 000) in the 27 MDR-HBCs and 11% (30 475/280 000) globally. The low level of notification is due to under-detection as a result of limited laboratory capacity in many resource-challenged settings, as well as problems with reporting of data. Drug-susceptibility testing is often of unknown quality and as a result MDR-TB may be incorrectly diagnosed. Enrolment is also subject to under-reporting. Treatment facilities are often deficient in low-resource settings, with limitations in availability of drugs. There is also a lack of information about the quality of care: only one third of the patients enrolled in 2009 in the MDR-HBCs were in projects monitored by the GLC.

FIGURE 6

MDR-TB cases notified and enrolled on treatment, 2009*



* As a proportion of the estimated number of MDR-TB cases among notified TB patients; this MDR-TB estimate (in thousands) is indicated in brackets next to the country names.

Treatment outcomes in high MDR-TB burden countries[a]

This section presents the treatment outcome data for MDR-TB patients as reported to WHO by the MDR-HBCs. Globally, 13 countries provided final outcome data on treatments for MDR-TB cases who started treatment in 2007 (Table 2). Nine countries reported outcomes from sites where TB management and drug quality are monitored by the GLC, while in four – Bangladesh, Bulgaria, Kazakhstan and South Africa – no GLC project was in place in 2007.

Outcomes were reported for cohorts composed of a total of 7063 MDR-TB cases. Information on outcome was missing for 0–23% of the cases included (median: 3%). The size of the cohorts varied from 57 cases in Armenia to 3815 in South Africa (median size: 132). The number of cases assessed represented 45% of all MDR-TB cases that were identified and notified (country range: 23% to >100%), but less than a fifth of all the MDR-TB cases expected to have occurred among the TB cases notified by these countries in the same year. In Bangladesh, Democratic Republic of the Congo, Kazakhstan, Latvia

[a] Treatment outcomes for MDR patients treated in 2007

TABLE 2

Treatment outcomes for MDR-TB patient cohorts in the 27 high MDR-TB burden countries, 2007

Country	MDR-TB cases notified in 2007	Cohort	Cured	Completed	% Successfully treated	Died	Failed	Defaulted	No information
Armenia	125	57	25	5	53%	6	5	14	2
Azerbaijan	196	–	–	–	–	–	–	–	–
Bangladesh*	0	106	86	1	82%	10	0	9	0
Belarus	870	–	–	–	–	–	–	–	–
Bulgaria*	82	76	15	4	25%	34	13	6	4
China	79	–	–	–	–	–	–	–	–
DR Congo	15	147	9	80	61%	20	6	21	11
Estonia	80	81	44	2	54%	11	6	18	0
Ethiopia	145	–	–	–	–	–	–	–	–
Georgia	269	61	5	18	38%	12	2	15	9
India	146	–	–	–	–	–	–	–	–
Indonesia	0	–	–	–	–	–	–	–	–
Kazakhstan*	5568	1609	1088	149	77%	72	64	57	179
Kyrgyzstan	322	132	60	6	50%	7	11	47	1
Latvia	98	99	58	5	64%	15	5	15	1
Lithuania	314	–	–	–	–	–	–	–	–
Myanmar	600	–	–	–	–	–	–	–	–
Nigeria	45	–	–	–	–	–	–	–	–
Pakistan	0	–	–	–	–	–	–	–	–
Philippines	568	296	155	32	63%	32	11	62	4
Republic of Moldova	896	254	124	9	52%	21	21	75	4
Russian Federation	5297	–	–	–	–	–	–	–	–
South Africa*	7350	3815	845	756	42%	778	182	365	889
Tajikistan	0	–	–	–	–	–	–	–	–
Ukraine	0	–	–	–	–	–	–	–	–
Uzbekistan	484	330	106	74	55%	32	33	76	9
Viet Nam	0	–	–	–	–	–	–	–	–

* Treatment outcome data not from GLC project.

and the Philippines, treatment success was reported to be higher than 60%. Countries reported deaths in 4%–45% (median: 11%) and default in 3%–36% of cases (median: 21%). In countries with success below 60%, defaults were high (median: 25%) and in one, a non-GLC site, low success was associated with the highest levels of death and failure among the 13 countries. (Table 2).

The data on treatment outcomes of MDR-TB patients remain incomplete, with very few countries having outcomes reported for all the MDR cases detected. This probably reflects different degrees of challenges in diagnostics, capacity for treatment or in the reporting and organization of data. The low levels of success and the high degrees of failure and default may be a result of inadequate regimens when addressing MDR-TB patients with additional drug resistance. High deaths are to be expected in settings with a high frequency of HIV/MDR-TB and where access to ART is problematic.

Supporting countries to scale up management of MDR-TB through the Green Light Committee Initiative

The Green Light Committee (GLC) Initiative helps countries gain access to quality-assured second-line anti-TB drugs for the treatment of MDR-TB, in line with the WHO guidelines. The initiative consists of a secretariat, the GLC (an expert review WHO advisory body) and the Global Drug Facility (the drug procurement arm).

From its inception until 2010, the GLC has approved 234 applications from 133 projects in 83 countries. It has approved applications from these sites for over 100 000 MDR-TB patients (Table 3). The overall approval rate of applications received was 94% (234/248). For patients approved for treatment, 75% correspond to programmes expanding treatment cohorts. Forty-three projects in 24 countries enrolled more patients in 2009 than in 2008. Provisional data about new enrolments from 28 of the 65 countries implementing GLC projects by 2010 amounted to well over 10 000, so enrolments are expected to exceed levels achieved in 2009. This reflects the progress made implementing programmatic management of drug-resistant tuberculosis (PMDT) as a result of country-wide MDR-TB treatment scale-up plans.

Since 2000, 303 technical assistance missions have been carried out through the GLC Initiative; more than 50% were carried out between 2008 and 2010.

TABLE 3

Number of applications and patients approved by the Green Light Committee, 2000–2010

Year	No. of GLC applications approved	No. of patients approved
2000	2	1 000
2001	3	1 180
2002	1	800
2003	9	2 099
2004	17	4 630
2005	12	2 191
2006	25	12 954
2007	24	5 212
2008	39	19 652
2009	44	13 389
2010	58	42 033
TOTAL	**234**	**105 140**

Enrolment and treatment outcomes in programmes supported by the GLC

A total of 29 418 MDR-TB cases were reported to be enrolled on treatment in 92 GLC-approved projects (54 countries) from 2000 to 2009. Figure 7 shows the annual and cumulative number of patients enrolled during this period. Over 50% of the total number of patients on treatment was enrolled in 2008 and 2009. Thirty percent of cases enrolled had no previous anti-TB treatment history, while 50% were reported as having previously received anti-TB treatment. In the remainder, prior history was unknown or could not be classified in one of the other categories shown in Figure 8.

FIGURE 7

Annual and cumulative number of MDR-TB patients enrolled on treatment in GLC-approved projects, 2000–2009

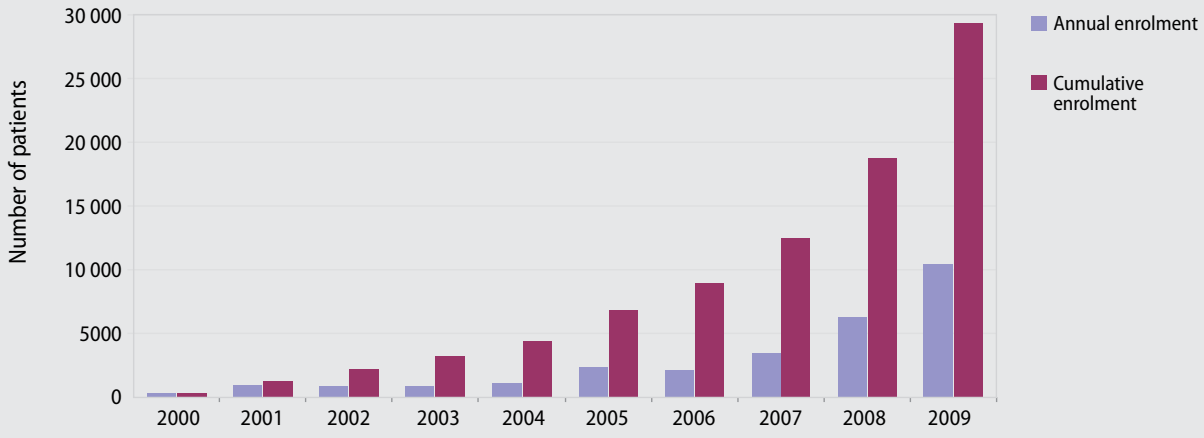
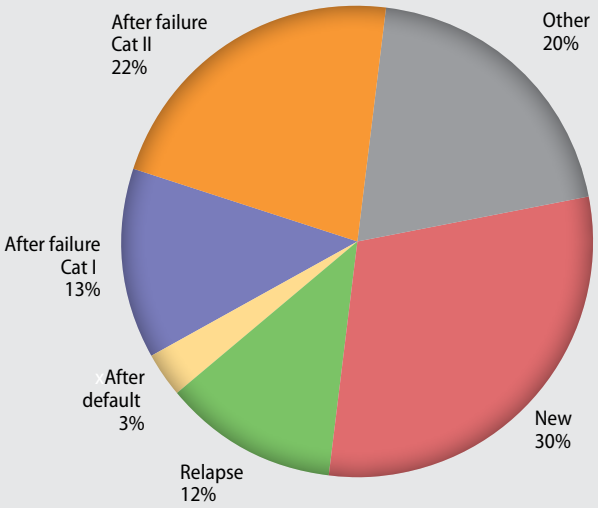


FIGURE 8

Distribution by history of previous treatment of MDR-TB cases enrolled on treatment in projects approved by the Green Light Committee, 2000–2009 (N=29 418)



Outcome data were available for 12 535 MDR-TB cases enrolled in programmes using the GLC over the period 2000 to 2007. The number of projects reporting outcomes increased progressively to 44 in 2007, while the number of cohorts with information available and the overall number of cases on treatment also increased (Table 4). The proportion of cases successfully completing treatment has remained stable over time although a dip in overall success in 2006–2007 has been observed. This was accompanied by an increase in the number of cases reported without treatment outcomes in 2006–2007, largely as a result of delayed recovery of outcome results in a number of countries. The overall proportion of deaths and failures also decreased slightly over time. These observations are not indicative of the global achievements of the programmes using the GLC as they mask wide variations in the performance of individual projects. For instance, success ranged between 41% and 77%, and death from 5% to 24% in the 15 projects reporting >25 cases and with outcome information on >90% of patients started on treatment in 2006.

Alignment with WHO policy/guidelines/training material

Among the 27 MDR-HBCs, 23 have developed guidelines for the programmatic management of drug-resistant TB (PMDT). Some 21 countries have developed training materials for MDR-TB and 22 countries have organized training specifically for MDR-TB.

Models of care for PMDT

Among the 27 MDR-HBCs, 24 require hospitalization of MDR-TB cases during the intensive phase of treatment. MDR-TB drugs are free of charge in all countries, but achieving a diagnosis can cost a great deal. All MDR-HBCs provide social support to promote adherence to treatment. Social support may include food packages, transportation vouchers, counselling and psychosocial support, among others.

TABLE 4

Treatment outcomes for TB patient cohorts receiving second-line treatment in projects approved by the Green Light Committee, by year, 2000–2007

Year	Number of Projects	Cohort size (N)	Treatment success*(%)	Died (%)	Failed (%)	Defaulted (%)	No information** (%)
2000	4	342	71%	11%	10%	8%	
2001	6	1015	64%	14%	9%	13%	
2002	7	945	63%	13%	8%	15%	1%
2003	9	965	63%	12%	8%	16%	1%
2004	12	1216	62%	10%	7%	19%	2%
2005	23	2379	65%	9%	8%	15%	3%
2006	32	2174	58%	9%	8%	15%	10%
2007	44	3499	40%	9%	5%	15%	31%

* Refers to patients who were cured or completed treatment.

** Includes patients who Transferred Out, were Still on Treatment and Unknown.

1.7. Status of progress at country level

Table 5 summarizes the key epidemiology, strategy and financial indicators contained in the country profiles for the 27 MDR-HBCs (Annex 2). The profiles are aimed at informing policy-makers and their partners about the situation in each country and to assess progress and prioritize actions in the effort to control MDR and reduce the mortality associated with it. They are based on the most recent data available that countries have reported to WHO, either through the WHO annual data collection or in response to a questionnaire designed specifically for the purpose of the current publication. Data on case notification and enrolment may not always be linked at a national level and while all data published in the country profiles have been validated by countries, some inconsistencies may remain. Indicators covered in the MDR country profiles include: MDR-TB burden, diagnostic capacity, drug management, status of MDR expansion plans, human resources and financial flows and major bottlenecks hindering progress to achieve universal access to MDR-TB care.

While nearly all countries report having a nationally-endorsed PMDT expansion plan, the actual number of MDR-TB patients diagnosed and enrolled on treatment remains very low. In 2009, only 16% of expected cases of MDR-TB among TB cases notified by the 27 countries were reported to WHO, and less than 10% in 10 of the countries. Treatment success of MDR-TB patients started on treatment in 2007 was only reported by 13 counties. No outcome data were yet available for the countries with the highest caseload of MDR-TB (China, India and the Russian Federation). Success tended to be low as a result of high mortality in Bulgaria and South Africa, as well as high defaults and missing information in the remainder of MDR-HBCs. Nationwide data from anti-TB drug resistance surveillance were available in 17 countries. Not all these data are fully representative and in three countries (Belarus, Bulgaria and Ukraine) the country-wide drug resistance levels used in this report are still based on modelled estimates. In the Russian Federation, estimates are averaged over a number of quality-assured centres throughout the country. In three countries, data refer to surveys dating from before 2005 (Kazakhstan, the Philippines and South Africa). While drug resistance survey data have improved in recent years, and a number of countries such as Bulgaria, Nigeria and Uzbekistan are currently completing surveys, more efforts are needed to improve coverage and commence surveys in other countries. Only 14 former Soviet Union countries and South Africa had more than one laboratory performing DST per 10 million population; the remainder had less than one. Quality of DST varies markedly between laboratories and even a ratio above one does not necessarily imply adequate diagnostic capacity. National infection control plans were present in only 11 countries, although information on the degree of implementation was not available.

Table 6 presents a summary of the major bottlenecks to diagnose, treat and care MDR-TB patients, as identified by the countries. The bottlenecks can be grouped into six major categories, which include: case finding; laboratory capacity; weak programme management; human resource capacity; financing; and access to quality-assured second-line drugs. Most of the countries identified weak programme management and limited human resource capacity as common bottlenecks.

TABLE 5

Status of capacity for programmatic management of M/XDR-TB in 27 high MDR-TB burden countries

Country	Estimated cases of MDR-TB among notified cases of pulmonary TB, 2009 (in thousands)	Notified cases of MDR-TB, 2009	Cases of MDR-TB enrolled on treatment in 2009	Treatment success for MDR-TB patients started on treatment in 2007	Nationwide survey/ surveillance data on MDR TB available	Number of DST laboratories per 10 million population, 2009*	National Reference Laboratory 2009	Stock out of second-line drugs**	National Guidelines for PMDT	PMDT expansion plan officially approved by 2010	National infection control plan
Armenia	0.18	156	134	53%	Yes	3.2	Yes	No	Yes	Yes	Yes
Azerbaijan	2.40	–	–	–	No	2.3	Yes	Yes		Yes	No
Bangladesh	3.60	–	352	82%	No	<0.1	Yes	No	Yes	Yes	Yes
Belarus	0.90	1 342	–	–	Yes	22.8	Yes	–		Yes	Yes
Bulgaria	0.42	43	43	25%	Yes	29.2	Yes	No	Yes	Yes	No
China	66	474	458	–	Yes	1.0	Yes	No	Yes	No	Yes
DR Congo	2.20	91	176	61%	No	0.2	Yes	No	Yes	–	No
Estonia	0.08	86	86	57%	Yes	14.9	Yes	No	Yes	Yes	No
Ethiopia	2.00	233	88	–	Yes	0.2	Yes	No	Yes	Yes	Yes
Georgia	0.37	369	266	38%	Yes	2.3	Yes	No	Yes	Yes	No
India	73	1 660	1 136	–	No	0.1	Yes	Yes	Yes	Yes	No
Indonesia	6.40	–	20	–	No	0.2	No	No	Yes	Yes	Yes
Kazakhstan	7.30	3 644	3 209	77%	Yes	14.1	Yes	No		Yes	No
Kyrgyzstan	0.80	785	545	50%	No	5.5	Yes	No	Yes	Yes	No
Latvia	0.14	131	124	64%	Yes	4.4	Yes	No	Yes	Yes	Yes
Lithuania	0.33	322	322	–	Yes	12.2	Yes	No	Yes	Yes	No
Myanmar	4.80	815	64	–	Yes	0.4	Yes	No	Yes	Yes	No
Nigeria	2.10	28	–	–	No	0.2	Yes	No	Yes	Yes	–
Pakistan	9.30	49	368	–	No	0.6	Yes	–	Yes	Yes	No
Philippines	7.60	1 073	491	63%	Yes	0.3	Yes	No	Yes	Yes	Yes
Republic of Moldova	1.50	1 069	334	52%	Yes	11.1	Yes	No	Yes	Yes	Yes
Russian Federation	31	14 686	8 143	–	Yes	19.3	No	No	No	Yes	–
South Africa	9.60	9 070	4 143	42%	Yes	3.2	Yes	Yes	Yes	Yes	Yes
Tajikistan	1.00	319	52	–	No	1.4	Yes	No	Yes	Yes	No
Ukraine	7.20	3 482	3 186	–	Yes	10.1	Yes	Yes	Yes	Yes	No
Uzbekistan	2.90	654	464	55%	No	0.7	Yes	No	Yes	Yes	–
Viet Nam	3.50	217	307	–	Yes	0.2	Yes	No	Yes	Yes	Yes
	250	**40 798**	**24 511**								

* DST laboratory should be 1 per 10 million population, as per WHO guidelines.

** Stock out is defined as shortage of anti-TB drugs in central or peripheral centres even for one day.

Cells in violet indicate non-adherence to the respective WHO policy or standards.

TABLE 6

Bottlenecks to scaling up management of MDR-TB in 27 high MDR-TB burden countries

Armenia	**Access to quality-assured second-line drugs:** weak drug management.
Azerbaijan	**Laboratory capacity and quality assurance:** limited laboratory capacity. **Qualified M/XMDR-TB treatment (human resources, facilities):** limited human resource capacity to manage MDR-TB. **Financing:** lack of funds for first-line drugs and weak commitment of NTP.
Bangladesh	**Programme management:** a significant number of diagnosed patients are not receiving treatment. **Laboratory capacity and quality assurance:** limited laboratory capacity. **Qualified M/XMDR-TB treatment (human resources, facilities):** limited human resource capacity to manage MDR-TB. **Financing:** funds to be identified for full scale-up. Delays in disbursing funds are causing delays in starting treatment.
Belarus	**Qualified M/XMDR-TB treatment (human resources, facilities):** limited human resource capacity for MDR-TB. **Access to quality-assured second-line drugs:** decentralized drug procurement system is not efficient.
Bulgaria	**Qualified MDR/XDR-TB treatment (human resources, facilities):** need to increase the number of staff involved in MDR-TB management at central level and MDR-TB treatment sectors.
China	**Issues in case-finding or enrolment for treatment:** delays in diagnosis and treatment initiation in selected sites. **Laboratory capacity and quality assurance:** new tools need to be incorporated in the national plan and match treatment capacity. **Qualified M/XMDR-TB treatment (human resources, facilities):** human resource capacity for MDR-TB is limited in quantity and quality; facilities for infection control are insufficient. **Access to quality-assured second-line drugs:** no quality assurance for second-line drugs outside the Global Fund project area.
DR Congo	**Programme management:** delay in signing memorandum of understanding between Expand-TB and Ministry of Health; insufficient implementation of MDR-TB. **Laboratory capacity and quality assurance:** weak laboratory capacity. **Qualified M/XMDR-TB treatment (human resources, facilities):** limited human resource capacity. **Access to quality-assured second-line drugs:** weak drug management.
Estonia	**Qualified MDR/XDR-TB treatment (human resources, facilities):** limited access to some third-line drugs (linezolid, clofazimine) for treatment of patients with XDR-TB.
Ethiopia	**Issues in case-finding or enrolment for treatment:** huge backlog of diagnosed cases. **Qualified M/XMDR-TB treatment (human resources, facilities):** limited human resource capacity and high staff turnover.
Georgia	**Issues in case-finding or enrolment for treatment:** involvement of private health-care providers needs strengthening. **Financing:** need to increase NTP staff salaries and incentives for patients.
India	**Laboratory capacity and quality assurance:** although expanding, limited laboratory capacity for diagnosis and follow-up of MDR-TB patients. Limited availability of second-line drugs and DST. Need for implementation of high-throughput diagnostics. Specimen transportation infrastructure is needed in the general health system. **Qualified MDR/XDR-TB treatment (human resources, facilities):** limited human resource capacity to undertake required pre-implementation training and assessments. **Financing:** funding envelope is limited and unable to accommodate scale-up as envisaged with rising costs of second-line drugs.

Continues…

Indonesia	**Programme management:** at early stages of initiating programmatic management of drug-resistant TB; poor commitment of decision-makers and related sectors for uninterrupted funding and to ensure the continuation of such activities; delay in initiating the programme. **Laboratory capacity and quality assurance:** limited laboratory capacity for culture and DST. Only five NRLs are certified to carry out DST of first- and second-line drugs. Expansion of the TB laboratory network requires more capability for MDR-TB culture and identification, and should accord with expansion of the programmatic management of drug-resistant TB.
Kazakhstan	**Programme management:** weak implementation capacity at the regional level.
Kyrgyzstan	**Qualified MDR/XDR-TB treatment (human resources, facilities):** limited human resource capacity. **Other:** unstable political situation.
Latvia	
Lithuania	**Programme management:** lack of appointed manager and supervisors for national TB control. **Laboratory capacity and quality assurance:** insufficient quality control for DST carried out by NRLs or SRLs. **Access to quality-assured second-line drugs:** supply interruptions caused by the existing decentralized drug procurement system.
Myanmar	**Issues in case-finding or enrolment for treatment:** for the pilot phase, only Category 2 failures are included. The pilot phase will end in summer 2011; thereafter the patient categories for DST will be expanded to include Category 1 failures. **Laboratory capacity and quality assurance:** limited to Yangon and Mandalay; quality is good according to SRL in Bangkok and FIND. **Qualified M/XMDR-TB treatment (human resources, facilities):** for pilot phase, human resources situation is under control but for expansion, training and additional staff are needed. **Financing:** dependent on external resources.
Nigeria	**Programme management:** delayed Global Fund grant negotiation as a result of lack of MDR-TB response plan. **Laboratory capacity and quality assurance:** limited laboratory capacity. **Qualified M/XMDR-TB treatment (human resources, facilities):** limited hospitalization capacity; limited human resource capacity. **Access to quality-assured second-line drugs:** additional drugs to be procured under Global Fund Round 9.
Pakistan	**Issues in case-finding or enrolment for treatment:** delay in negotiating Global Fund grant. **Programme management:** limited experience. **Qualified MDR/XDR-TB treatment (human resources, facilities):** limited number of prepared facilities and human resources. **Other:** under-budgeting (using Global Fund Round 6) resulted in a request for half of the intended number of treatment target. MDR-TB care in prisons to be addressed after strengthening DOTS services.
Philippines	**Issues in case-finding or enrolment for treatment:** patient enrolment remained below target enrolment; delay in the start of treatment caused by long waiting times for the results of culture and DST. **Programme management:** limited monitoring of patients from case-finding to initiation of treatment; limited implementation of standardized treatment regimen; long installation process of culture and treatment centres. **Laboratory capacity and quality assurance:** rapid diagnosis is not used. **Qualified MDR/XDR-TB treatment (human resources, facilities):** not yet accessible nationwide. **Other:** the transition from the TDF to PBSP was a major challenge.
Republic of Moldova	**Issues in case-finding or enrolment for treatment:** late diagnosis of MDR-TB. **Programme management:** training for staff needed. **Laboratory capacity and quality assurance:** insufficient rapid tests for drug resistance to detect MDR-TB and XDR-TB. **Qualified MDR-/XDR-TB treatment (human resources, facilities):** insufficient human resources. **Financing:** limited financial resources for MDR-TB.

Continues…

Russian Federation	**Programme management:** insufficient integration of TB control with the health-care system. **Qualified M/XMDR-TB treatment (human resources, facilities):** limited human resource capacity for MDR-TB. **Access to quality-assured second-line drugs:** continuing supply of second-line drugs for GLC-approved projects and in other regions; potential risk of discontinued support from the Global Fund.
South Africa	**Issues in case-finding or enrolment for treatment:** gap between patient diagnosis and enrolment for treatment. **Programme management:** centralized model; poor patient tracking mechanism.
Tajikistan	**Issues in case-finding or enrolment for treatment:** weak integration with primary health-care providers. **Programme management:** weak health systems and integration with the health system; no electronic-based data management system. **Qualified MDR/XDR-TB treatment (human resources, facilities):** limited human resource capacity for MDR-TB management; weak infection control measures; low adherence to treatment of MDR-TB patients; work overloading and low motivation of primary health-care personnel. **Financing:** weak domestic financing.
Ukraine	**Programme management:** frequent changes of management in the Ministry of Health. **Laboratory capacity and quality assurance:** low laboratory capacity; quality assurance is partially implemented. **Qualified M/XMDR-TB treatment (human resources, facilities):** patient-oriented approach is not implemented. **Financing:** lack of financing.
Uzbekistan	**Programme management:** weak health systems and integration with the health system. **Qualified MDR/XDR-TB treatment (human resources, facilities):** limited human resource capacity for MDR-TB.
Viet Nam	**Qualified M/XMDR-TB treatment (human resources, facilities):** limited human resources capacity for MDR-TB. **Access to quality-assured second-line drugs:** delays in drug delivery; weak drug management capacity.

BOX 5 South Africa – Scaling up access to M/XDR-TB care

South Africa, a high MDR-TB burden country, is making strides towards universal access to diagnosis and treatment of M/XDR-TB care. Since 2007, the country accelerated efforts to diagnose everyone with MDR-TB, including the use of new tools like line probe assays (LPA) (see Table 1).

Table 1. Distribution of annual volume of TB diagnostics tests in South Africa

Year	Culture	Microscopy	DST LPA	DST MGIT
2004	273 829	1 815 333		34 542
2005	349 246	2 300 241		36 871
2006	481 757	2 720 813		48 049
2007	581 671	2 927 017	5963	64 943
2008	729 424	3 373 134	23 126	58 887
2009	759 643	3 276 347	61 423	39 334
2010 (Q1 & 2)	422 106	2 224 766	45 133	15 704

The original strategy of hospitalization till culture conversion and poor tracing mechanisms are the major reasons for thousands of diagnosed MDR-TB patients without access to treatment, while transmission is maintained in the community. In 2009 a process was begun to decentralize management of MDR-TB by engaging communities and primary health-care services, while reducing hospitalization until smear conversion. This policy is freeing up ~2 000 hospital beds and increasing access to treatment (see Table 2). In parallel, the WHO policy for infection control is being adopted countrywide, and collaboration with the HIV programme has improved dramatically. Scaling-up of isoniazid preventive therapy (IPT) to prevent TB, for example, has resulted in more than 50 000 people living with HIV started on IPT between January and June 2010 as part of the HIV testing campaign. The response to MDR-TB in South Africa is totally funded with domestic sources.

Table 2. Number of M/XDR-TB patients diagnosed and enrolled on treatment, by year, 2007–2009

Year	MDR-TB		XDR-TB	
	Diagnosed	Enrolled on treatment	Diagnosed	Enrolled on treatment
2007	7 429	3 334	458	474
2008	8 198	4 031	488	391
2009	9 070	4 143	594	431

PART 2:

Prevention of M/XDR-TB through basic TB control

2.1 Strengthening basic TB control

As drug-resistant TB is largely a man-made condition, its prevention relies heavily on the effectiveness with which control efforts succeed to treat TB patients in both the public and the private sectors. Poor treatment adherence is an important cause of emergence and spread of MDR-TB. Having a strong and sustained control programme for drug-susceptible TB in place provides a solid foundation on which to add a component for MDR-TB treatment. With a vision of a "TB-free world", the WHO Stop TB strategy aims to address all the major constraints and challenges to global TB control, including DOTS, the internationally-recommended approach to basic TB control. In 2009, 180 countries were implementing DOTS.

Data on DOTS implementation, which are collected annually from countries, demonstrate the continuing progress achieved in basic TB control. The global detection of TB cases has increased over the years but still falls short of the 70% target. The best global estimate in 2009 was 63%. The low levels of detection in the African and South East Asia Regions were largely responsible for this low figure. Low detection may be a combined result of failure by patients to seek TB care, poor diagnostic capacity and ineffectual reporting of diagnosed cases.

Globally, 86% of new sputum smear-positive cases of pulmonary TB who were treated in 2008 had a successful outcome, a little above the global target of 85%. Despite the attainment of this global target, closer scrutiny of regional and national surveillance data indicate that future progress in basic TB control may be threatened. Treatment success in new TB cases has increased since 1995 in all regions except the European Region in recent years, where deaths and failures have increased. Improvements in success, seen in most other regions in recent years, appear to be levelling off. Among previously treated TB cases, overall success was 72% in 2008, with higher levels of default (10%), death (7%) and failure of treatment (5%) than among the new cases (5%, 4% and 2% respectively). In the European Region, where overall success in retreated TB patients had declined to 47% by 2008, 21% of cases failed treatment (reaching 29% in the Russian Federation and 32% in Kazakhstan) and 12% defaulted (up to 25% in Azerbaijan and 21% in Armenia). This high level of failure in countries of eastern Europe, which have some of the highest levels of drug-resistant TB in the world, most probably mirrors the inadequate treatment of this sub-group of patients. Treatment interruption among both new and retreated patients is expected to compound this problem.

Table 7 focuses on the key performance indicators for basic TB control in the 27 MDR-HBCs. These countries reported 4.4 million new and relapsed TB cases out of the 5.8 million reported globally in 2009. In 14 of these countries, however, the case detection ratio was lower than the 70% target. Moreover, in 15 of the 27 MDR-HBCs, TB incidence was stable or increasing in 2009. In more than half the countries (17), treatment success among new smear-positive cases was below the target of 85% in 2008. Fourteen of these countries were from eastern Europe.

Poor performance in identifying TB cases may also mean that many of the drug-resistant TB cases are also escaping detection. An incremental trend in TB incidence is expected to enlarge the pool of drug-resistant TB cases in some countries. The performance of TB programmes in certain countries is being undermined by the high levels of drug resistance. Early identification of drug resistance even in TB patients not previously treated, and the institution of adequate treatment, could reduce a number of avoidable deaths, improve success rates and reduce amplification and transmission of resistant TB strains.

2.2 Engaging all health-care providers

In most resource-poor countries with a high TB burden, patients with symptoms suggestive of TB seek care from a wide array of health-care providers, who are often not linked to national TB control programmes. Evidence indicates that many of these patients are managed in inappropriate,

TABLE 7

TB incidence and detection of TB (2009) and treatment outcomes for new smear-positive TB cases (2008) in 27 high MDR-TB burden countries

	Estimated incidence* (thousands)		Notified new and relapse cases	Estimated case detection rate* (all forms)		Treatment outcomes, new smear-positive, 2008 (%)		Incidence declining?
						Success	Unfavourable**	
Armenia	2.2	(1.8–2.7)	1 560	70	(58–85)	73	20	No
Azerbaijan	9.7	(7.9–12)	7 301	75	(63–93)	56	15	No
Bangladesh	360	(300–440)	160 875	44	(37–54)	91	6	No
Belarus	3.8	(3.1–4.5)	5 250	140	(120–170)	71	19	Yes
Bulgaria	3.1	(2.7–3.6)	2 683	86	(75–100)	85	14	Yes
China	1 300	(1 100–1 500)	965 257	75	(66–86)	94	3	Yes
DR Congo	250	(200–300)	112 222	46	(38–56)	87	9	Yes
Estonia	0.4	(0.36–0.47)	361	89	(77–100)	60	39	Yes
Ethiopia	300	(240–360)	148 936	50	(42–62)	84	7	Yes
Georgia	4.5	(4–5.1)	4 732	100	(93–120)	73	23	No
India	2 000	(1 600–2 400)	1 351 913	67	(56–83)	87	12	No
Indonesia	430	(350–520)	292 754	67	(56–83)	91	7	No
Kazakhstan	26	(21–30)	20 508	80	(68–96)	64	34	Yes
Kyrgyzstan	8.7	(7.1–11)	5 765	66	(55–81)	84	14	No
Latvia	1	(0.88–1.1)	951	94	(83–110)	33	10	Yes
Lithuania	2.3	(2–2.7)	1 895	81	(70–95)	82	18	No
Myanmar	200	(160–240)	128 343	64	(53–78)	85	13	No
Nigeria	460	(370–550)	88 589	19	(16–24)	78	15	Yes
Pakistan	420	(340–500)	264 248	63	(52–78)	90	7	No
Philippines	260	(210–310)	146 565	57	(47–70)	88	7	Yes
Republic of Moldova	6.4	(5.2–7.7)	4 347	68	(56–83)	62	31	No
Russian Federation	150	(130–180)	126 227	84	(72–100)	57	38	Yes
South Africa	490	(400–590)	360 183	74	(61–91)	76	17	No
Tajikistan	14	(11–17)	6 125	44	(36–54)	82	17	No
Ukraine	46	(38–56)	36 075	78	(65–95)	62	33	Yes
Uzbekistan	35	(29–42)	17 540	50	(41–61)	81	16	No
Viet Nam	180	(130–230)	95 036	54	(42–72)	92	6	No

* Numbers in parentheses indicate uncertainty intervals.

** Excludes treatment outcomes that have not been evaluated.

non-standardized ways with anti-TB drugs of questionable quality.[13] Most of these patients are not notified to the national TB control programme and their treatment outcomes are not known. Hospitals in particular, draw patients from far and wide and in many settings are not close to areas of need, without proper links with peripheral health centres to follow-up patients on treatments of long duration. The engagement of hospitals is vital to curb the emergence and spread of drug-resistant TB.

Within hospitals, managing the flow of TB patients through the various departments and ensuring quality diagnosis and treatment presents challenges. Infection control in high-burden country hospital settings is weak or absent.

To address this problem of inappropriate management of TB patients outside national TB control programmes, engaging all relevant health-care providers in TB care and control through 'public–private mix' (PPM) approaches is an essential component of the WHO Stop TB strategy. PPM for TB care and control represents a comprehensive approach for systematic involvement of all relevant health-care providers in TB control to promote the use of

TABLE 8

Contribution of public–private mix approaches to TB case notifications in selected countries

Country	Types of non-NTP care providers engaged	Coverage	Number of cases notified per year*	Contribution to total notifications** (%)
Angola	Diverse public and private providers	Countrywide	4591	12%
Cambodia	Pharmacies, private clinics and hospitals	Countrywide	6550	17%
China	General public hospitals	Countrywide	337 286	37%
Ghana	Diverse public and private providers	Countrywide	2124	15%
India	Diverse public, private and NGO providers	14 large cities (50 million population)	12 450	36% of new smear-positive cases
Indonesia	Public and private hospitals	Countrywide	38 362	13%
Islamic Republic of Iran	Diverse public and private providers	Countrywide	8829	93%
Kazakhstan	Prison health services	Countrywide	1515	8%
Mexico	Social security organizations	43% of the economically- active population	3438 (2008)	29% of new smear-positive cases
Myanmar	Private practitioners through the professional medical association	26 townships (6.4 million population)	8526 (2008)	21%
Nepal	Diverse public and private providers	Countrywide	2519	8%
Nigeria	Private clinics and hospitals	Countrywide	29418	34%
Pakistan	Private practitioners, NGOs and hospitals	Countrywide	43 162	14%
Philippines	Private clinics and hospitals	30 million population	3994	28% of new smear-positive cases
United Republic of Tanzania	Private and NGO hospitals	Countrywide	11 492	19%

* Data from 2009, except where specified.

** Contribution to all notifications is shown, except where specified.

NGO = nongovernmental organization

Source: *Global tuberculosis control: WHO report 2010.* Geneva, World Health Organization, 2010 (WHO/HTM/TB/2010.7).

international standards for TB Care and achieve national and global TB control targets. PPM for drug-resistant TB can increase detection and management of MDR-TB in line with international standards, by establishing effective referral links and/or building the capacity of providers and institutions outside national TB control programmes to adequately diagnose, treat and report drug-resistant patients, in the same way as PPM has been shown to do for drug-susceptible TB.

Currently, PPM is being scaled up globally, increasing the number of TB patients that are being managed according to international standards, and thereby helping to prevent MDR-TB. PPM providers detect and manage a significant proportion of TB cases in many countries, as seen in the data reported in the *WHO Global TB Report 2010* (Table 8). Bangladesh, Pakistan and the Philippines are examples of countries that have successfully engaged with key private sector providers for the scale-up of PMDT (Boxes 6 and 7). To guide and facilitate the engagement of all health-care providers in PMDT, WHO has developed tools for PPM approaches to MDR-TB which are part of the recently launched PPM toolkit.[14] A task force to promote the engagement of all health-care providers in PMDT has also been set up by the MDR-TB Working Group of the Stop TB Partnership.

Increasing TB case detection may thus require a multi-pronged approach. The more widespread use of electronic systems for reporting TB surveillance data has been shown to lead to increased completeness of reporting, even across different types of health-care providers.[15] Data from 15 countries show that the contribution to total notification by various health-care providers outside the national TB control programme exceeds one third of notified cases in countries with some of the heaviest TB caseloads in the world, such as in China and India (Table 8). Different methods have been used

BOX 6 Implementing PMDT through private sector in Bangladesh

In Bangladesh, programmatic management of drug-resistant tuberculosis was started with support from the public sector and the Damien Foundation (Bangladesh) (DFB). DFB is one of the main partners of the national TB control programme in Bangladesh and provides both DOTS and PMDT through a network of NGO hospitals, and through linking with private, informal providers ('village doctors') that are active in rural areas of Bangladesh. These providers refer suspected TB cases and supervise treatment of drug-susceptible and -resistant TB cases.

MDR-TB activities started in 1997 and have become completely integrated with routine programme activities. This initiative has full programmatic support from the public sector. Village doctors provide ambulatory treatment to 80% of the MDR-TB cases in the DFB catchment area, and have contributed to a remarkably high cure rate (90%) and low default rate (5%) among MDR-TB cases. After learning from this experience, the public sector recently started its first GLC-approved project for drug-resistant TB patients in a public sector tertiary hospital.

BOX 7 Scaling up public–private approaches in the Philippines

The Philippines has not waited for PPM to be fully consolidated, mainstreamed and scaled up before embarking on PPM for PMDT. Instead PPM for PMDT has been one step ahead. The first GLC-approved initiative for PMDT was established in 2000 at Makati Medical Center (MMC), a private hospital in Manila, which hosts the Tropical Disease Foundation. Initially all MDR-TB cases were treated in the MMC MDR treatment centre (MTC). Gradually, satellite treatment centres were established within the public and private sectors. All DOTS units (including PPM) refer MDR-TB suspects directly to MTCs, while other facilities refer MDR-TB suspects to DOTS units for initial evaluation and possible onward referral to MTCs. MDR-TB treatment outcomes have gradually improved, and the treatment success rate reached 73–74% in 2003–2005. An additional positive outcome is the decrease in the proportion of patients with a history of previous treatment with fluoroquinolones. This proportion dropped from 30% in 2001 to zero in 2007. Resistance to fluoroquinolones also decreased from 45% in 2006 to 12% in 2007.

to engage health-care providers outside national TB control programmes in case detection and surveillance for TB, including incentives to individuals and institutions, and extending health insurance coverage.

2.3 Promoting regulated access to anti-TB medicines

Successful treatment of tuberculosis requires that an appropriate regimen of quality-assured drugs is taken by patients for a certain period of time. Self-prescription and self-administration of anti-TB drugs is thought to promote drug resistance and is facilitated by lack of regulation in the access to drugs. In 2010, 44 countries including 18 MDR-HBCs reported that first-line anti-TB medicines were available in private pharmacies (Table 9). In 22 countries, including 12 MDR-HBCs, these medicines were available without prescription.[16] A study conducted by the TB Alliance and IMS Health in 10 countries in 2010, revealed that 74 different first-line fixed-dose combination (FDC) dosage variants were in use in the private sector. In India alone, 48 distinct dosage combinations of FDCs were available in the private sector. This means that a considerable amount of anti-TB drugs are being dispensed in a non-standardized and uncontrolled way, including over-the-counter, increasing the risk for treatment failure and drug resistance.

Documentation of regulatory approaches used to minimize the misuse of first-line anti-TB medicines was recently undertaken in Brazil, Ghana, India, the United Republic of Tanzania and Zambia. The assessment shows that it is possible for countries, under appropriate conditions, to restrict anti-TB drug prescription and dispensing to quality-assured providers only. Experience shows that successfully controlling the dispensing of TB drugs, especially in countries where a domestic pharmaceutical industry is present, requires concerted effort and collaboration among ministries of health, drug regulatory authorities, the pharmaceutical industry, pharmacy associations, associations of health professionals and civil society, in order to garner full support and help enforce regulation of sales of TB drugs outside quality-assured facilities. The positive experiences in these countries should be replicated and evaluated in other countries.

TABLE 9

Size and characteristics of the private-sector market for anti-TB drugs[17]

Country	Incident cases (2008)	Coverage by first line, private sector drugs*	% of private market that uses loose drugs^
India	1 982 628	117%	23%
Indonesia	429 730	116%	91%
Philippines	257 317	86%	16%
Pakistan	409 392	65%	36%
China	1 301 322	23%	98%
Thailand	92 087	17%	94%
Russian Federation	150 898	13%	100%
Viet Nam	174 593	7%	90%
Bangladesh	359 671	7%	11%
South Africa	476 732	3%	34%
Weighted average		66%	52%
Global Total	9 369 038		
10 country total, as % of global incidence	60%	39%	

From: Wells W et al. *Size and Usage Patterns of Private TB Markets in the High Burden Countries*. 2011 (in press).

* Percentage of all incident MDR-TB cases that can be treated by first-line drugs in the private-sector market (average across four first-line drugs, assuming a daily 6–8-month regimen). Data for this and other columns, unless noted, are for Q4 2008–Q3 2009.

^ Shaded entries are ≥90%.

In addition, efforts have been undertaken by some countries, such as Cambodia, India and the United Republic of Tanzania, to promote the rational use of anti-TB drugs by engaging pharmacists and their associations. WHO and the International Pharmaceutical Federation are jointly developing a statement on the role of pharmacists in the fight against TB.

2.4 Addressing the dual MDR-TB and HIV epidemics

People living with HIV have a high risk of drug-resistant TB and of the 27 MDR-HBCs, 12 also belong to the TB/HIV priority list that endure the brunt of the HIV-related TB epidemic. The response to overcome the drug-resistant TB problem should also encompass TB/HIV interventions. There have been some efforts to strengthen synergy between the two areas of focus, including the systematic recommendation of HIV testing as an integral part of TB drug resistance surveillance, regardless of the state of the HIV epidemic.[18] Almost all TB drug resistance surveys reported to WHO in recent years also collected information on HIV status, and some countries – such as Estonia, Latvia and the Republic of Moldova – routinely report the HIV status of patients with drug-resistant TB.

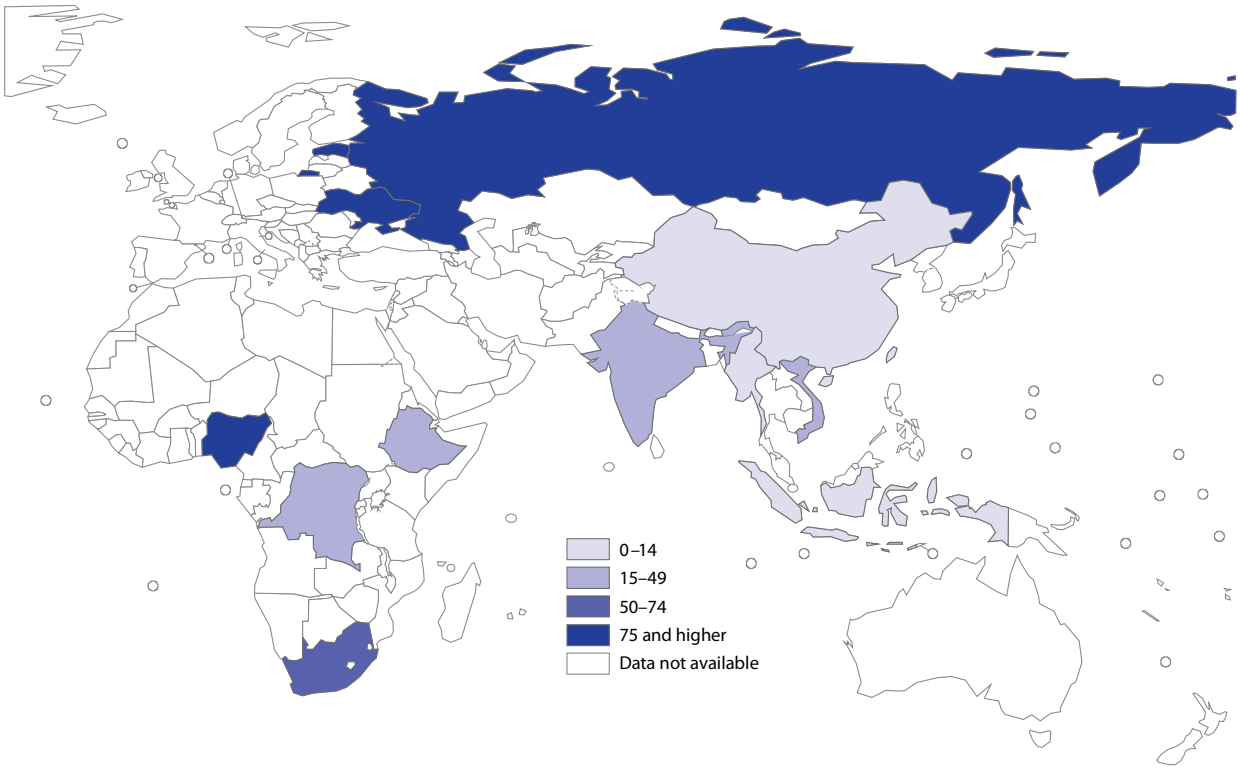
In 2009, there were 1.7 million people living with HIV screened for TB in 101 countries. Map 3 shows the distribution of HIV testing for TB patients in the 12 MDR-HBCs that are also TB/HIV priority countries. TB screening among people living with HIV, including those with drug-resistant TB, is expected to further increase with the implementation of the recent release of the 2010 *WHO Guidelines for intensified TB case-finding and isoniazid preventive therapy for people living with HIV*,[19] that provide clear recommendations for national AIDS and TB programmes, and those providing HIV services to scale up these activities. The new guidelines have already been adopted by Cambodia and South Africa. Scale-up of IPT to prevent TB has been spectacular in South Africa with more than 50 000 people living with HIV starting IPT between January and June 2010 as part of an HIV testing campaign.

Similarly, there have been efforts to harmonize TB and HIV laboratory-strengthening efforts through the 'Expand TB' project involving 13 priority TB/HIV countries, including the promotion of an integrated platform for HIV diagnosis, viral load assessment and diagnosis of drug-resistant TB in Ethiopia. People living with HIV and diagnosed with drug-susceptible or drug-resistant TB should be regarded as eligible for ART regardless of CD4 count. ART should be started as soon as possible after initiation of TB or M/XDR-TB treatment. These recommendations are both included in the 2010 WHO ART guidelines[20] and in the upcoming WHO guidelines on programmatic management of MDR-TB. However, more research is urgently needed and priority research questions on drug-resistant TB and HIV have been defined in the 2010 WHO TB/HIV priority research agenda.[21] The TB/HIV Working Group of the Stop TB Partnership has prioritized the convergence of drug-resistant TB and HIV in eastern Europe and Central Asia regions,[22] and garnered increased political commitment to expedite the response.

At the country level, there is limited epidemiological data about an association between HIV infection and MDR-TB. Of the 12 countries with the greatest burden of MDR-TB and HIV-associated TB, only Estonia and Ukraine reported data on MDR-TB stratified by HIV status, either through routine surveillance (Estonia) or drug resistance survey (Ukraine). Prevalence of HIV among MDR-TB patients ranged from

MAP 3

Global distribution of HIV testing services for TB patients in 12 high MDR-TB burden countries that are also TB/HIV priority countries, 2009



7.2% in Estonia to 23.8% in Ukraine. Three other MDR-HBCs, which are not on the list of the 63 priority TB/HIV countries, also reported routine surveillance data: Latvia, Lithuania and the Republic of Moldova.

The extent of MDR-TB disease among people living with HIV is poorly documented in the MDR-HBCs, especially in the 12 that carry the brunt of MDR-TB and HIV-related TB. The publication *WHO Policies on collaborative TB/HIV activities and provider initiated HIV testing* recommends that all TB patients and suspects, including those with MDR-TB, should be tested for HIV. Expanding HIV testing for MDR-TB patients and suspects, and routine surveillance data on HIV status of MDR-TB patients, are urgently needed in the 27 MDR-HBCs.

2.5 Prioritizing tuberculosis infection control

TB infection control (IC) measures are effective at preventing transmission of TB, and complement the effect of chemotherapy in interrupting the transmission chain, the backbone of the Stop TB strategy. The *WHO policy on TB infection control in health-care facilities, congregate settings and households,* published in 2009,[23] guides countries to implement IC measures in TB hospital wards, outpatient settings where TB is diagnosed and treated, and congregate settings. However, emphasis and prioritization should focus on implementing simple and economical measures, e.g. identifying potentially infectious cases (triage); separating them into a proper environment; enhancing the use of masks; minimizing the time spent in health-care settings and assuring health-care worker protection. These procedures should target MDR-TB care settings, and be context-sensitive, emphasizing the importance of developing "Safe health-care facilities".

In order to implement these activities, WHO and other partners have developed a global policy and provided specific technical assistance to countries. The development of the global WHO policy on TB IC has been followed by the preparation of both an advocacy strategy document[24] and of a framework document for implementing the WHO TB IC policy.[25] This latter document should be very practical for countries, by providing downloadable posters, flow charts, facility diagrams, checklists and monitoring and evaluation tools. Regional and national trainings have already reached several hundred professionals and some countries have started to prepare their national TB IC action plans. By embedding TB IC plans into broader ones (i.e. MDR-TB, HIV,

FIGURE 9

Percentage of MDR-TB HBCs with a TB IC national assessment (N=27)

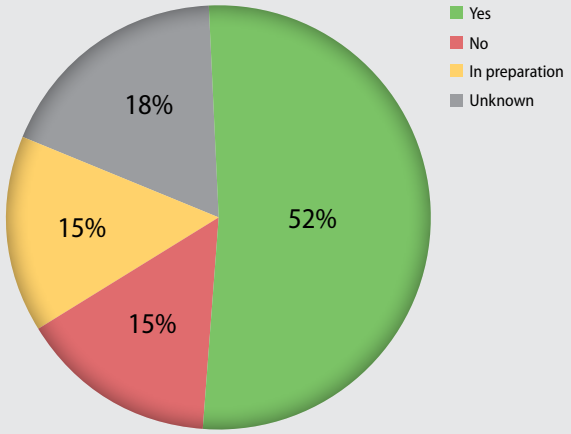
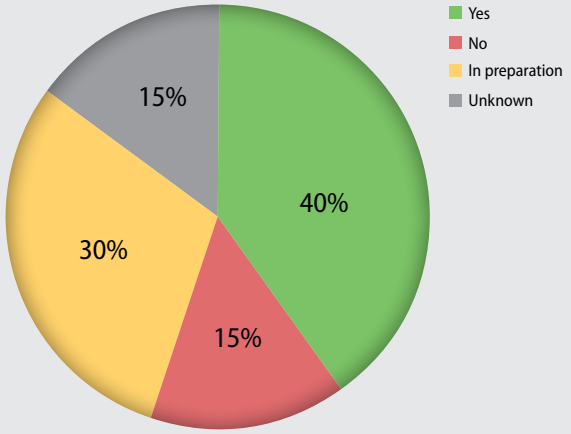


FIGURE 10

Percentage of MDR-TB HBCs with a TB IC national action plan prepared (N=27)



health system strengthening, general IC), measures of TB IC are progressively incorporated into national plans funded by major donors (e.g. Global Fund, United States Agency for International Development (USAID), etc.). Each WHO region has now entered into a phase of elaborating/scaling up its own specific TB IC regional activities. WHO and other partners are also providing the framework and often the funding for country-level technical assistance. WHO also developed a new indicator for monitoring TB IC, and the cost analysis of TB IC implementation worldwide has been integrated into the *Global Plan to Stop TB 2011–2015*.[2]

Twenty MDR-HBCs have reported some kind of data on TB IC (four from the African Region, eight from the European Region, one from the Eastern Mediterranean Region, four from the South-East Asia Region and three from the Western Pacific Region). Fourteen countries reported to have undergone a national TB IC situation assessment (Armenia, Bulgaria, Belarus, Estonia, Ethiopia, Georgia, Indonesia, Kazakhstan, Latvia, Republic of Moldova, the Philippines, Tajikistan, Ukraine and Viet Nam) and four are currently undergoing assessment (Bangladesh, China, India and Pakistan) (Figure 9). Eleven countries have developed a national TB infection control action plan (Armenia, Bangladesh, Belarus, China, Ethiopia, Indonesia, Latvia, Republic of Moldova, the Philippines, South Africa and Viet Nam) and one as a pilot project only (India), while eight countries (Azerbaijan, Bulgaria, Georgia, Kazakhstan, Myanmar, Pakistan, Tajikistan and Ukraine) are currently preparing one (Figure 10). Eight countries (29.6%) reported having a person in charge of TB IC in at least one of their tertiary hospitals.

Surveillance of TB among health-care workers (HCW) is part of the national policy in a few countries. In 2009, six MDR-HBCs (22.2%) reported to the WHO global TB data collection system the incidence rate of TB among HCW. This enabled WHO to calculate the ratio of TB notification rate (all forms) in HCW (all staff) over the TB notification rate in the general population, in order to have an estimate of the positive impact of TB IC measures at health-care facility level.

TB IC is still in a preliminary implementation phase in most countries. More MDR-TB HBCs are making steady progress in their preparedness toward TB IC field implementation. Yet other countries still lack the institutional capacity to adequately address TB IC, and have not yet started their TB IC national assessment or drafted their national action plan. These specific countries may benefit from upcoming regional/national trainings organized by WHO and other partners, followed by TB IC technical assistance. All these components are essential tools for enabling the preparation of national TB action plans, which should subsequently allow countries to embed TB IC plans into broader activities (i.e. MDR-TB, HIV, health system strengthening, general IC etc.), budgeted by their own governments and/or by partners, such as Global Fund. Regardless of their current stage in the implementation process, country political commitment was and remains essential for progress in their implementation phase.

ANNEX 1:

Resolution WHA62.15

SIXTY-SECOND WORLD HEALTH ASSEMBLY WHA62.15

Agenda item 12.9 22 May 2009

Prevention and control of multidrug-resistant tuberculosis and extensively drug-resistant tuberculosis

The Sixty-second World Health Assembly,

Having considered the reports on the prevention and control of multidrug-resistant tuberculosis and extensively drug-resistant tuberculosis;

Noting the progress made since 1991 towards achieving the international targets for 2005, the acceleration of efforts following the establishment of the Stop TB Partnership in response to resolution WHA51.13, and more recently following resolution WHA58.14 encouraging Member States to ensure availability of sufficient resources to achieve the internationally agreed goal relevant to tuberculosis contained in the United Nations Millennium Declaration by 2015;

Aware that the development of the Stop TB strategy as a holistic approach to tuberculosis prevention and control and represents a significant expansion in the scale and scope of tuberculosis control activities as a part of strengthening health systems within the context of primary health care and addressing social determinants of health;

Noting that the Stop TB Partnership's Global Plan to Stop TB 2006–2015 sets out the activities oriented towards implementing the Stop TB strategy and achieving the international targets for tuberculosis control set by the Stop TB Partnership – in line with the target of the internationally agreed development goal relevant to tuberculosis contained in the United Nations Millennium Declaration to "have halted by 2015 and begun to reverse the incidence of major diseases" – of halving tuberculosis prevalence and death rates by 2015 compared with 1990 levels;

Noting that the care and control of tuberculosis have progressed significantly during the past decade and the incidence of new cases is estimated to have fallen slightly each year since 2003;

Aware that a significant proportion – an estimated 37% of tuberculosis cases worldwide remain un-notified and receive either no treatment or inappropriate treatment;

Recognizing that the rates of tuberculosis are disproportionately high in high-risk populations including indigenous populations;

Recognizing that emergence and spread of multidrug-resistant and extensively, drug-resistant tuberculosis is facilitated by not detecting sufficient cases of tuberculosis and not treating them appropriately by DOTS-based treatment;

Concerned that the highest levels of multidrug-resistance reported in WHO's fourth global report on anti-tuberculosis drug resistance1 – an estimated half a million multidrug-resistant cases occurring globally, including 50 000 cases of extensively drug-resistant tuberculosis – pose a threat to global public health security;

Recognizing that there is an urgent need to invest in research for development of new diagnostics, medicines and vaccines and in operational research to prevent and manage tuberculosis, including multidrug-resistant and extensively drug-resistant tuberculosis; while exploring and, where appropriate, promoting a range of incentive schemes for research and development including addressing, where appropriate, the de-linkage of the costs of research and development and the price of health products;

Noting that less than 3% of the estimated total number of multidrug-resistant and extensively drug-resistant cases of tuberculosis receive treatment according to WHO recommended standards;

Concerned that the disease transmission occurs mostly in communities where there is a lack of appropriate infection control;

Concerned that the insufficient demand from countries for internationally quality-assured anti-tuberculosis medicines resulting in an inadequate supply through the Green Light Committee mechanism has been a major bottleneck to treating multidrug-resistant and extensively drug-resistant tuberculosis and that quality-assured fixed-dose drug combinations, developed as a tool to prevent the emergence of resistance, are not widely used;

Aware that the delays in implementing the Global Plan to Stop TB 2006–2015 will result in increasing numbers of tuberculosis cases and deaths, including those due to multidrug-resistant and extensively multidrug-resistant tuberculosis and to the impact of HIV, and therefore in delays in achieving by 2015 the international targets for tuberculosis control and the internationally agreed development goal relevant to tuberculosis contained in the United Nations Millennium Declaration;

Recalling resolution WHA60.19 on tuberculosis control in which the Health Assembly urged Member States to develop and implement long-term plans for tuberculosis including multidrugresistant and extensively drug-resistant tuberculosis prevention and control in line with the Global Plan to Stop TB 2006–2015, within the overall health development plans, and resolution WHA58.33 on achieving universal coverage;

Welcoming the Beijing Call for Action on tuberculosis control and patient care given jointly by representatives of 27 Member States carrying a high burden of multidrug-resistant and extensively drug-resistant tuberculosis, civil society, the private sector and others to address the alarming threat of multidrug-resistant and extensively drug-resistant tuberculosis,

1. URGES all Member States:

(1) to achieve universal access to diagnosis and treatment of multidrug-resistant and extensively drug-resistant tuberculosis as part of the transition to universal health coverage, thereby saving lives and protecting communities, by means of:

(a) developing a comprehensive framework for management and care of multidrugresistant and extensively drug-resistant tuberculosis, that includes directly-observed treatment, community-based and patient-centered care, and which identifies and addresses the needs of persons living with HIV, the poor and other vulnerable groups, such as prisoners, mineworkers, migrants, drug users, and alcohol dependants, as well as the underlying social determinants of tuberculosis and multidrug-resistant and extensively drug-resistant tuberculosis;

(b) strengthening health information and surveillance systems to ensure detection and monitoring of the epidemiological profile of multidrug-resistant and extensively drug resistant tuberculosis and monitor achievement in its prevention and control;

(c) aiming to ensure the removal of financial barriers to allow all tuberculosis patients equitable access to tuberculosis care, that their rights are protected, and that they are treated with respect and dignity in accordance with the local legislation;

(d) making available sufficiently trained and motivated staff in order to enable diagnosis, treatment and care of tuberculosis including multidrug-resistant and extensively drug-resistant tuberculosis, as an integral part of efforts to address the overall health workforce crisis;

(e) strengthening laboratory systems, through increasing capacity and adequate human resources, and accelerating access to faster and quality-assured diagnostic tests;

(f) engaging all relevant public and private health-care providers in managing tuberculosis including multidrug-resistant and extensively drug-resistant tuberculosis and tuberculosis-HIV coinfection according to national policies, and strengthening primary health care in early detection, effective treatment and support to patients;

(g) ensuring that national airborne infection-control policies are developed (as part of general infection prevention and control programmes) and implemented in every health-care facility and other high-risk settings and that there is sufficient awareness of tuberculosis infection control in the community;

(h) ensuring uninterrupted supply of first- and second-line medicines for tuberculosis treatment, which meet WHO prequalification standards or strict national regulatory authority standards, and that quality-assured fixed-dose combination medicines of proven bioavailability are prioritized within a system that promotes treatment adherence;

(i) strengthening mechanisms to ensure that tuberculosis medicines are sold on prescription only and that they are prescribed and dispensed by accredited public and private providers;

(j) undertaking effective advocacy, communication and social mobilization, avoiding stigmatization and discrimination, and spreading community awareness about policies and plans for prevention and control of tuberculosis including multidrug-resistant and extensively drug-resistant tuberculosis;

(k) establishing national targets in order to accelerate access to treatment according to WHO guidelines, for multidrug-resistant and extremely drug-resistant tuberculosis patients;

(2) to enhance quality and coverage of DOTS in achieving 70% detection rate and 85% success rate of tuberculosis treatment, thereby preventing secondary multi-drug resistant tuberculosis;

(3) to use all possible financing mechanisms in order to fulfil the commitments made in resolutions WHA58.14 and WHA60.19, including the commitment to ensure sustainable domestic and external financing, thereby filling the funding gaps identified in the Global Plan to Stop TB 2006–2015;

(4) to increase investment by countries and all partners substantially in operational research and research and development for new diagnostics, medicines and vaccines to prevent and manage tuberculosis including multidrug-resistant and extensively drug-resistant tuberculosis;

2. REQUESTS the Director-General:

(1) to provide technical support to Member States in order to develop and implement response plans, based on a comprehensive framework for management of care, for the prevention and control of tuberculosis including multidrug-resistant and extensively drug-resistant tuberculosis;

(2) to provide support to Member States in developing and implementing strategies to engage all relevant public, voluntary, corporate and private health-care providers in the training for and scaling up of prevention and control of tuberculosis including multidrug-resistant and extensively drug-resistant tuberculosis and all aspects of tuberculosis-HIV coinfection;

(3) to advise and support Member States to bring the standards of national drug regulatory agencies in line with international standards, thus enabling national pharmaceutical manufacturers to produce material of assured quality to be sold in the local and international markets;

(4) to provide support to Member States for upgrading laboratory networks to be able to undertake diagnosis and monitoring of multidrug-resistant and extensively drug-resistant tuberculosis and facilitate systematic evaluations of newer and faster diagnostic technology;

(5) to strengthen the Green Light Committee mechanism to help to expand access to concessionally-priced and quality-assured first- and second-line medicines, to encourage and assist the local pharmaceuticals in high-burden countries to get qualification within the Green Light Committee mechanism;

(6) to explore and, where appropriate, promote a range of incentive schemes for research and development including addressing, where appropriate, the de-linkage of the costs of research and development and the price of health products;

(7) to work with countries to develop country indicators and to support monitoring and evaluation of the implementation of the measures outlined in this resolution;

(8) to report through the Executive Board to the Sixty-third and Sixty-fifth World Health Assemblies on overall progress made.

Eighth plenary meeting, 22 May 2009
A62/VR/8

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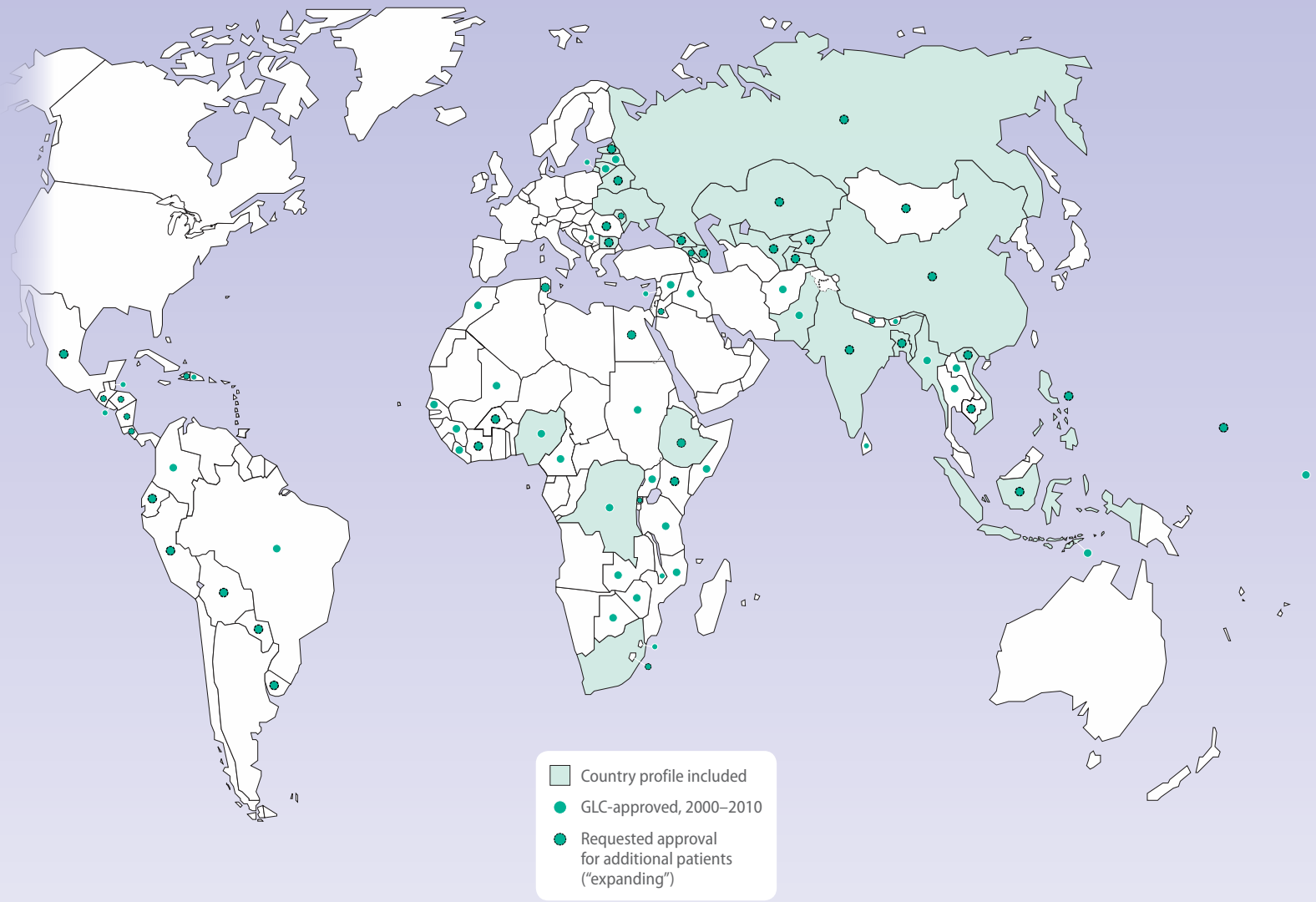
ANNEX 2:

Multidrug-resistant tuberculosis country profiles



Symbol Key:

TB High TB burden

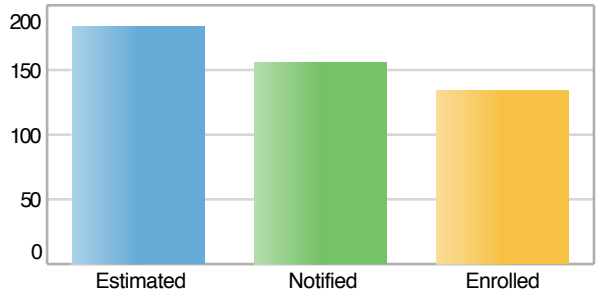
HIV High HIV burden

MDR-TB High MDR-TB burden

Armenia MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	3

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	9.4 (7.3–12)	[DRS 2007]
% of retreatment TB cases with MDR-TB	43 (38–49)	[DRS 2007]
MDR-TB cases among incident total TB cases in 2008	480 (380–580)	
MDR-TB cases among new pulmonary TB cases notified in 2009	110 (85–140)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	74 (66–83)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB	80	76	156
MDR-TB patients started treatment			134

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

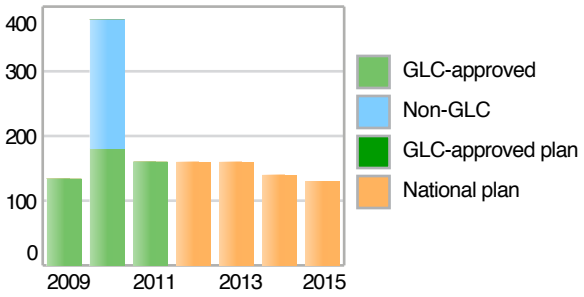
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	0.38 (0.26–0.55)	12 (8.4–18)
Prevalence (incl HIV/AIDS)	3.3 (1.3–5.6)	107 (43–182)
Incidence (incl HIV/AIDS)	2.2 (1.8–2.7)	73 (59–88)
Case detection, all forms (%)	70 (58–85)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	1.8	1.8	1.9
Culture (per 5 million population)	1.6	1.6	1.6
DST (per 10 million population)	3.2	3.2	3.2
LPA (per 10 million population)		0	3.2
Number of DST units for which external quality assurance was carried out			

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Borstel, Germany

First-line DST routinely performed for: all patients

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size	57	
% Treatment success	53	
% Deaths	11	

Drug management 2009	
First-line drugs available in private pharmacies	Yes
First-line drugs available without prescription	Yes
Drug management 2010	
Second-line drug procurement issues	
Drugs provided to treat side-effects	Yes

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs		

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, not including XDR-TB
Training material developed	No
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out	Yes, started in 2010
in the scope of MDR-TB	Yes
National infection control plan available	Yes
Tertiary hospitals with person in charge of TB infection control	0
TB notification rate (all forms) in health care workers (all staff) over rate in general population	0
Recording and reporting for MDR-TB in place	Yes Paper-based
Representative survey/surveillance data on MDR-TB available	Class B routine surveillance data (2009); nationwide survey (2007)

* Ranges represent uncertainty intervals

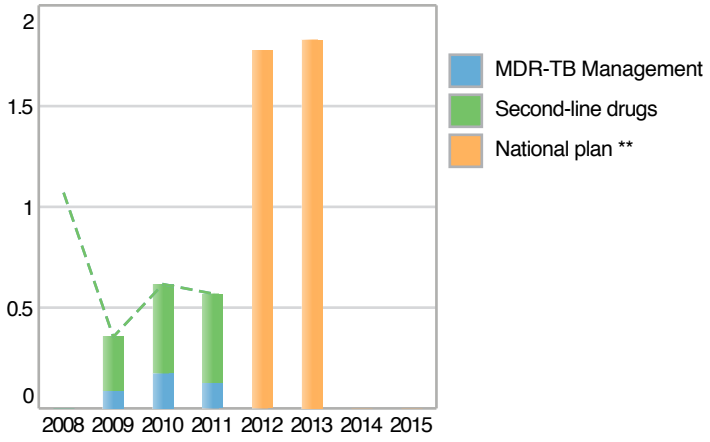
Please refer to Abbreviations on page v

Armenia *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: food packages, transport vouchers/reimbursement, counselling/psychosocial support, hygiene packages, education; support adapted to patient's situation	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	NTP
Prison care coordinated with NTP	Yes

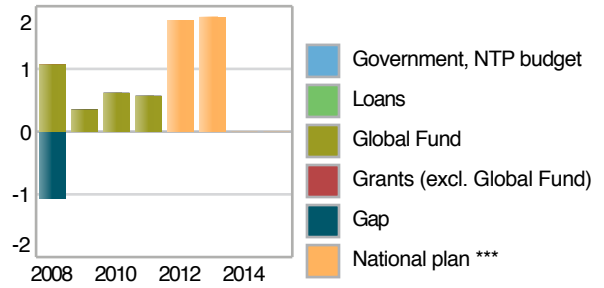
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



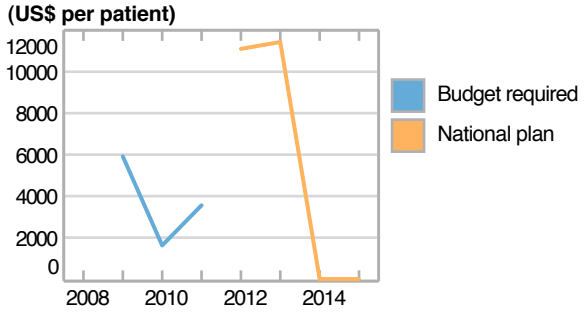
Financing (US$ millions)	2010	2011
Total NTP budget	7	6
MDR-TB financing component:		
second-line drugs budget	<1	<1
total MDR-TB budget	<1	<1
available funding	<1	<1
funding gap	0	0
% of budget funded	100	100
% available funding from domestic sources		
% available funding from Global Fund	100	100

WHO TB planning and budgeting tool used

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Programme management: NTP and MSF share responsibilities.

Laboratory capacity and quality assurance: MGIT and PCR are used.

Qualified M/XMDR-TB treatment (human resources, facilities): managed by a committee on drug resistance, based on WHO recommendations. Specialists are trained in MDR-TB by international experts. There is an MDR-TB Department in the Republican TB Dispensary.

TB infection control: the Ministry of Health approved a TB infection control plan in 2010.

Financing: NTP (Ministry of Health), MSF and the Global Fund.

Bottlenecks in 2010

Recording and reporting: technical assistance needed for new electronic system.

Access to quality-assured second-line drugs: weak drug management.

** No breakdown by line item available for 2012–2015

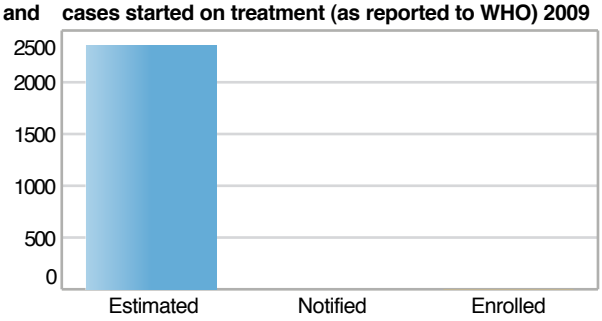
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Azerbaijan MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	9

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	22 (19–26)	[DRS 2007]
% of retreatment TB cases with MDR-TB	56 (52–60)	[DRS 2007]
MDR-TB cases among incident total TB cases in 2008	4 000 (3 300–4 700)	
MDR-TB cases among new pulmonary TB cases notified in 2009	1 000 (880–1 200)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	1 300 (1 200–1 400)	

MDR-TB notified cases 2009	New	Retreatment	Total
Confirmed cases of MDR-TB			
MDR-TB patients started treatment			

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

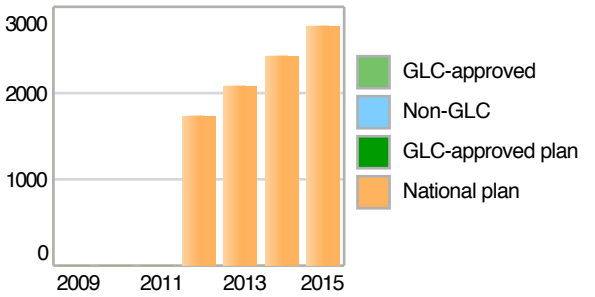
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	1 (0.73–1.4)	12 (8.2–16)
Prevalence (incl HIV/AIDS)	15 (6.5–26)	172 (73–289)
Incidence (incl HIV/AIDS)	9.7 (7.9–12)	110 (89–132)
Case detection, all forms (%)	75 (63–93)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	0.8	0.8	0.8
Culture (per 5 million population)		1.1	1.1
DST (per 10 million population)		2.3	2.2
LPA (per 10 million population)			
Number of DST units for which external quality assurance was carried out			

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Borstel, Germany

First-line DST routinely performed for: (no patient groups identified)

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size		
% Treatment success		
% Deaths		

Drug management 2009	
First-line drugs available in private pharmacies	No
First-line drugs available without prescription	
Drug management 2010	
Second-line drug procurement issues	Possibility of waivers
Drugs provided to treat side-effects	Yes

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	Yes	Yes
Second-line drugs	Yes	

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	
Training material developed	
Training conducted specifically for DR-TB	
TB infection control national situation assessment carried out in the scope of MDR-TB	
National infection control plan available	Under preparation
Tertiary hospitals with person in charge of TB infection control	
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	Partially Weak implementation of old electronic recording and reporting system; start of support to electronic system by WHO: 02/2011
Representative survey/surveillance data on MDR-TB available	Routine surveillance data not representative; survey in the city of Baku (2007); nationwide survey planned for 2011

* Ranges represent uncertainty intervals

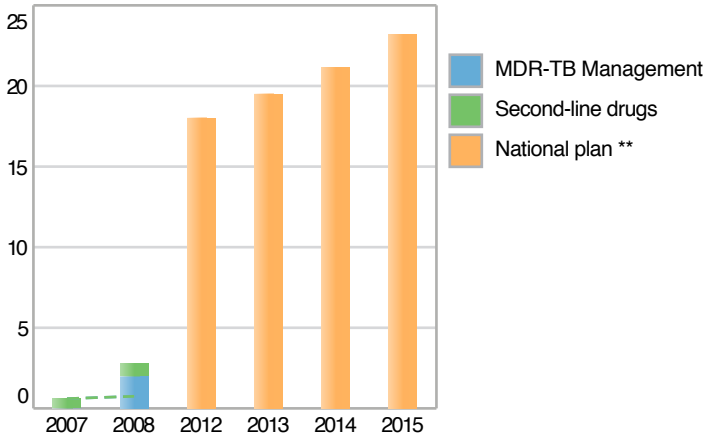
Please refer to Abbreviations on page v

Azerbaijan *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: food packages, counselling/psychosocial support, hygiene packages; *transportation being considered (GFATM Round 7, 2007)*	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	MoH
Prison care coordinated with NTP	Yes

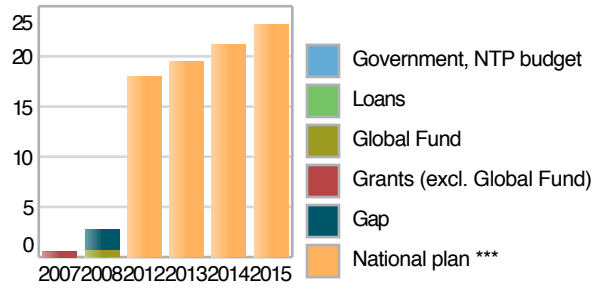
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



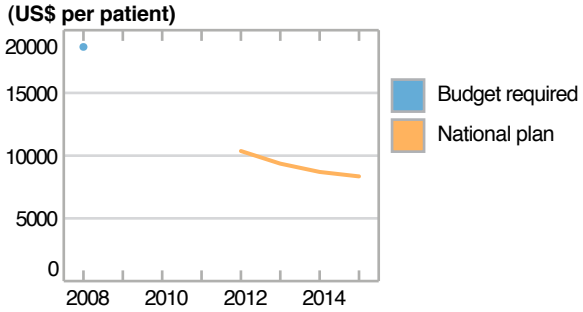
Financing (US$ millions)	2010	2011
Total NTP budget		
MDR-TB financing component:		
second-line drugs budget		
total MDR-TB budget		
available funding		
funding gap		
% of budget funded		
% available funding from domestic sources		
% available funding from Global Fund		

WHO TB planning and budgeting tool used

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Issues in case-finding or enrolment for treatment: as of 2011, cultures are taken from all new patients and re-treatment patients. This allows quick identification of drug resistance and adequate provision of treatment.

Programme management: a new TB control plan and strategy were approved by country authority for 2011–2015.

Recording and reporting: with WHO support, TB data Recording and reporting forms were revised and standardized. The TB reporting forms will be used from 2011.

Laboratory capacity and quality assurance: the NRL was certified and quality-assured in 2010 by the SRL. There are no human resources constraints. In 2010, four second-level laboratories were established at inter-regional level. The NRL and third-level laboratory in the prison sector are fully equipped with reagents for culture and DST of first-line drugs.

Qualified M/XMDR-TB treatment (human resources, facilities): TB doctors were trained in MDR-TB management in WHO collaborating centers abroad in 2010.

TB infection control: "Guidelines on infection control" were developed in 2010.

Bottlenecks in 2010

Laboratory capacity and quality assurance: limited laboratory capacity.

Qualified M/XMDR-TB treatment (human resources, facilities): limited human resource capacity to manage MDR-TB.

Financing: lack of funds for first-line drugs and weak commitment of NTP.

** No breakdown by line item available for 2012–2015

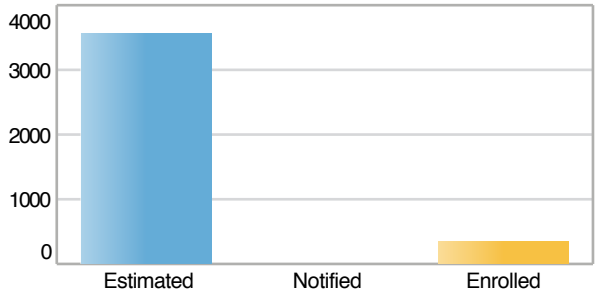
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Bangladesh TB MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	162

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	2.2 (0.0–5.6)	[model 2008]
% of retreatment TB cases with MDR-TB	15 (0.0–40)	[model 2008]
MDR-TB cases among incident total TB cases in 2008	9 800 (1 000–19 000)	
MDR-TB cases among new pulmonary TB cases notified in 2009	3 000 (0–7 500)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	600 (0–1 600)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB			
MDR-TB patients started treatment			352

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

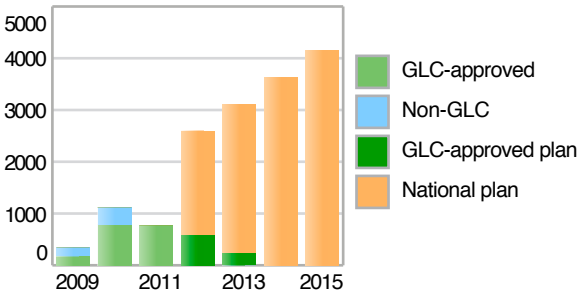
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	83 (60–110)	51 (37–68)
Prevalence (incl HIV/AIDS)	690 (320–1 100)	425 (197–697)
Incidence (incl HIV/AIDS)	360 (300–440)	225 (183–271)
Case detection, all forms (%)	44 (37–54)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	0.6	0.6	0.6
Culture (per 5 million population)	0.1	<0.1	<0.1
DST (per 10 million population)	0.1	<0.1	<0.1
LPA (per 10 million population)			
Number of DST units for which external quality assurance was carried out			

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Antwerp, Belgium

First-line DST routinely performed for: cases failing a retreatment regimen, cases failing one or more retreatment regimens

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size		106
% Treatment success		82
% Deaths		9

Drug management 2009	
First-line drugs available in private pharmacies	Yes
First-line drugs available without prescription	No
Drug management 2010	
Second-line drug procurement issues	No (registration waived)
Drugs provided to treat side-effects	Yes

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, not including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out	Yes (2009). Not systematically done
in the scope of MDR-TB	Yes
National infection control plan available	Yes
Tertiary hospitals with person in charge of TB infection control	1
TB notification rate (all forms) in health care workers (all staff) over rate in general population	0
Recording and reporting for MDR-TB in place	Partially Paper-based
Representative survey/surveillance data on MDR-TB available	No representative data available; nationwide survey under way

* Ranges represent uncertainty intervals

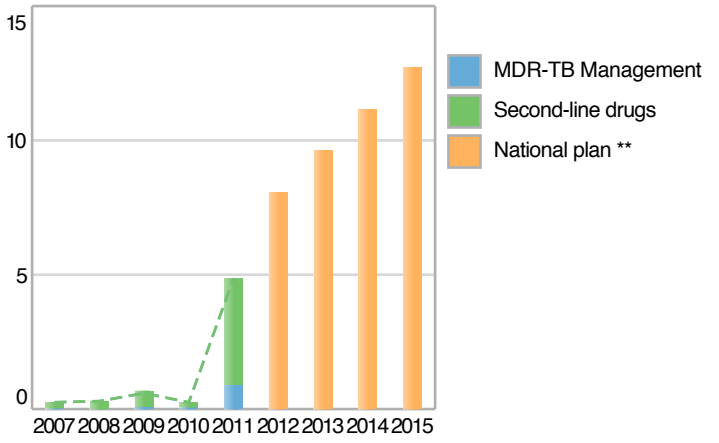
Please refer to Abbreviations on page v

Bangladesh *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: transport cost reimbursement, counselling/psychosocial support, vocational training	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	NTP (MOH) Treatment as per National MDR-TB Guidelines
Prison care coordinated with NTP	Yes

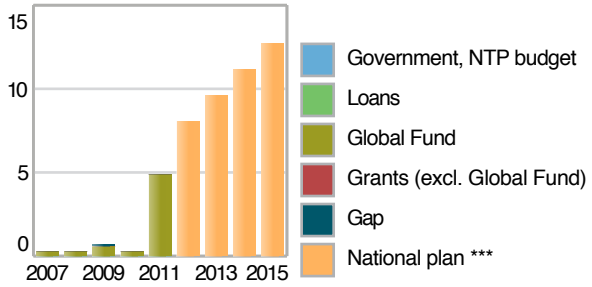
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



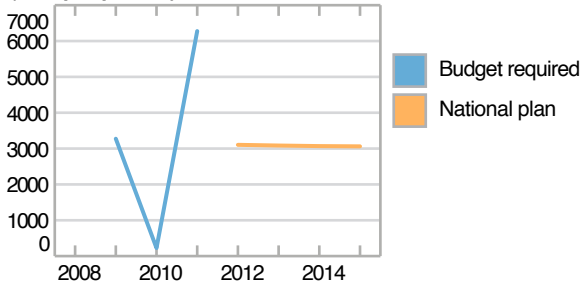
Financing (US$ millions)	2010	2011
Total NTP budget	25	46
MDR-TB financing component:		
second-line drugs budget	<1	4
total MDR-TB budget	<1	5
available funding	<1	5
funding gap	0	0
% of budget funded	100	100
% available funding from domestic sources		
% available funding from Global Fund	100	100

WHO TB planning and budgeting tool used	Yes (2010)

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

TB infection control:TB infection control measures have been implemented.

Access to quality-assured second-line drugs: in place.

Bottlenecks in 2010

Programme management: a significant number of diagnosed patients are not receiving treatment.

Laboratory capacity and quality assurance: limited laboratory capacity.

Qualified M/XMDR-TB treatment (human resources, facilities): limited human resource capacity to manage MDR-TB.

Financing: funds to be identified for full scale up. Delays in disbursing funds are causing delays in starting treatment.

** No breakdown by line item available for 2012–2015

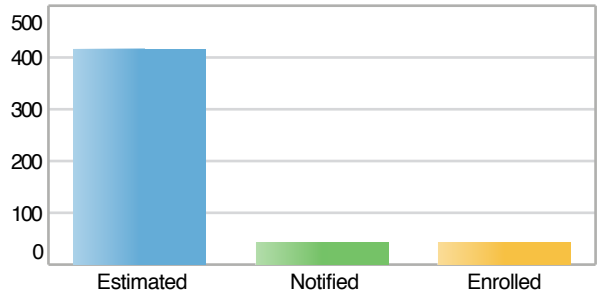
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Bulgaria MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	8

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	13 (0.0–25)	[model 2008]
% of retreatment TB cases with MDR-TB	42 (12–72)	[model 2008]
MDR-TB cases among incident total TB cases in 2008	460 (98–810)	
MDR-TB cases among new pulmonary TB cases notified in 2009	260 (0–530)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	160 (44–270)	

MDR-TB notified cases 2009	New	Retreatment	Total
Confirmed cases of MDR-TB	12	31	43
MDR-TB patients started treatment			43

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

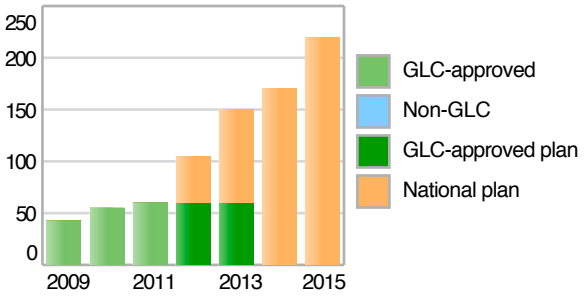
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	0.25 (0.19–0.36)	3.3 (2.5–4.8)
Prevalence (incl HIV/AIDS)	3.8 (1.2–6.6)	51 (16–88)
Incidence (incl HIV/AIDS)	3.1 (2.7–3.6)	41 (36–47)
Case detection, all forms (%)	86 (75–100)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	0.5	0.5	0.5
Culture (per 5 million population)	21.7	21.9	20.0
DST (per 10 million population)	29.0	29.2	5.3
LPA (per 10 million population)		1.3	1.3
Number of DST units for which external quality assurance was carried out		1	1

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Rome, Italy

First-line DST routinely performed for: new cases, all retreatment cases, cases failing a retreatment regimen, cases that are contacts of MDR-TB cases

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size		76
% Treatment success		25
% Deaths		45

Drug management 2009	
First-line drugs available in private pharmacies	Yes
First-line drugs available without prescription	No
Drug management 2010	
Second-line drug procurement issues	Possibility of waivers
Drugs provided to treat side-effects	Availability of free ancillary drugs assured by hospitals during the intensive phase

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out	Yes
in the scope of MDR-TB	Yes
National infection control plan available	Under preparation
Tertiary hospitals with person in charge of TB infection control	
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	Yes Electronic
Representative survey/surveillance data on MDR-TB available	Class B routine surveillance data (2008); nationwide survey under way

* Ranges represent uncertainty intervals

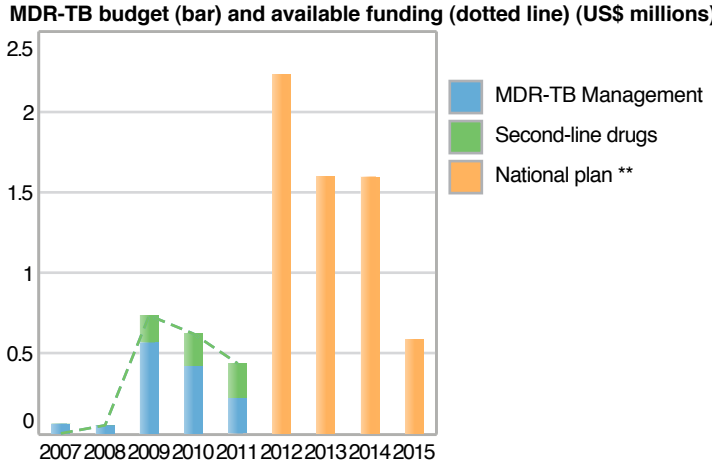
Please refer to Abbreviations on page v

Bulgaria *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: food packages; additional support needed to cover transport costs	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	MoH and MoJ
Prison care coordinated with NTP	Yes

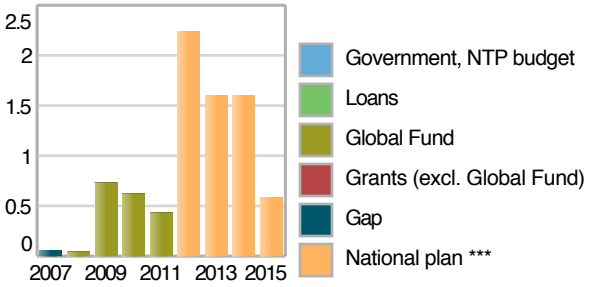
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



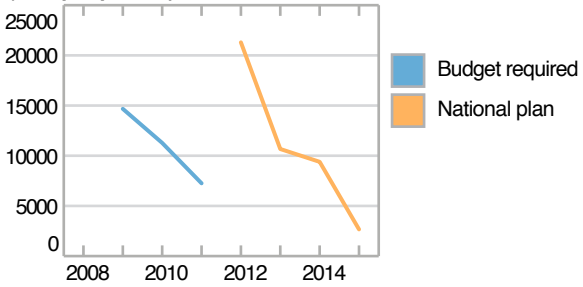
Financing (US$ millions)	2010	2011
Total NTP budget	17	16
MDR-TB financing component:		
second-line drugs budget	<1	<1
total MDR-TB budget	<1	<1
available funding	<1	<1
funding gap	0	0
% of budget funded	100	100
% available funding from domestic sources		
% available funding from Global Fund	100	100

WHO TB planning and budgeting tool used

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Issues in case-finding or enrolment for treatment: NGOs are involved in supporting TB health facilities in active case-finding and contact tracing to ensure early diagnosis for all TB cases, including MDR-TB.

Programme management: monthly review of GLC cohort of MDR-TB patients by Expert Committee. Algorithm for management of inpatient and outpatient treatment and care was successfully introduced in 2009.

Recording and reporting: strengthened through the development of an Electronic Patient Information System.

Laboratory capacity and quality assurance: EQA system for cultures and DST of first-line drugs introduced in 2010.

Access to quality-assured second-line drugs: second-line drugs procured through GLC.

Infection control: to be strengthened through improved infection control plans; regular supervisory visits; upgraded and well maintained laboratory equipment; and improved environmental control.

Financing: public financing ensured to cover the costs of inpatient treatment for MDR-TB patients.

Bottlenecks in 2010

Qualified MDR/XDR-TB treatment (human resources, facilities): need to increase the number of staff involved in MDR-TB management at central level and MDR-TB treatment sectors.

Other: insufficient social support to MDR-TB patients.

** No breakdown by line item available for 2012–2015

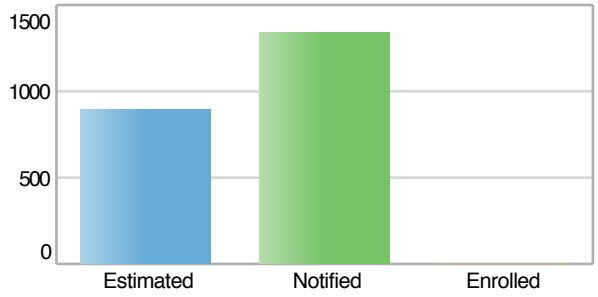
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Belarus MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	10

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	13 (0.0–25)	[model 2008]
% of retreatment TB cases with MDR-TB	42 (12–72)	[model 2008]
MDR-TB cases among incident total TB cases in 2008	800 (260–1 300)	
MDR-TB cases among new pulmonary TB cases notified in 2009	530 (0–1 100)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	370 (100–630)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB	464	840	1 342
MDR-TB patients started treatment			

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

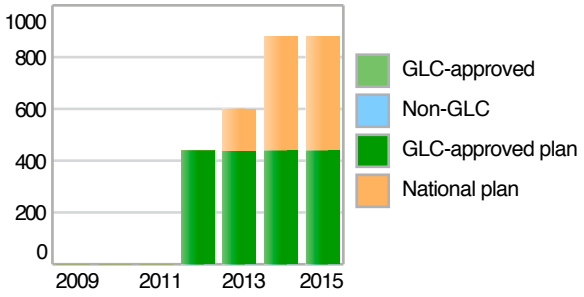
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	0.51 (0.46–0.57)	5.3 (4.8–5.9)
Prevalence (incl HIV/AIDS)	5.6 (1.3–9.9)	58 (14–103)
Incidence (incl HIV/AIDS)	3.8 (3.1–4.5)	39 (32–47)
Case detection, all forms (%)	140 (120–170)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	15.5	1.6	
Culture (per 5 million population)	47.0	20.8	
DST (per 10 million population)	22.7	22.8	
LPA (per 10 million population)			
Number of DST units for which external quality assurance was carried out			

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Stockholm, Sweden

First-line DST routinely performed for:

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size		
% Treatment success		
% Deaths		

Drug management 2009	
First-line drugs available in private pharmacies	
First-line drugs available without prescription	
Drug management 2010	
Second-line drug procurement issues	Strict customs regulations
Drugs provided to treat side-effects	

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs		
Second-line drugs		

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	
Training material developed	
Training conducted specifically for DR-TB	
TB infection control national situation assessment carried out	Yes (2009)
in the scope of MDR-TB	Yes
National infection control plan available	Yes
Tertiary hospitals with person in charge of TB infection control	
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	Yes Electronic
Representative survey/surveillance data on MDR-TB available	Class B routine surveillance data (2008); nationwide survey under way

* Ranges represent uncertainty intervals

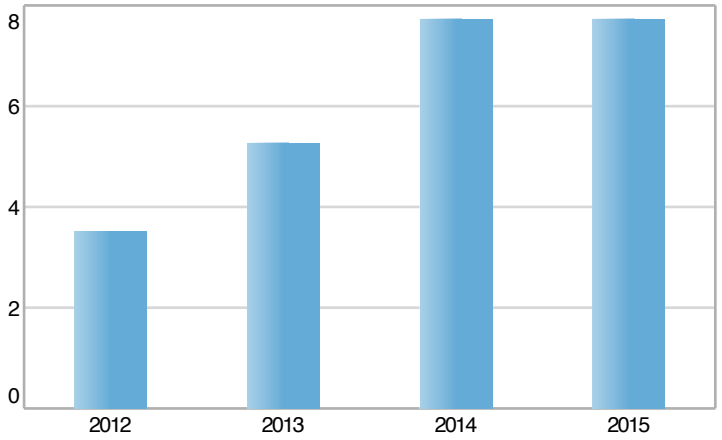
Please refer to Abbreviations on page v

Belarus *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: food packages, transport vouchers/reimbursement, counselling/psychosocial support; exploring possibility of treatment programs for alcohol-dependent individuals and injecting drug users for DR-TB (2008)	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	Ministry of Interior, Department of medical services for penitentiary system
Prison care coordinated with NTP	Yes

MDR-TB budget (bar) and available funding (dotted line) (US$ millions)

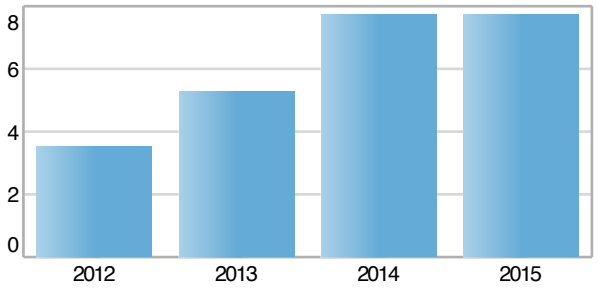


Progress since 2009 World Health Assembly resolution 62.15 †

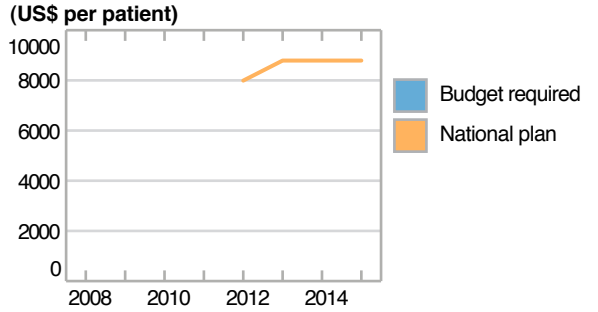
Financing (US$ millions)	2010	2011
Total NTP budget		
MDR-TB financing component:		
second-line drugs budget		
total MDR-TB budget		
available funding		
funding gap		
% of budget funded		
% available funding from domestic sources		
% available funding from Global Fund		

WHO TB planning and budgeting tool used

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Bottlenecks in 2010

Qualified M/XMDR-TB treatment (human resources, facilities): limited human resource capacity for MDR-TB.

Access to quality-assured second-line drugs: decentralized drug procurement system is not efficient.

TB infection control: weak infection control.

** No breakdown by line item available for 2012–2015

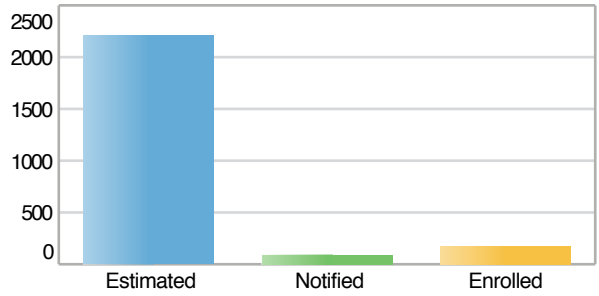
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Democratic Republic of the Congo TB HIV MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	66

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	1.8 (0.0–4.3)	[model 2008]
% of retreatment TB cases with MDR-TB	7.7 (0.0–18)	[model 2008]
MDR-TB cases among incident total TB cases in 2008	5 600 (530–11 000)	
MDR-TB cases among new pulmonary TB cases notified in 2009	1 500 (0–3 700)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	670 (0–1 600)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB		91	91
MDR-TB patients started treatment			176

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

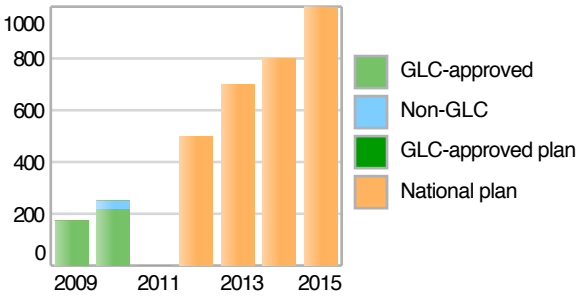
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	50 (35–67)	76 (54–102)
Prevalence (incl HIV/AIDS)	430 (200–700)	645 (302–1 061)
Incidence (incl HIV/AIDS)	250 (200–300)	372 (302–448)
Case detection, all forms (%)	45 (38–56)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	2.1	2.2	2.1
Culture (per 5 million population)	<0.1	<0.1	0.1
DST (per 10 million population)	0.2	0.2	0.3
LPA (per 10 million population)			
Number of DST units for which external quality assurance was carried out			

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Antwerp, Belgium

First-line DST routinely performed for: all retreatment cases, cases failing a retreatment regimen, cases failing one or more retreatment regimens, cases that are contacts of MDR-TB cases

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size	147	
% Treatment success	61	
% Deaths	14	

Drug management 2009	
First-line drugs available in private pharmacies	No
First-line drugs available without prescription	No
Drug management 2010	
Second-line drug procurement issues	
Drugs provided to treat side-effects	No

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	Yes	No
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, not including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out in the scope of MDR-TB	No
National infection control plan available	No
Tertiary hospitals with person in charge of TB infection control	
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	Yes Paper-based at peripheral level. Electronic at provincial and national levels
Representative survey/surveillance data on MDR-TB available	Routine surveillance data not representative; survey in the city of Kinshasa (1999)

* Ranges represent uncertainty intervals

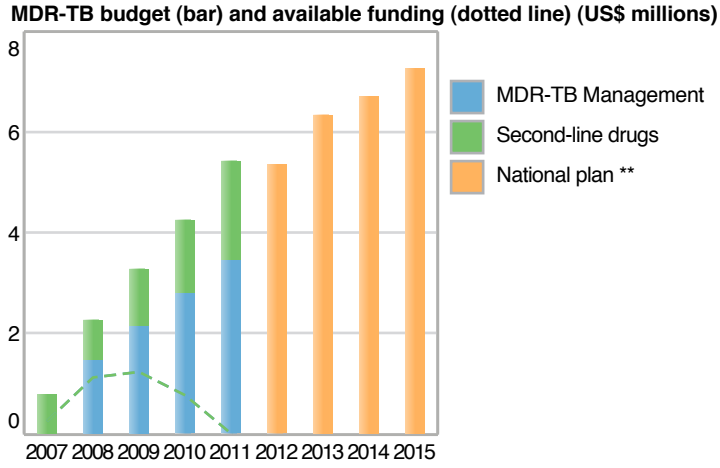
Please refer to Abbreviations on page v

Democratic Republic of the Congo *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: food packages, counselling/psychosocial support; patient support groups with former TB patients	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	
Prison care coordinated with NTP	

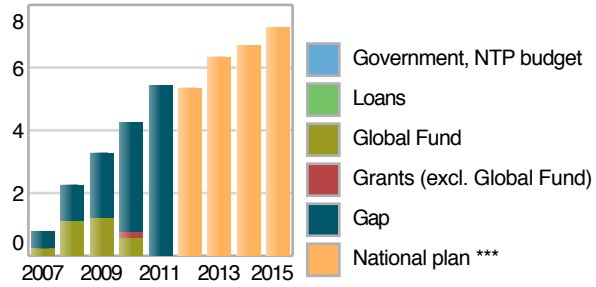
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



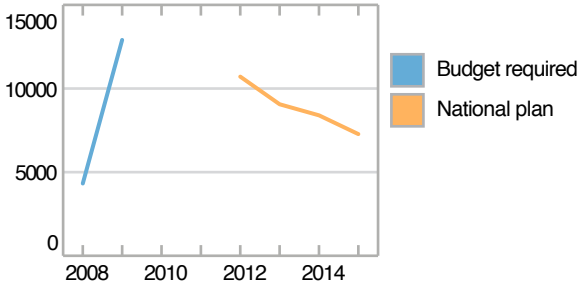
Financing (US$ millions)	2010	2011
Total NTP budget	64	64
MDR-TB financing component:		
second-line drugs budget	1	2
total MDR-TB budget	4	5
available funding	<1	
funding gap	3	5
% of budget funded	18	
% available funding from domestic sources		
% available funding from Global Fund	78	

WHO TB planning and budgeting tool used	Yes (2007-2008)

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Bottlenecks in 2010

Programme management: delay in signing memorandum of understanding between Expand-TB and Ministry of Health; insufficient implementation of MDR-TB.

Recording and reporting: weak; limited capacity at peripheral and provincial levels.

Laboratory capacity and quality assurance: weak laboratory capacity.

Qualified M/XMDR-TB treatment (human resources, facilities): limited human resource capacity.

Access to quality-assured second-line drugs: weak drug management.

TB infection control: no national policy.

Other: no access to drugs for managing side-effects.

** No breakdown by line item available for 2012–2015

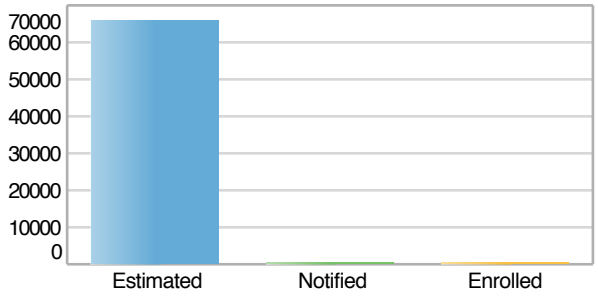
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

China TB HIV MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	1 346

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	5.7 (5.0–6.6)	[DRS 2007]
% of retreatment TB cases with MDR-TB	26 (23–28)	[DRS 2007]
MDR-TB cases among incident total TB cases in 2008	100 000 (79 000–120 000)	
MDR-TB cases among new pulmonary TB cases notified in 2009	51 000 (44 000–59 000)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	15 000 (13 000–17 000)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB	12	367	474
MDR-TB patients started treatment			458

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

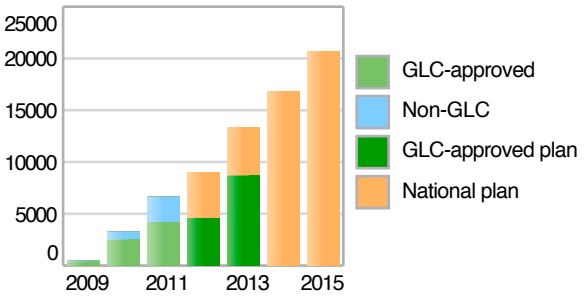
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	160 (100–220)	12 (7.5–17)
Prevalence (incl HIV/AIDS)	1 900 (760–3 000)	138 (56–225)
Incidence (incl HIV/AIDS)	1 300 (1 100–1 500)	96 (83–109)
Case detection, all forms (%)	75 (66–86)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	0.2	0.2	0.2
Culture (per 5 million population)	2.3	3.1	3.5
DST (per 10 million population)	0.8	1.0	1.2
LPA (per 10 million population)		<0.1	<0.1
Number of DST units for which external quality assurance was carried out		0	11

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Hong Kong SAR, China

First-line DST routinely performed for: all retreatment cases, cases failing a retreatment regimen, cases failing one or more retreatment regimens, cases that are contacts of MDR-TB cases

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size		
% Treatment success		
% Deaths		

Drug management 2009	
First-line drugs available in private pharmacies	No
First-line drugs available without prescription	No
Drug management 2010	
Second-line drug procurement issues	Complex importation procedures
Drugs provided to treat side-effects	Yes

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out	Under preparation
in the scope of MDR-TB	Yes
National infection control plan available	Yes
Tertiary hospitals with person in charge of TB infection control	
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	Yes Electronic and paper-based.
Representative survey/surveillance data on MDR-TB available	Routine surveillance data not representative; representative survey data available from nationwide TB drug-resistance survey (2007), and from drug-resistance surveys in 10 provinces (WHO project)

* Ranges represent uncertainty intervals

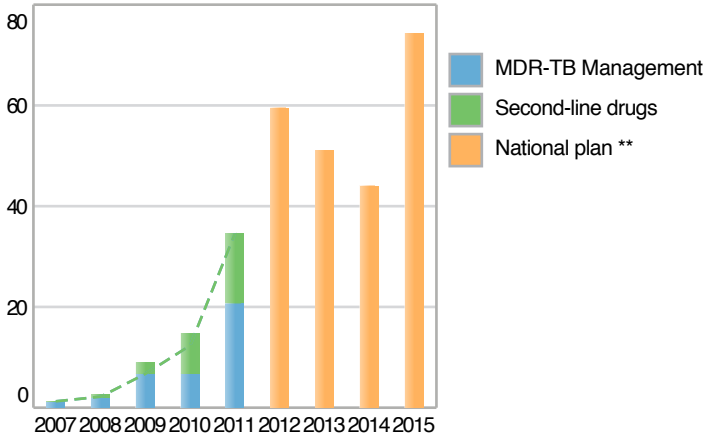
Please refer to Abbreviations on page v

China *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: food packages, transport vouchers/reimbursement (limited to poorest)	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	No
includes a budget	No
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	No
Prison care coordinated with NTP	

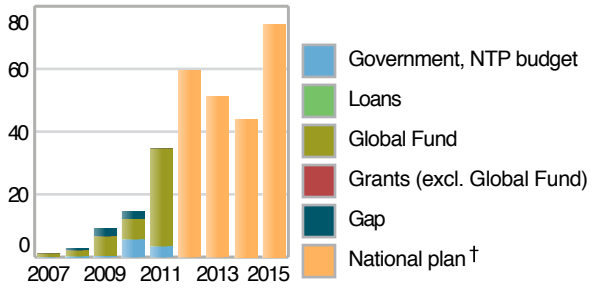
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



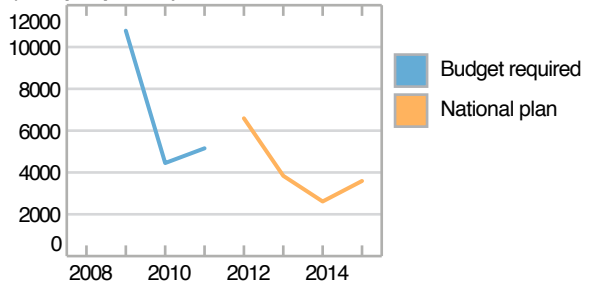
Financing (US$ millions)	2010	2011
Total NTP budget	239	285
MDR-TB financing component: ***		
second-line drugs budget	8	14
total MDR-TB budget	15	35
available funding	12	35
funding gap	2	0
% of budget funded	84	100
% available funding from domestic sources	46	10
% available funding from Global Fund	54	90

WHO TB planning and budgeting tool used	No

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 ††

Programme management: national MDR-TB strategic plan (in draft).

Laboratory capacity and quality assurance: plan for national TB laboratory network system (in draft).

Access to quality-assured second-line drugs: quality-assured second-line drugs available from Global Fund project.

Financing: funding mechanism for MDR-TB under development through insurance and government investment.

Bottlenecks in 2010

Issues in case-finding or enrolment for treatment: delays in diagnosis and treatment initiation in selected sites.

Recording and reporting: timeliness and veracity of individual case reporting system is unsatisfactory.

Laboratory capacity and quality assurance: new tools need to be incorporated in the national plan and match treatment capacity.

Qualified M/XMDR-TB treatment (human resources, facilities): human resource capacity for MDR-TB is limited in quantity and quality; facilities for infection control are insufficient.

Access to quality-assured second-line drugs: no quality assurance for second-line drugs outside the Global Fund project area.

** No breakdown by line item available for 2012–2015

*** Data in the table only apply to the Global Fund MDR-TB pilot areas in China. China government budget contributes to MDR-TB care and control through health insurance schemes and support to medical facilities and human resources.

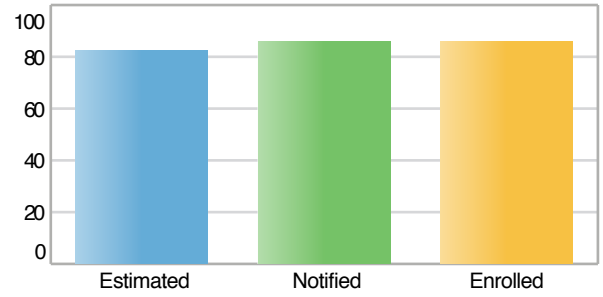
† No breakdown by sources of funding available for 2012–2015

†† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Estonia HIV MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	1

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	22 (17–28)	[DRS 2009]
% of retreatment TB cases with MDR-TB	52 (39–65)	[DRS 2009]
MDR-TB cases among incident total TB cases in 2008	93 (71–120)	
MDR-TB cases among new pulmonary TB cases notified in 2009	48 (36–63)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	34 (26–43)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB	54	32	86
MDR-TB patients started treatment			86

% of MDR-TB patients living with HIV/AIDS	7.2 [2009 routine surveillance]
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	0.8 (0.2-2.1) [2009 routine surveillance]

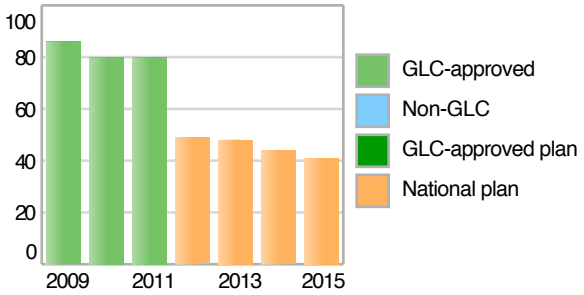
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	0.044 (0.038–0.059)	3.3 (2.8–4.4)
Prevalence (incl HIV/AIDS)	0.45 (0.13–0.77)	33 (10–57)
Incidence (incl HIV/AIDS)	0.4 (0.36–0.47)	30 (27–35)
Case detection, all forms (%)	89 (77–100)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	0.6	0.6	0.6
Culture (per 5 million population)	7.5	7.5	7.5
DST (per 10 million population)	14.9	14.9	14.9
LPA (per 10 million population)		0	0
Number of DST units for which external quality assurance was carried out		0	0

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Solna, Sweden

First-line DST routinely performed for: all patients

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size	81	
% Treatment success	57	
% Deaths	14	

Drug management 2009	
First-line drugs available in private pharmacies	No
First-line drugs available without prescription	No
Drug management 2010	
Second-line drug procurement issues	Possibility of waivers
Drugs provided to treat side-effects	Yes

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out	Yes (during joint WHO/ECDC/GLC country mission, 23-27 August 2010)
in the scope of MDR-TB	Yes
National infection control plan available	No
Tertiary hospitals with person in charge of TB infection control	
TB notification rate (all forms) in health care workers (all staff) over rate in general population	0.8
Recording and reporting for MDR-TB in place	Yes Electronic
Representative survey/surveillance data on MDR-TB available	Class A routine surveillance data (2009)

* Ranges represent uncertainty intervals

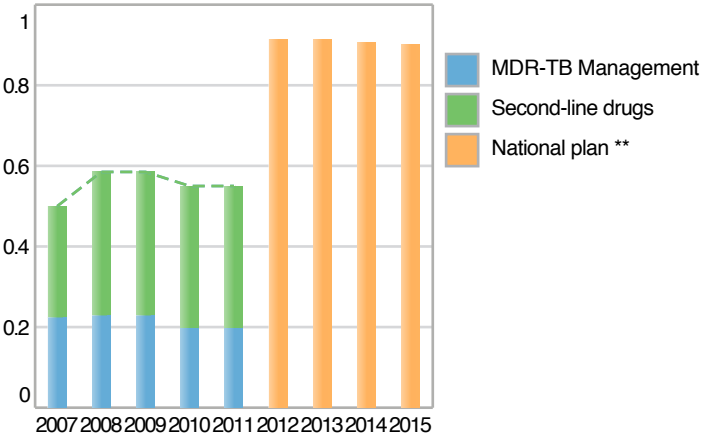
Please refer to Abbreviations on page v

Estonia *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: food packages, transport vouchers/reimbursement, counselling, social support	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	MoH
Prison care coordinated with NTP	Yes

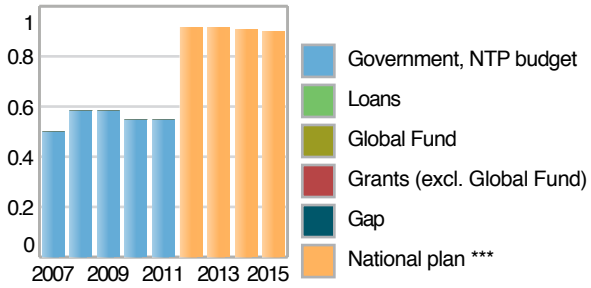
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



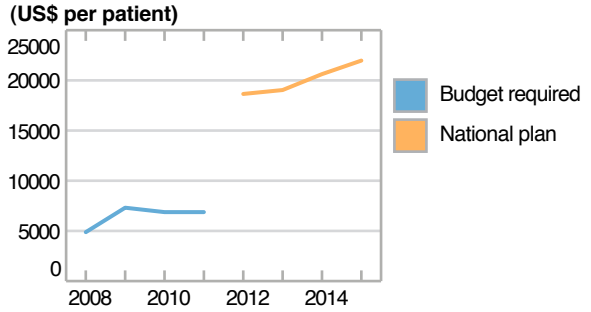
Financing (US$ millions)	2010	2011
Total NTP budget	<1	<1
MDR-TB financing component:		
second-line drugs budget	<1	<1
total MDR-TB budget	<1	<1
available funding	<1	<1
funding gap	0	0
% of budget funded	100	100
% available funding from domestic sources	100	100
% available funding from Global Fund		

WHO TB planning and budgeting tool used

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Bottlenecks in 2010

Qualified MDR/XDR-TB treatment (human resources, facilities): limited access to some third-line drugs (linezolid, clofazimine) for treatment of patients with XDR-TB.

TB infection control: problems with case management and isolation of XDR-TB patients after specific TB treatment has terminated.

Other: limited palliative care; limited counselling capacity for alcohol-dependent individuals and injecting drug users.

** No breakdown by line item available for 2012–2015

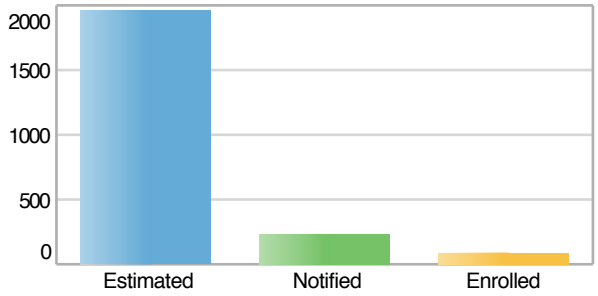
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Ethiopia TB HIV MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	83

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	1.6 (0.90–2.7)	[DRS 2005]
% of retreatment TB cases with MDR-TB	12 (6.4–21)	[DRS 2005]
MDR-TB cases among incident total TB cases in 2008	5 200 (2 400–8 000)	
MDR-TB cases among new pulmonary TB cases notified in 2009	1 500 (870–2 600)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	420 (230–740)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB	12	180	233
MDR-TB patients started treatment			88

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

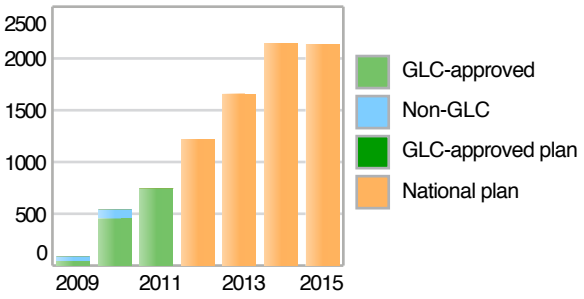
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	53 (36–74)	64 (43–90)
Prevalence (incl HIV/AIDS)	470 (220–780)	572 (265–947)
Incidence (incl HIV/AIDS)	300 (240–360)	359 (291–432)
Case detection, all forms (%)	50 (42–62)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	1.5	1.4	1.9
Culture (per 5 million population)	0.1	0.1	0.4
DST (per 10 million population)	0.2	0.2	0.2
LPA (per 10 million population)		0	0.8
Number of DST units for which external quality assurance was carried out		0	7

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Bilthoven, Netherlands

First-line DST routinely performed for: all retreatment cases, cases failing a retreatment regimen, cases failing one or more retreatment regimens, cases that are contacts of MDR-TB cases

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size		
% Treatment success		
% Deaths		

Drug management 2009	
First-line drugs available in private pharmacies	No
First-line drugs available without prescription	No
Drug management 2010	
Second-line drug procurement issues	Registration of SLD mandatory
Drugs provided to treat side-effects	Yes

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	Yes	Yes
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, not including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out	Yes (2008)
in the scope of MDR-TB	Yes
National infection control plan available	Yes
Tertiary hospitals with person in charge of TB infection control	100
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	Yes Electronic (Excel-based)
Representative survey/surveillance data on MDR-TB available	Routine surveillance data not representative; nationwide survey (2005)

* Ranges represent uncertainty intervals

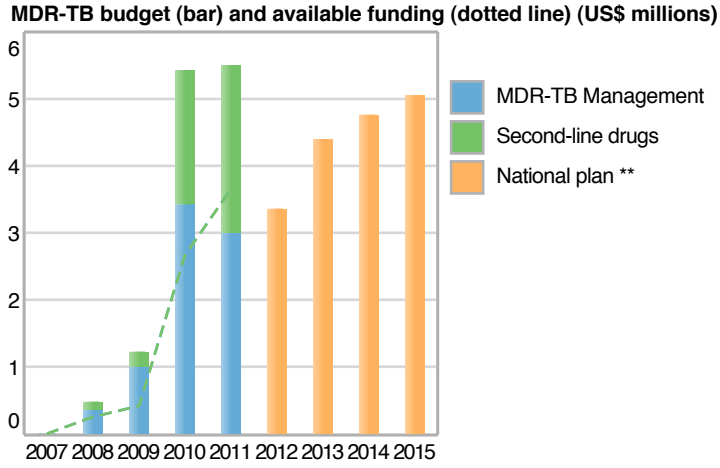
Please refer to Abbreviations on page v

Ethiopia *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: food packages, counselling/psychosocial support, education	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	NGO & MoH
Prison care coordinated with NTP	Yes

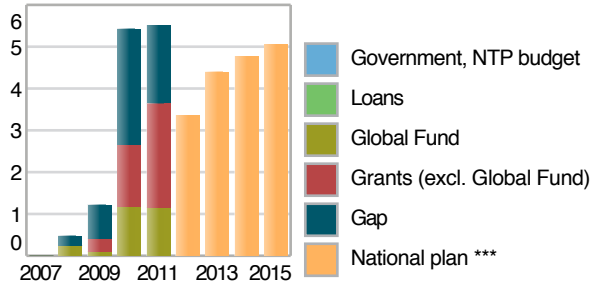
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



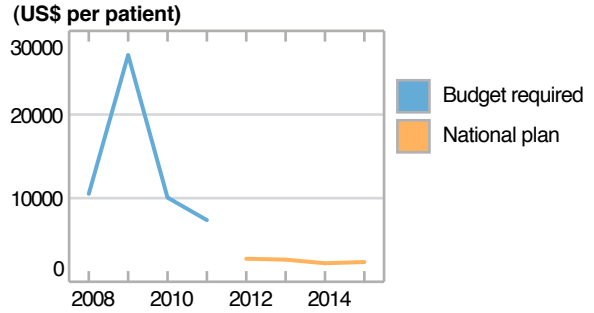
Financing (US$ millions)	2010	2011
Total NTP budget	39	38
MDR-TB financing component:		
second-line drugs budget	2	3
total MDR-TB budget	5	6
available funding	3	4
funding gap	3	2
% of budget funded	49	66
% available funding from domestic sources		
% available funding from Global Fund	44	32

WHO TB planning and budgeting tool used	Yes (2007-2008)

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Laboratory capacity and quality assurance: NRL capacity is huge and expansion of diagnostic services to regions is almost completed.

Bottlenecks in 2010

Issues in case-finding or enrolment for treatment: huge backlog of diagnosed cases.

Programme management: MDR-TB service limited to two sites (Addis Ababa and Gondar).

Qualified M/XMDR-TB treatment (human resources, facilities): limited human resource capacity and high staff turnover.

Access to quality-assured second-line drugs: strict drug regulations pursuant to contract with International Dispensary Association.

TB infection control: limited to MDR-TB treatment sites, poorly practiced in other facilities.

** No breakdown by line item available for 2012–2015

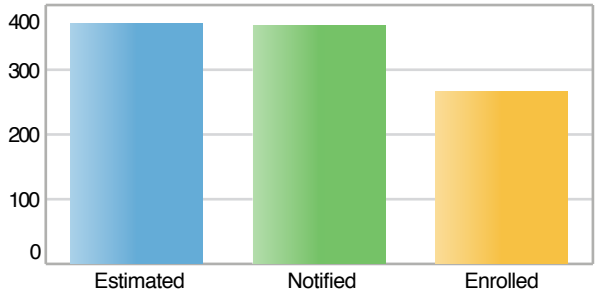
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Georgia MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	4

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	10 (8.9–12)	[DRS 2009]
% of retreatment TB cases with MDR-TB	31 (27–35)	[DRS 2009]
MDR-TB cases among incident total TB cases in 2008	670 (550–780)	
MDR-TB cases among new pulmonary TB cases notified in 2009	220 (170–280)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	160 (130–180)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB	183	185	369
MDR-TB patients started treatment			266

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

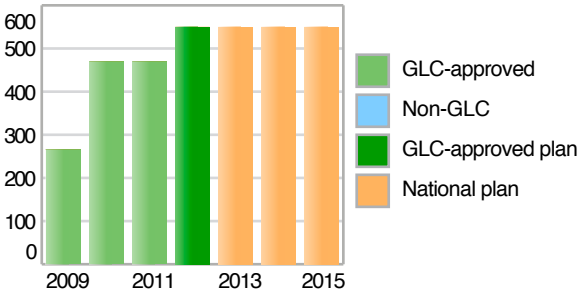
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	0.21 (0.19–0.23)	4.8 (4.4–5.3)
Prevalence (incl HIV/AIDS)	4.9 (1.1–8.7)	116 (27–205)
Incidence (incl HIV/AIDS)	4.5 (4–5.1)	107 (94–119)
Case detection, all forms (%)	100 (93–120)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	0.7	0.7	0.7
Culture (per 5 million population)	2.3	2.3	2.4
DST (per 10 million population)	2.3	2.3	2.4
LPA (per 10 million population)		2.3	2.4
Number of DST units for which external quality assurance was carried out			1

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Antwerp, Belgium

First-line DST routinely performed for: all patients

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size	61	
% Treatment success	38	
% Deaths	20	

Drug management 2009	
First-line drugs available in private pharmacies	Yes
First-line drugs available without prescription	Yes
Drug management 2010	
Second-line drug procurement issues	Product registration mandatory
Drugs provided to treat side-effects	Yes

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out	Yes (2008)
in the scope of MDR-TB	
National infection control plan available	Under preparation
Tertiary hospitals with person in charge of TB infection control	0
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	Yes Electronic (web-based)
Representative survey/surveillance data on MDR-TB available	Class A routine surveillance data (2009)

* Ranges represent uncertainty intervals

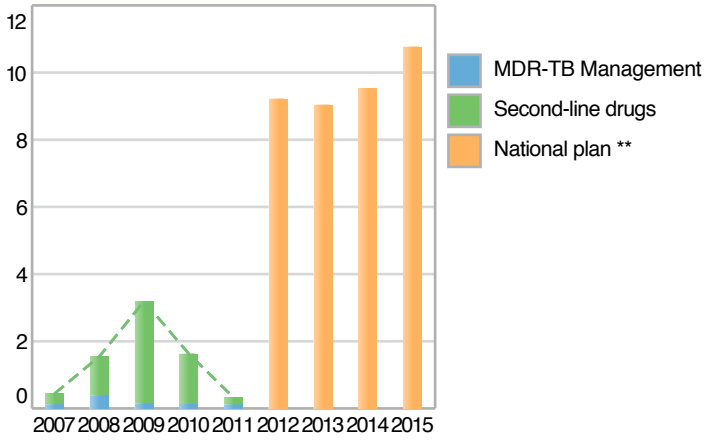
Please refer to Abbreviations on page v

Georgia *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: food packages, transport vouchers/reimbursement, hygiene packages, counselling/psychosocial support, housing support, education, financial incentives	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	MCLA, NTP
Prison care coordinated with NTP	Yes

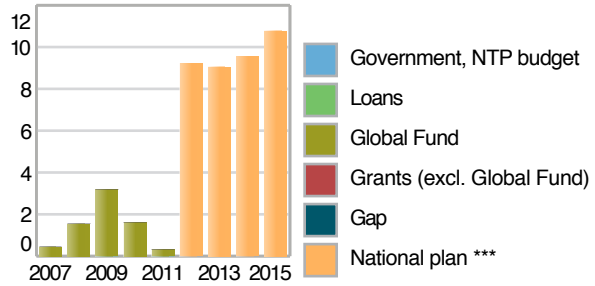
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



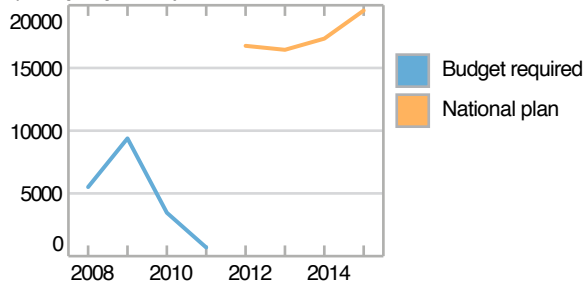
Financing (US$ millions)	2010	2011
Total NTP budget	9	8
MDR-TB financing component:		
second-line drugs budget	1	<1
total MDR-TB budget	2	<1
available funding	2	<1
funding gap	0	0
% of budget funded	100	100
% available funding from domestic sources		
% available funding from Global Fund	100	100

WHO TB planning and budgeting tool used

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

TB infection control: improved infection control measures implemented in the penitentiary sector.

Recording and reporting: routine linkage of laboratory information and drug management module established.

Bottlenecks in 2010

Issues in case-finding or enrolment for treatment: involvement of private health-care providers needs strengthening.

Financing: need to increase NTP staff salaries and incentives for patients.

Other: outpatient care needs further strengthening.

** No breakdown by line item available for 2012–2015

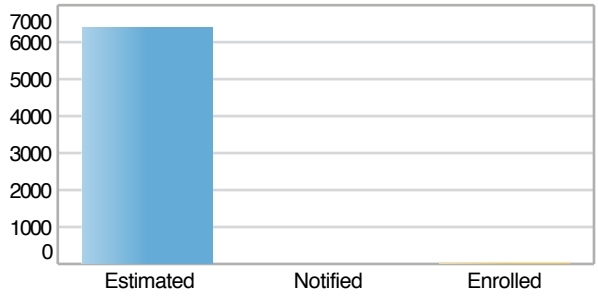
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Indonesia TB HIV MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	230

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	1.8 (1.0–2.6)	[DRS 2006]
% of retreatment TB cases with MDR-TB	17 (8.1–26)	[DRS 2006]
MDR-TB cases among incident total TB cases in 2008	9 300 (0–21 000)	
MDR-TB cases among new pulmonary TB cases notified in 2009	5 600 (1 400–19 000)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	840 (0–2 300)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB			
MDR-TB patients started treatment			20

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

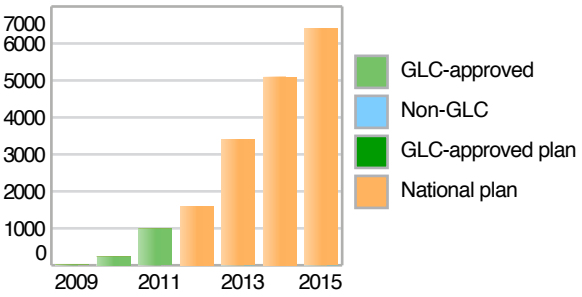
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	61 (36–95)	27 (16–41)
Prevalence (incl HIV/AIDS)	660 (280–1 100)	285 (120–482)
Incidence (incl HIV/AIDS)	430 (350–520)	189 (154–228)
Case detection, all forms (%)	67 (56–83)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	2.2	2.2	2.2
Culture (per 5 million population)	1.3	0.9	0.9
DST (per 10 million population)	0.9	0.2	0.3
LPA (per 10 million population)		0	0
Number of DST units for which external quality assurance was carried out		0	0

National reference laboratory in 2009	No
Link to supra-national laboratory	Adelaide, Australia

First-line DST routinely performed for: all retreatment cases, cases failing a retreatment regimen, cases failing one or more retreatment regimens, cases that are contacts of MDR-TB cases

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size		
% Treatment success		
% Deaths		

Drug management 2009	
First-line drugs available in private pharmacies	Yes
First-line drugs available without prescription	No
Drug management 2010	
Second-line drug procurement issues	Complicated importation procedures & shortage of Kanamycin in GDF
Drugs provided to treat side-effects	Yes

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	Yes
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, not including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out	Yes (2008)
in the scope of MDR-TB	Yes
National infection control plan available	Yes
Tertiary hospitals with person in charge of TB infection control	
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	Yes Paper-based and electronic
Representative survey/surveillance data on MDR-TB available	Routine surveillance data not representative; survey in Mimika district, Papua province (2004) and in Central Java province (2006); survey in East Java province under way

* Ranges represent uncertainty intervals

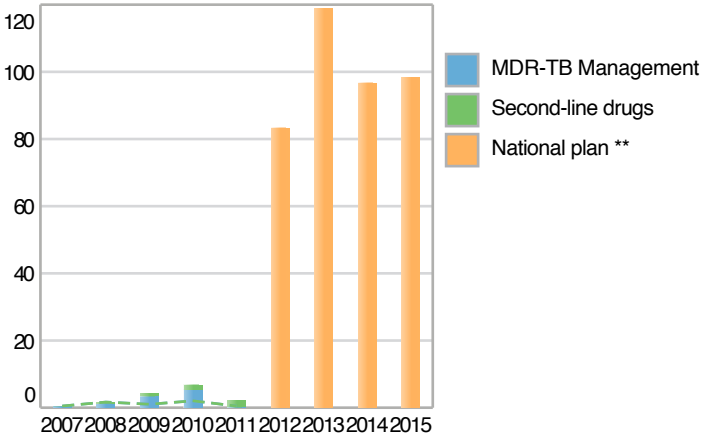
Please refer to Abbreviations on page v

Indonesia *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	No
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: incentive for transport and nutrition/food, moral/ religious support, simple skills to make handicrafts (income generated activities)	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	No
Prison care coordinated with NTP	

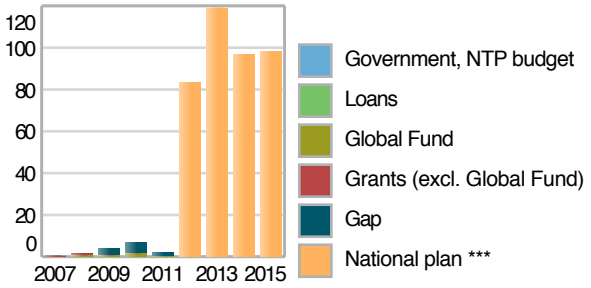
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



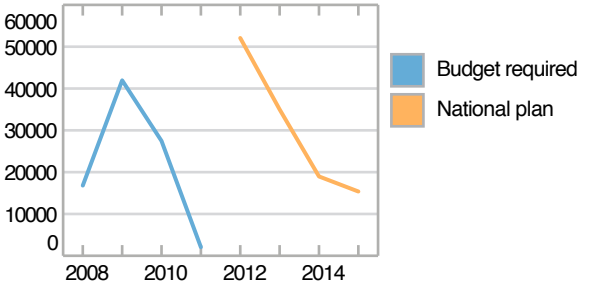
Financing (US$ millions)	2010	2011
Total NTP budget	71	85
MDR-TB financing component:		
second-line drugs budget	1	2
total MDR-TB budget	7	2
available funding	2	<1
funding gap	5	2
% of budget funded	30	24
% available funding from domestic sources	7	
% available funding from Global Fund	79	100

WHO TB planning and budgeting tool used	Yes (2010-2014)

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Programme management: significantly improved.

Qualified M/XMDR-TB treatment (human resources, facilities): sufficient.

Access to quality-assured second-line drugs: available via the GLC.

TB infection control: in place.

Bottlenecks in 2010

Programme management: at early stages of initiating programmatic management of drug-resistant TB; poor commitment of decision-makers and related sectors for uninterrupted funding and to ensure the continuation of such activities; delay in initiating the programme.

Recording and reporting: electronic recording and reporting needs to be adjusted and strengthened.

Laboratory capacity and quality assurance: limited laboratory capacity for culture and DST. Only five NRLs are certified to carry out DST of first- and second-line drugs. Expansion of the TB laboratory network requires more capability for MDR-TB culture and identification, and should accord with expansion of the programmatic management of drug-resistant TB.

** No breakdown by line item available for 2012–2015

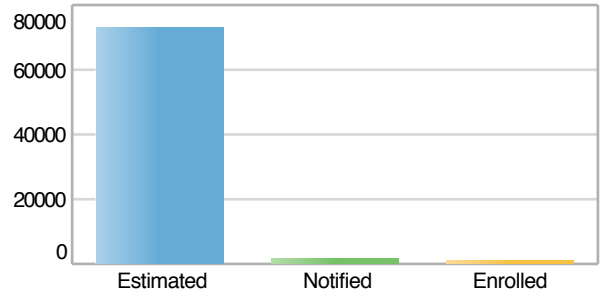
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

India TB HIV MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	1 198

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	2.3 (1.8–2.8)	[DRS 2005]
% of retreatment TB cases with MDR-TB	17 (15–20)	[DRS 2005]
MDR-TB cases among incident total TB cases in 2008	99 000 (79 000–120 000)	
MDR-TB cases among new pulmonary TB cases notified in 2009	23 000 (18 000–28 000)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	50 000 (43 000–57 000)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB		1 660	1 660
MDR-TB patients started treatment			1 136

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

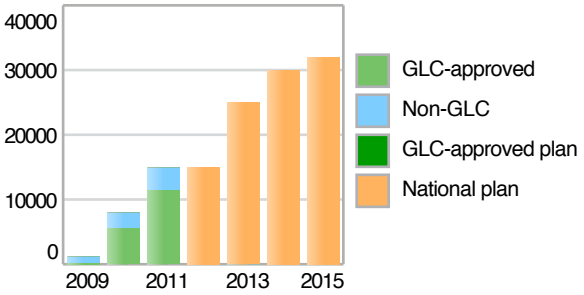
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	280 (160–430)	23 (14–36)
Prevalence (incl HIV/AIDS)	3 000 (1 300–5 000)	249 (105–419)
Incidence (incl HIV/AIDS)	2 000 (1 600–2 400)	168 (137–202)
Case detection, all forms (%)	67 (56–83)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	1.1	1.1	1.1
Culture (per 5 million population)	<0.1	<0.1	0.1
DST (per 10 million population)	0.1	0.1	0.2
LPA (per 10 million population)		<0.1	<0.1
Number of DST units for which external quality assurance was carried out		0	12

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Chennai, India

First-line DST routinely performed for: cases failing a retreatment regimen, cases failing one or more retreatment regimens, cases that are contacts of MDR-TB cases

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size		
% Treatment success		
% Deaths		

Drug management 2009	
First-line drugs available in private pharmacies	Yes
First-line drugs available without prescription	Yes
Drug management 2010	
Second-line drug procurement issues	
Drugs provided to treat side-effects	No

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs	Yes	Yes

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out	Pilot sites only (2010)
in the scope of MDR-TB	Yes
National infection control plan available	Pilot sites only (2010)
Tertiary hospitals with person in charge of TB infection control	0
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	Yes Paper-based and electronic (Reporting system for aggregate data)
Representative survey/surveillance data on MDR-TB available	Routine surveillance data not representative; surveys in 9 districts/states 1995-2006; 3 subnational DRS surveys conducted 2006-2010 and 1 subnational DRS survey under way

* Ranges represent uncertainty intervals

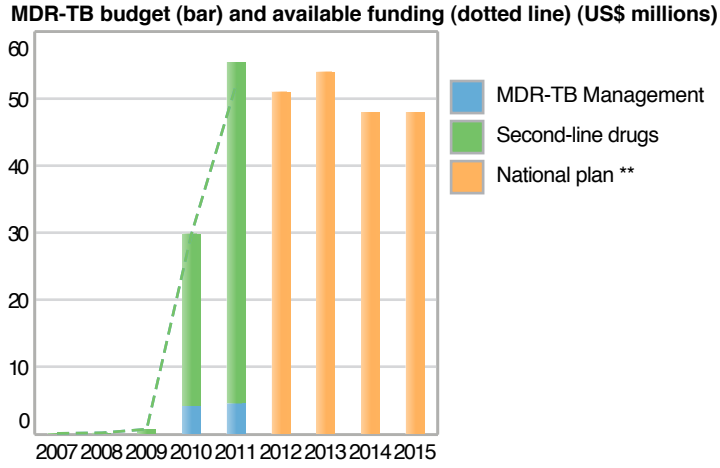
Please refer to Abbreviations on page v

India *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: inadequate access to social schemes; Eli Lilly and German Leprosy and TB Relief Association providing food support in some states	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	
Prison care coordinated with NTP	

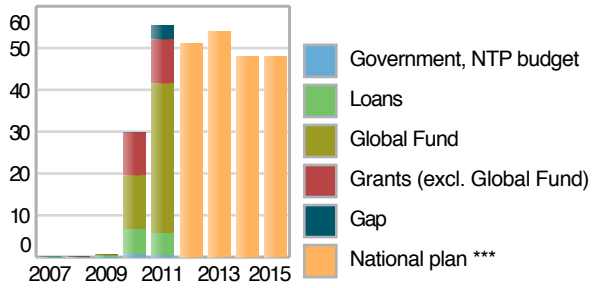
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



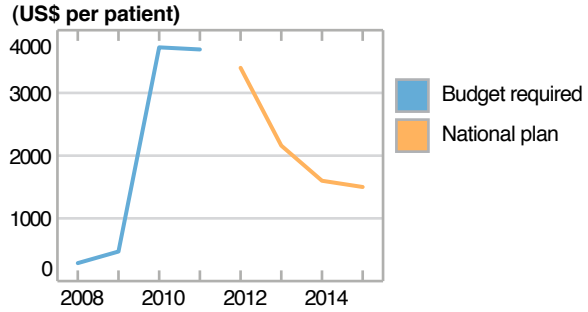
Financing (US$ millions)	2010	2011
Total NTP budget	112	151
MDR-TB financing component:		
second-line drugs budget	26	51
total MDR-TB budget	30	55
available funding	30	52
funding gap	0	3
% of budget funded	100	94
% available funding from domestic sources	23	11
% available funding from Global Fund	43	69

WHO TB planning and budgeting tool used	No

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Laboratory capacity and quality assurance: expanding.

Access to quality-assured second-line drugs: adequate availability; timely procurement and delivery; cost limits treatment options within funding envelope.

TB infection control: national guidelines on airborne infection control containing section on MDR-TB ward and laboratories are prioritized for implementation.

Bottlenecks in 2010

Recording and reporting: no comprehensive integrated electronic MDR-TB system in place.

Laboratory capacity and quality assurance: although expanding, limited laboratory capacity for diagnosis and follow-up of MDR-TB patients. Limited availability of second-line drugs and DST. Need for implementation of high-throughput diagnostics. Specimen transportation infrastructure is needed in the general health system.

Qualified MDR/XDR-TB treatment (human resources, facilities): limited human resource capacity to undertake required pre-implementation training and assessments.

Financing: funding envelope is limited and unable to accommodate scale-up as envisaged with rising costs of second-line drugs.

** No breakdown by line item available for 2012–2015

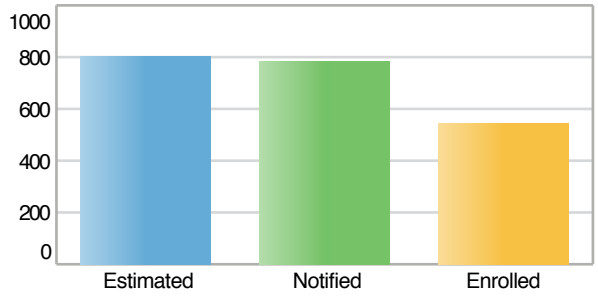
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Kyrgyzstan MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	5

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	13 (0.0–25)	[model 2008]
% of retreatment TB cases with MDR-TB	42 (12–72)	[model 2008]
MDR-TB cases among incident total TB cases in 2008	1 400 (350–2 400)	
MDR-TB cases among new pulmonary TB cases notified in 2009	480 (0–980)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	320 (90–550)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB	225	161	785
MDR-TB patients started treatment			545

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

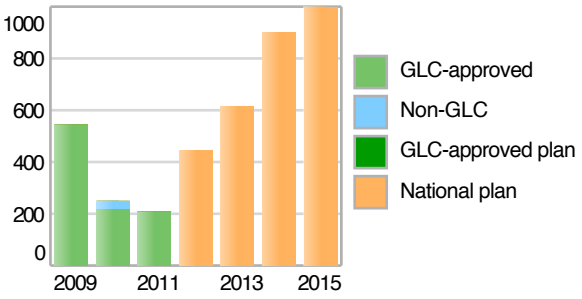
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	1.2 (0.84–1.8)	22 (15–32)
Prevalence (incl HIV/AIDS)	13 (5.2–22)	236 (95–401)
Incidence (incl HIV/AIDS)	8.7 (7.1–11)	159 (130–192)
Case detection, all forms (%)	66 (55–81)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	2.3	2.2	2.2
Culture (per 5 million population)	12.0	10.0	8.1
DST (per 10 million population)	1.8	5.5	5.4
LPA (per 10 million population)			
Number of DST units for which external quality assurance was carried out			

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Gauting, Germany

First-line DST routinely performed for: all patients

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size	132	
% Treatment success	50	
% Deaths	5	

Drug management 2009	
First-line drugs available in private pharmacies	Yes
First-line drugs available without prescription	Yes
Drug management 2010	
Second-line drug procurement issues	Product registration mandatory
Drugs provided to treat side-effects	

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out in the scope of MDR-TB	
National infection control plan available	No
Tertiary hospitals with person in charge of TB infection control	
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	Start of support to electronic system by WHO: 01/2011
Representative survey/surveillance data on MDR-TB available	No representative data available; nationwide survey under way

* Ranges represent uncertainty intervals

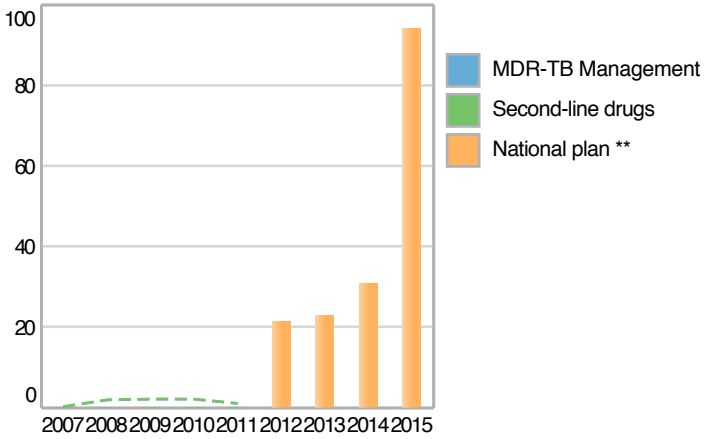
Please refer to Abbreviations on page v

Kyrgyzstan *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	
Treatment (drugs and care) free of charge	
Patient support available (GLC projects)	Yes
Type of support: limited food and transportation support	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	
Prison care coordinated with NTP	

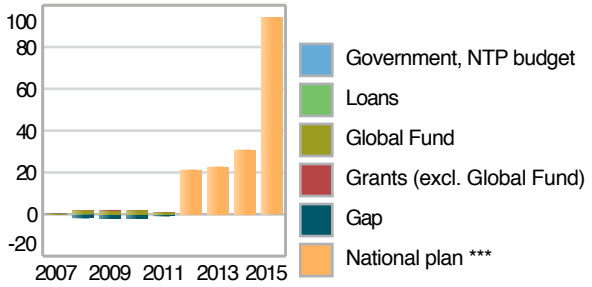
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



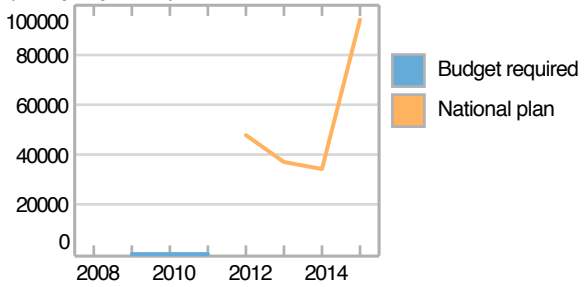
Financing (US$ millions)	2010	2011
Total NTP budget		
MDR-TB financing component:		
second-line drugs budget		
total MDR-TB budget		
available funding	2	<1
funding gap	<1	<1
% of budget funded		
% available funding from domestic sources		
% available funding from Global Fund	100	100

WHO TB planning and budgeting tool used

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Bottlenecks in 2010

Recording and reporting: technical assistance needed for training in electronic MDR-TB data management.

Qualified MDR/XDR-TB treatment (human resources, facilities): limited human resource capacity.

Access to quality-assured second-line drugs: national legislation regarding drug procurement.

Other: unstable political situation.

** No breakdown by line item available for 2012–2015

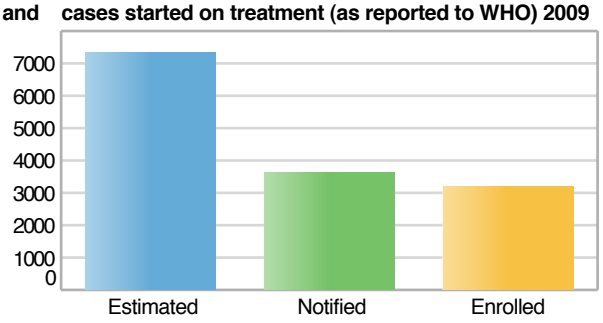
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Kazakhstan MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	16

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	14 (11–18)	[DRS 2001]
% of retreatment TB cases with MDR-TB	56 (51–62)	[DRS 2001]
MDR-TB cases among incident total TB cases in 2008	8 100 (6 400–9 700)	
MDR-TB cases among new pulmonary TB cases notified in 2009	2 100 (1 600–2 600)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	5 300 (4 800–5 800)	

MDR-TB notified cases 2009	New	Retreatment	Total
Confirmed cases of MDR-TB	981	2 329	3 644
MDR-TB patients started treatment			3 209

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

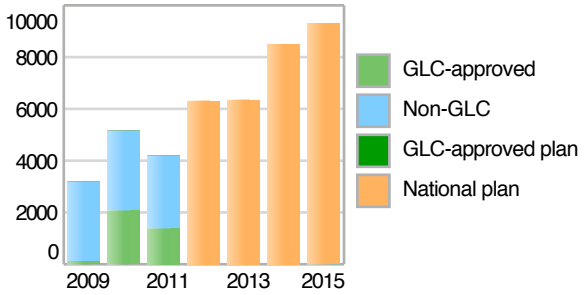
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	3.5 (2.4–5.2)	22 (16–33)
Prevalence (incl HIV/AIDS)	33 (11–57)	211 (69–367)
Incidence (incl HIV/AIDS)	26 (21–30)	163 (136–192)
Case detection, all forms (%)	80 (68–96)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	2.9	2.9	2.9
Culture (per 5 million population)	6.8	28.5	28.2
DST (per 10 million population)	13.5	14.1	14.0
LPA (per 10 million population)			
Number of DST units for which external quality assurance was carried out			

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Borstel, Germany

First-line DST routinely performed for: all patients

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size		1609
% Treatment success		77
% Deaths		4

Drug management 2009	
First-line drugs available in private pharmacies	Yes
First-line drugs available without prescription	Yes
Drug management 2010	
Second-line drug procurement issues	
Drugs provided to treat side-effects	

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	
Training material developed	
Training conducted specifically for DR-TB	
TB infection control national situation assessment carried out	Yes (2010)
in the scope of MDR-TB	Yes
National infection control plan available	Under preparation
Tertiary hospitals with person in charge of TB infection control	18
TB notification rate (all forms) in health care workers (all staff) over rate in general population	7.5
Recording and reporting for MDR-TB in place	Yes Data collection paper-based, entered in electronic database
Representative survey/surveillance data on MDR-TB available	Class B routine surveillance data (2008); nationwide survey (2001)

* Ranges represent uncertainty intervals

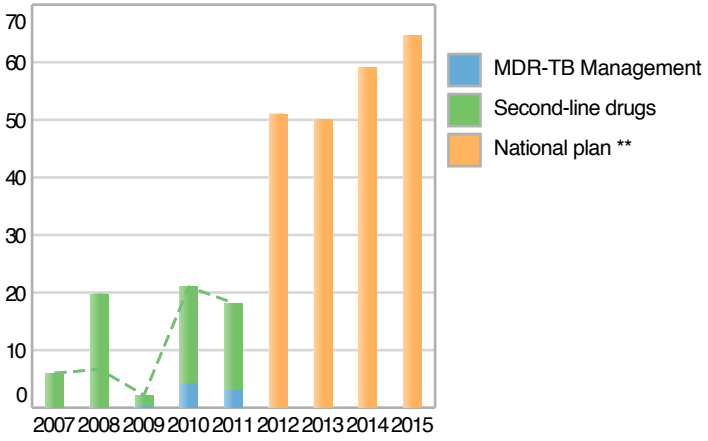
Please refer to Abbreviations on page v

Kazakhstan *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: food packages, transport vouchers/reimbursement, hygiene packages, financial incentives	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	MoJ
Prison care coordinated with NTP	Yes

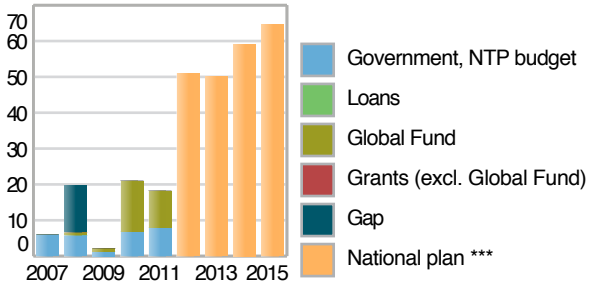
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



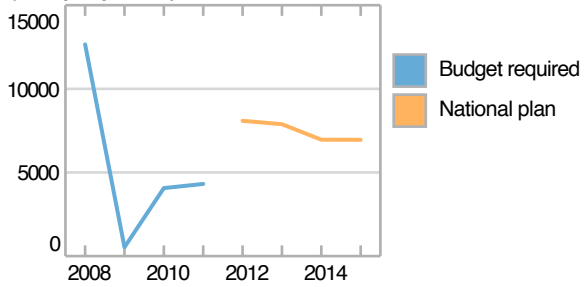
Financing (US$ millions)	2010	2011
Total NTP budget	265	196
MDR-TB financing component:		
second-line drugs budget	17	15
total MDR-TB budget	21	18
available funding	21	18
funding gap	0	0
% of budget funded	100	100
% available funding from domestic sources	33	44
% available funding from Global Fund	67	56

WHO TB planning and budgeting tool used

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Bottlenecks in 2010

Programme management: weak implementation capacity at the regional level.

** No breakdown by line item available for 2012–2015

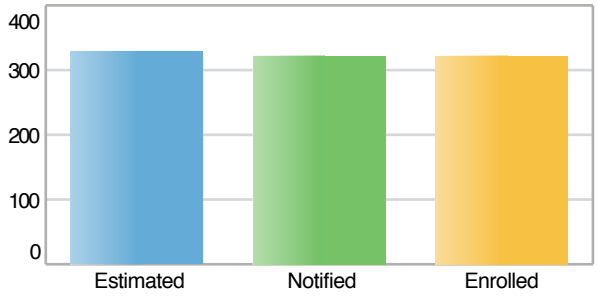
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Lithuania MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	3

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	11 (8.8–13)	[DRS 2009]
% of retreatment TB cases with MDR-TB	52 (47–57)	[DRS 2009]
MDR-TB cases among incident total TB cases in 2008	330 (270–390)	
MDR-TB cases among new pulmonary TB cases notified in 2009	140 (110–160)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	190 (170–210)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB	114	208	322
MDR-TB patients started treatment			322

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

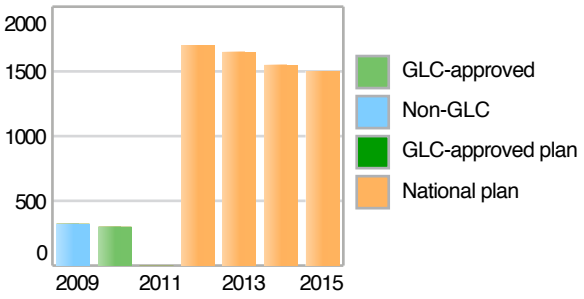
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	0.3 (0.2–0.45)	9 (6.2–14)
Prevalence (incl HIV/AIDS)	2.6 (0.98–4.5)	80 (30–137)
Incidence (incl HIV/AIDS)	2.3 (2–2.7)	71 (61–82)
Case detection, all forms (%)	81 (70–95)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	0.3	0.4	<0.1
Culture (per 5 million population)	0	6.1	1.5
DST (per 10 million population)	12.0	12.2	12.3
LPA (per 10 million population)		3.0	3.1
Number of DST units for which external quality assurance was carried out		0	1

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Solna, Sweden

First-line DST routinely performed for: new cases, all retreatment cases, cases failing a retreatment regimen, cases failing one or more retreatment regimens, cases that are contacts of MDR-TB cases

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size		
% Treatment success		
% Deaths		

Drug management 2009	
First-line drugs available in private pharmacies	Yes
First-line drugs available without prescription	No
Drug management 2010	
Second-line drug procurement issues	Registration of SLD mandatory
Drugs provided to treat side-effects	Yes

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, including XDR-TB
Training material developed	No
Training conducted specifically for DR-TB	No
TB infection control national situation assessment carried out	Yes
in the scope of MDR-TB	Yes
National infection control plan available	No
Tertiary hospitals with person in charge of TB infection control	
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	Yes Electronic reporting (national level) and paper-based reporting (regional level)
Representative survey/surveillance data on MDR-TB available	Class A routine surveillance data (2009)

* Ranges represent uncertainty intervals

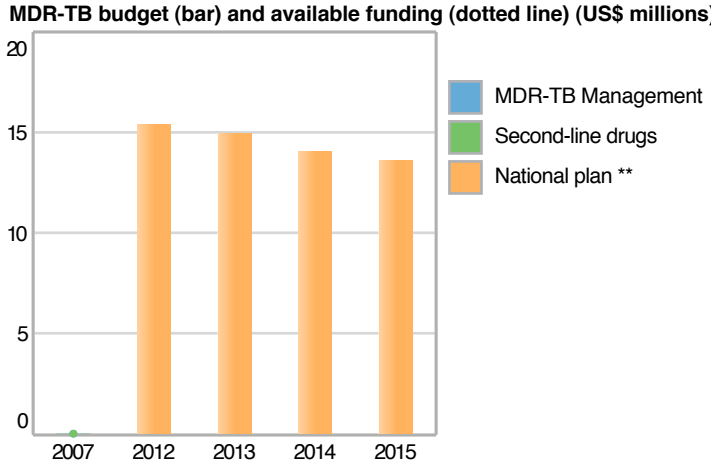
Please refer to Abbreviations on page v

Lithuania *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: food packages, hygiene packages	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	MoJ
Prison care coordinated with NTP	Yes

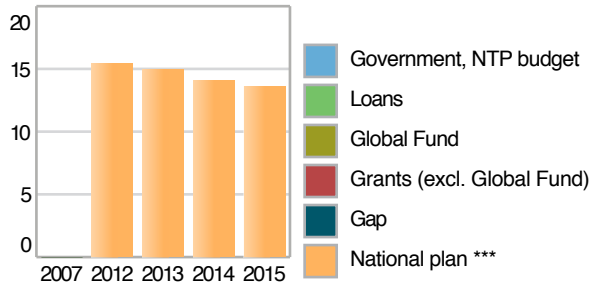
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



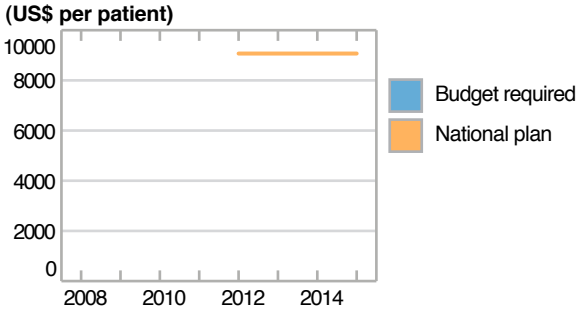
Financing (US$ millions)	2010	2011
Total NTP budget		
MDR-TB financing component:		
second-line drugs budget		
total MDR-TB budget		
available funding		
funding gap		
% of budget funded		
% available funding from domestic sources		
% available funding from Global Fund		

WHO TB planning and budgeting tool used

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Recording and reporting: the system is well organized.

Bottlenecks in 2010

Programme management: lack of appointed manager and supervisors for national TB control.

Laboratory capacity and quality assurance: insufficient quality control for DST carried out by NRLs or SRLs.

Access to quality-assured second-line drugs: supply interruptions caused by the existing decentralized drug procurement system.

** No breakdown by line item available for 2012–2015

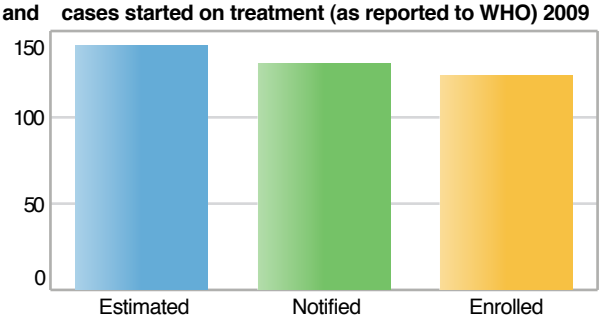
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Latvia MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	2	

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	13 (11–16)	[DRS 2009]
% of retreatment TB cases with MDR-TB	36 (28–45)	[DRS 2009]
MDR-TB cases among incident total TB cases in 2008	170 (140–200)	
MDR-TB cases among new pulmonary TB cases notified in 2009	95 (78–120)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	47 (37–59)	

MDR-TB notified cases 2009	New	Retreatment	Total
Confirmed cases of MDR-TB	83	48	131
MDR-TB patients started treatment			124

% of MDR-TB patients living with HIV/AIDS	24.6 [2008 routine surveillance]
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	1.9 (0.9-3.5) [2008 routine surveillance]

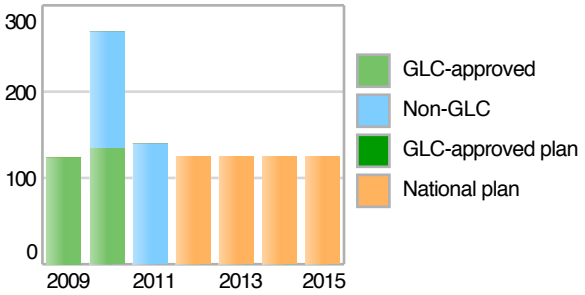
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	0.098 (0.084–0.14)	4.4 (3.7–6.1)
Prevalence (incl HIV/AIDS)	1.1 (0.28–1.9)	48 (13–83)
Incidence (incl HIV/AIDS)	1 (0.88–1.1)	45 (39–51)
Case detection, all forms (%)	94 (83–110)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	1.2	1.2	1.2
Culture (per 5 million population)	13.3	11.1	11.2
DST (per 10 million population)	4.4	4.4	4.5
LPA (per 10 million population)		4.4	4.5
Number of DST units for which external quality assurance was carried out		1	1

National reference laboratory in 2009	Yes
Link to supra-national laboratory	

First-line DST routinely performed for: all patients

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size	99	
% Treatment success	64	
% Deaths	15	

Drug management 2009	
First-line drugs available in private pharmacies	No
First-line drugs available without prescription	No
Drug management 2010	
Second-line drug procurement issues	Registration of SLD mandatory
Drugs provided to treat side-effects	Yes

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, not including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out	Yes (1998)
in the scope of MDR-TB	Yes
National infection control plan available	Yes
Tertiary hospitals with person in charge of TB infection control	
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	Yes Paper-based in regions, electronic database at national TB registry
Representative survey/surveillance data on MDR-TB available	Class A routine surveillance data (2009)

* Ranges represent uncertainty intervals

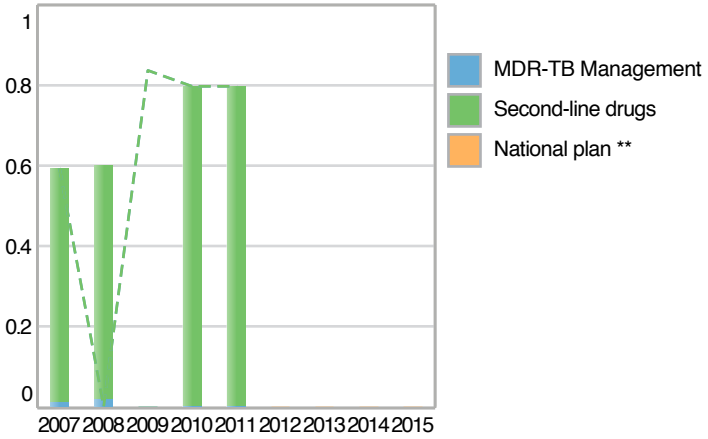
Please refer to Abbreviations on page v

Latvia *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: transport vouchers	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	MoJ and MoH
Prison care coordinated with NTP	Yes

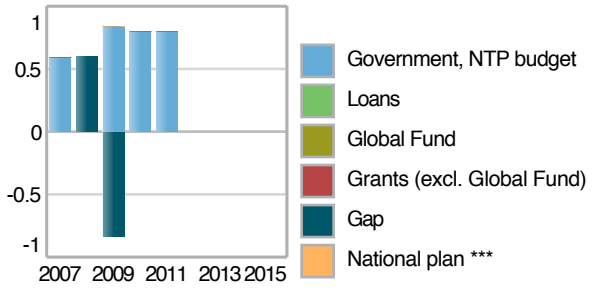
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



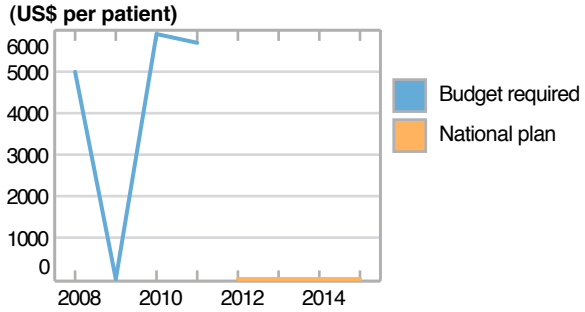
Financing (US$ millions)	2010	2011
Total NTP budget	5	5
MDR-TB financing component:		
second-line drugs budget	<1	<1
total MDR-TB budget	<1	<1
available funding	<1	<1
funding gap	0	0
% of budget funded	100	100
% available funding from domestic sources	100	100
% available funding from Global Fund		

WHO TB planning and budgeting tool used

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Bottlenecks in 2010

** No breakdown by line item available for 2012–2015

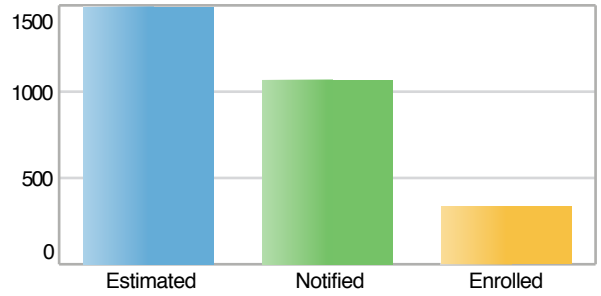
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Republic of Moldova MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	4

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	19 (17–22)	[DRS 2006]
% of retreatment TB cases with MDR-TB	51 (49–53)	[DRS 2006]
MDR-TB cases among incident total TB cases in 2008	2 100 (1 700–2 400)	
MDR-TB cases among new pulmonary TB cases notified in 2009	650 (560–740)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	840 (810–880)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB	289	780	1 069
MDR-TB patients started treatment			334

% of MDR-TB patients living with HIV/AIDS	9.7 [2009 routine surveillance]
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	2.0 (1.4-2.9) [2009 routine surveillance]

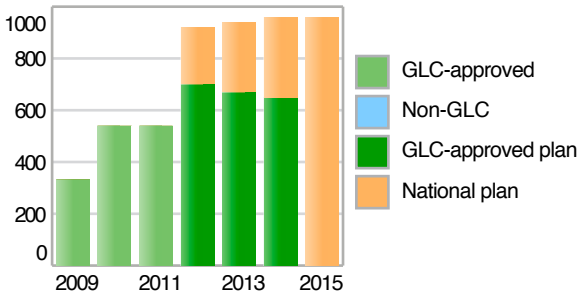
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	0.94 (0.65–1.3)	26 (18–37)
Prevalence (incl HIV/AIDS)	9.5 (4–16)	264 (112–446)
Incidence (incl HIV/AIDS)	6.4 (5.2–7.7)	178 (145–215)
Case detection, all forms (%)	68 (56–83)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	1.6	1.6	1.7
Culture (per 5 million population)	5.5	5.6	5.6
DST (per 10 million population)	11.0	11.1	11.2
LPA (per 10 million population)		2.8	0
Number of DST units for which external quality assurance was carried out		0	0

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Borstel, Germany

First-line DST routinely performed for: all patients

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size	254	
% Treatment success	52	
% Deaths	8	

Drug management 2009	
First-line drugs available in private pharmacies	No
First-line drugs available without prescription	No
Drug management 2010	
Second-line drug procurement issues	No
Drugs provided to treat side-effects	

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out	Yes
in the scope of MDR-TB	Yes
National infection control plan available	Yes
Tertiary hospitals with person in charge of TB infection control	6
TB notification rate (all forms) in health care workers (all staff) over rate in general population	0.3
Recording and reporting for MDR-TB in place	Yes Electronic
Representative survey/surveillance data on MDR-TB available	Class B routine surveillance data (2009); nationwide survey (2006)

* Ranges represent uncertainty intervals

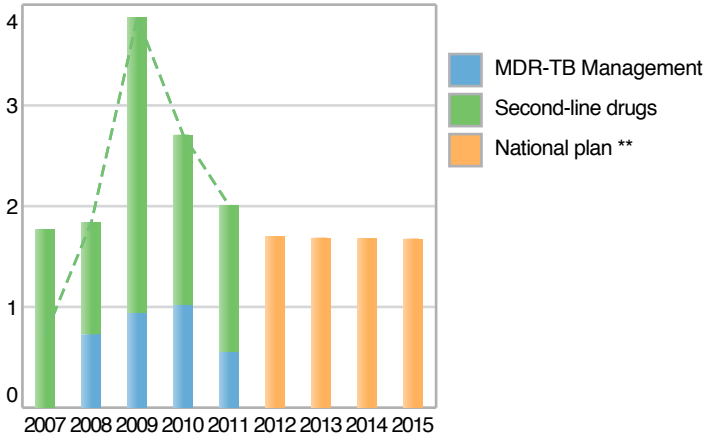
Please refer to Abbreviations on page v

Republic of Moldova *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: food packages, transport vouchers/reimbursement, hygiene packages	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	
Prison care coordinated with NTP	Yes

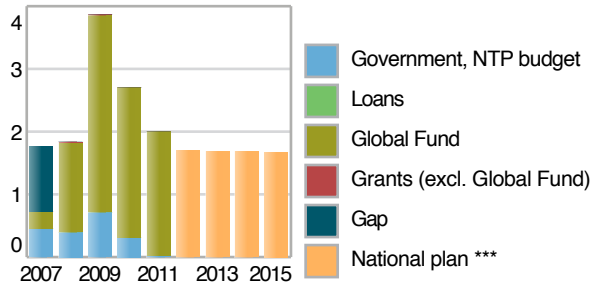
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



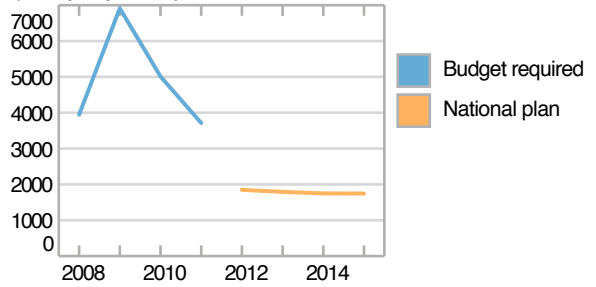
Financing (US$ millions)	2010	2011
Total NTP budget	5	4
MDR-TB financing component:		
second-line drugs budget	2	1
total MDR-TB budget	3	2
available funding	3	2
funding gap	0	0
% of budget funded	100	100
% available funding from domestic sources	11	1
% available funding from Global Fund	89	99

WHO TB planning and budgeting tool used

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Recording and reporting: sufficient.

Access to quality-assured second-line drugs: not an issue.

Bottlenecks in 2010

Issues in case-finding or enrolment for treatment: late diagnosis of MDR-TB.

Programme management: training for staff needed.

Laboratory capacity and quality assurance: insufficient rapid tests for drug resistance to detect MDR-TB and XDR-TB.

Qualified MDR-/XDR-TB treatment (human resources, facilities): insufficient human resources.

TB infection control: training of staff; revision of the national infection control plan; mission for technical assistance focused on environmental controls.

Financing: limited financial resources for MDR-TB.

Other: insufficient community involvement.

** No breakdown by line item available for 2012–2015

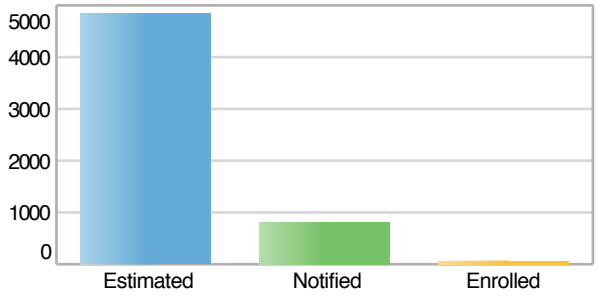
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Myanmar TB HIV MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	50

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	4.2 (3.2–5.6)	[DRS 2007]
% of retreatment TB cases with MDR-TB	10 (7.1–14)	[DRS 2007]
MDR-TB cases among incident total TB cases in 2008	9 300 (6 400–12 000)	
MDR-TB cases among new pulmonary TB cases notified in 2009	3 900 (3 000–5 200)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	970 (690–1 400)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB		815	815
MDR-TB patients started treatment			64

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

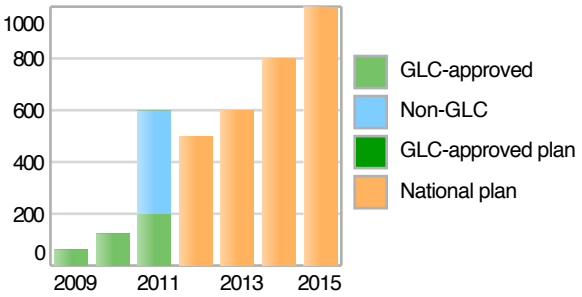
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	29 (18–43)	59 (36–87)
Prevalence (incl HIV/AIDS)	300 (130–500)	597 (266–995)
Incidence (incl HIV/AIDS)	200 (160–240)	404 (328–487)
Case detection, all forms (%)	64 (53–78)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	0.8	0.8	0.8
Culture (per 5 million population)	0.2	0.2	0.2
DST (per 10 million population)	0.2	0.4	0.4
LPA (per 10 million population)			0.4
Number of DST units for which external quality assurance was carried out			2

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Bangkok, Thailand

First-line DST routinely performed for: cases failing a retreatment regimen, cases failing one or more retreatment regimens

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size		
% Treatment success		
% Deaths		

Drug management 2009	
First-line drugs available in private pharmacies	Yes
First-line drugs available without prescription	Yes
Drug management 2010	
Second-line drug procurement issues	No
Drugs provided to treat side-effects	Yes

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, not including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out	Yes
in the scope of MDR-TB	Yes
National infection control plan available	Under preparation
Tertiary hospitals with person in charge of TB infection control	2
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	Yes Paper-based
Representative survey/surveillance data on MDR-TB available	Routine surveillance data not representative; nationwide surveys (2003, 2007, 2011)

* Ranges represent uncertainty intervals

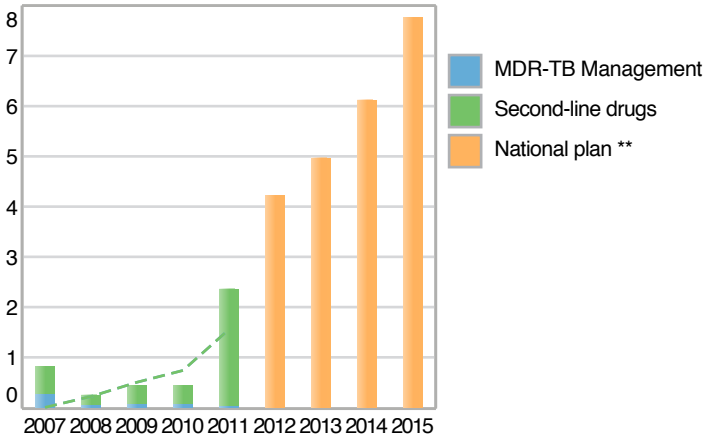
Please refer to Abbreviations on page v

Myanmar *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: food packages, transport vouchers/reimbursement, counselling/psychosocial support	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	No
Prison care coordinated with NTP	No

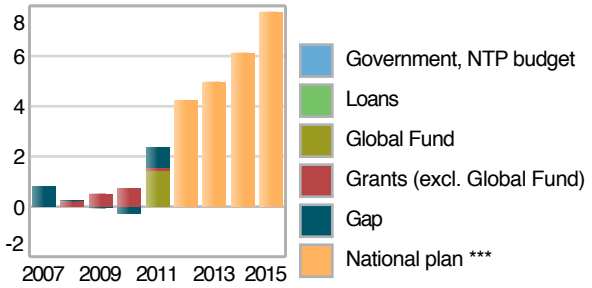
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



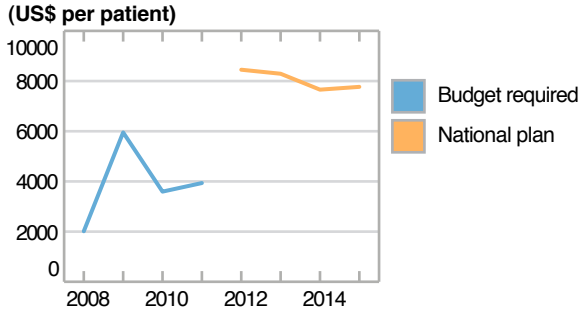
Financing (US$ millions)	2010	2011
Total NTP budget	14	18
MDR-TB financing component:		
second-line drugs budget	<1	2
total MDR-TB budget	<1	2
available funding	<1	2
funding gap	<1	<1
% of budget funded	165	66
% available funding from domestic sources		
% available funding from Global Fund		93

WHO TB planning and budgeting tool used	Yes (2008-2010)

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Programme management: the two new molecular laboratories in Mandalay and Yangon (Expand-TB project) will start clinical work during the first quarter of 2011. A harmonization plan for laboratory and clinical capacity will be developed in March 2011.

Recording and reporting: a support mission for electronic MDR-TB recording and reporting will take place in May 2011.

Access to quality-assured second-line drugs: no delay in drug delivery.

TB infection control: measures are implemented in MDR-TB hospitals and in pilot sites. All health-care workers use respirators.

Bottlenecks in 2010

Issues in case-finding or enrolment for treatment: for the pilot phase, only Category 2 failures are included. The pilot phase will end in summer 2011; thereafter the patient categories for DST will be expanded to include Category 1 failures.

Laboratory capacity and quality assurance: limited to Yangon and Mandalay; quality is good according to SRL in Bangkok and FIND.

Qualified M/XMDR-TB treatment (human resources, facilities): for pilot phase, human resources situation is under control but for expansion, training and additional staff are needed.

Financing: dependent on external resources.

Other: decentralization of MDR-TB management is challenging, especially in remote and hard-to-reach areas, given the duration of treatment and difficulties in managing

** No breakdown by line item available for 2012–2015

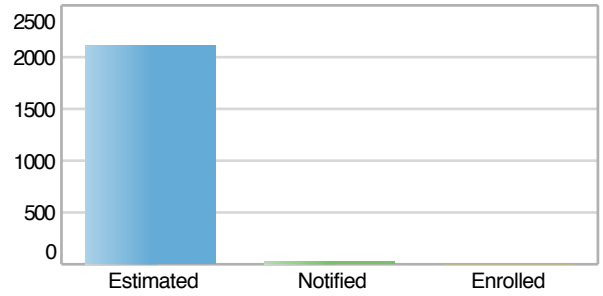
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Nigeria TB HIV MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	155

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	1.8 (0.0–4.3)	[model 2008]
% of retreatment TB cases with MDR-TB	7.7 (0.0–18)	[model 2008]
MDR-TB cases among incident total TB cases in 2008	11 000 (1 300–20 000)	
MDR-TB cases among new pulmonary TB cases notified in 2009	1 500 (0–3 500)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	630 (0–1 500)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB	12	11	28
MDR-TB patients started treatment			0

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

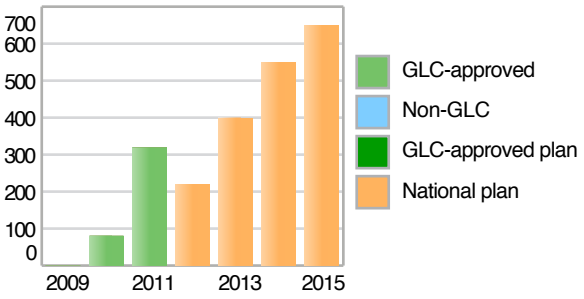
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	100 (82–130)	67 (53–84)
Prevalence (incl HIV/AIDS)	770 (360–1 300)	497 (231–811)
Incidence (incl HIV/AIDS)	460 (370–550)	295 (240–356)
Case detection, all forms (%)	19 (16–24)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	0.6	0.7	0.9
Culture (per 5 million population)	<0.1	0.1	0.3
DST (per 10 million population)	0.2	0.2	0.6
LPA (per 10 million population)		0.1	0.2
Number of DST units for which external quality assurance was carried out		1	3

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Milan, Italy

First-line DST routinely performed for: (no patient groups identified)

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size		
% Treatment success		
% Deaths		

Drug management 2009	
First-line drugs available in private pharmacies	Yes
First-line drugs available without prescription	Yes
Drug management 2010	
Second-line drug procurement issues	
Drugs provided to treat side-effects	Yes

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	Yes
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out in the scope of MDR-TB	No
National infection control plan available	
Tertiary hospitals with person in charge of TB infection control	15
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	No
Representative survey/surveillance data on MDR-TB available	No representative data available; nationwide survey under way

* Ranges represent uncertainty intervals

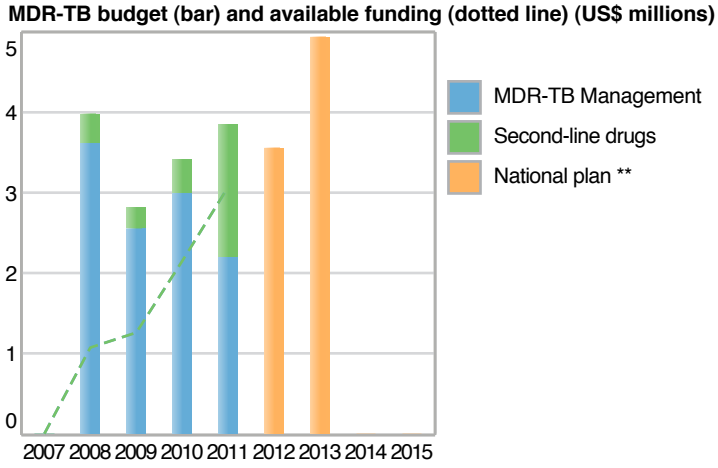
Please refer to Abbreviations on page v

Nigeria *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: food packages and transport reimbursement	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	
Prison care coordinated with NTP	

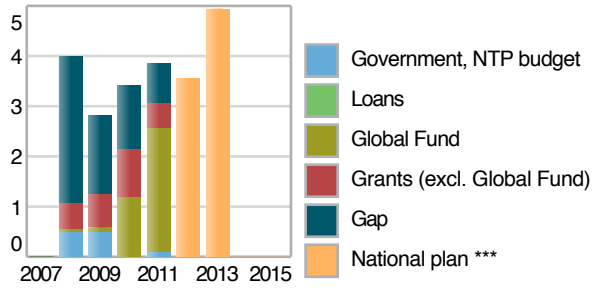
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



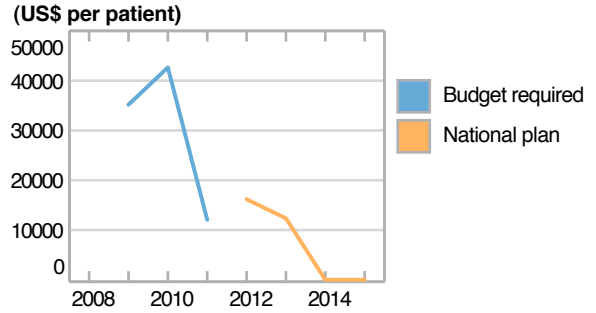
Financing (US$ millions)	2010	2011
Total NTP budget	37	39
MDR-TB financing component:		
second-line drugs budget	<1	2
total MDR-TB budget	3	4
available funding	2	3
funding gap	1	<1
% of budget funded	63	80
% available funding from domestic sources	0	3
% available funding from Global Fund	56	80

WHO TB planning and budgeting tool used	Yes (2007-2010)

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Access to quality-assured second-line drugs: available for 80 patients.

Financing: Government, partners and the Global Fund.

Bottlenecks in 2010

Programme management: delayed Global Fund grant negotiation as a result of lack of MDR-TB response plan.

Laboratory capacity and quality assurance: limited laboratory capacity.

Qualified M/XMDR-TB treatment (human resources, facilities): limited hospitalization capacity; limited human resource capacity.

Access to quality-assured second-line drugs: additional drugs to be procured under Global Fund Round 9.

TB infection control: only adequately functioning on MDR-TB wards and at two other treatment centres.

** No breakdown by line item available for 2012–2015

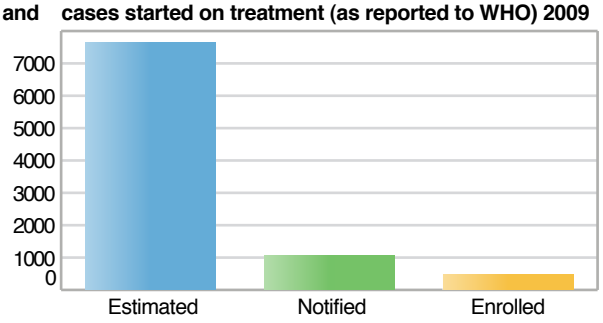
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Philippines TB MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	92

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	4.0 (3.0–5.5)	[DRS 2004]
% of retreatment TB cases with MDR-TB	21 (15–29)	[DRS 2004]
MDR-TB cases among incident total TB cases in 2008	13 000 (8 900–17 000)	
MDR-TB cases among new pulmonary TB cases notified in 2009	5 600 (4 200–7 700)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	2 000 (1 400–2 700)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB	1 050	23	1 073
MDR-TB patients started treatment			491

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

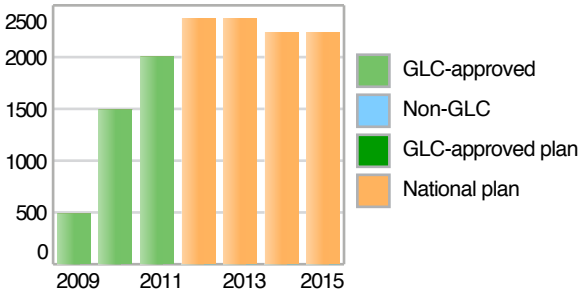
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	32 (21–45)	35 (23–49)
Prevalence (incl HIV/AIDS)	480 (450–510)	520 (486–554)
Incidence (incl HIV/AIDS)	260 (210–310)	280 (228–338)
Case detection, all forms (%)	57 (47–70)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	2.6	2.2	2.1
Culture (per 5 million population)	0.2	0.5	0.7
DST (per 10 million population)	0.3	0.3	0.4
LPA (per 10 million population)		0.1	0.1
Number of DST units for which external quality assurance was carried out		0	1

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Tokyo, Japan

First-line DST routinely performed for: all retreatment cases, cases failing a retreatment regimen, cases failing one or more retreatment regimens, cases that are contacts of MDR-TB cases

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size	296	
% Treatment success	63	
% Deaths	11	

Drug management 2009	
First-line drugs available in private pharmacies	Yes
First-line drugs available without prescription	Yes
Drug management 2010	
Second-line drug procurement issues	Registration is needed but currently with waiver for compassionate reasons. Registration process is ongoing.
Drugs provided to treat side-effects	Yes

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	Yes	Yes
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, not including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out	Yes
in the scope of MDR-TB	Yes
National infection control plan available	Yes
Tertiary hospitals with person in charge of TB infection control	
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	Partially Electronic (web-based) in 3 treatment centres only but will expand in 2011
Representative survey/surveillance data on MDR-TB available	Routine surveillance data not representative; nationwide survey (2004); second nationwide survey planned for 2011

* Ranges represent uncertainty intervals

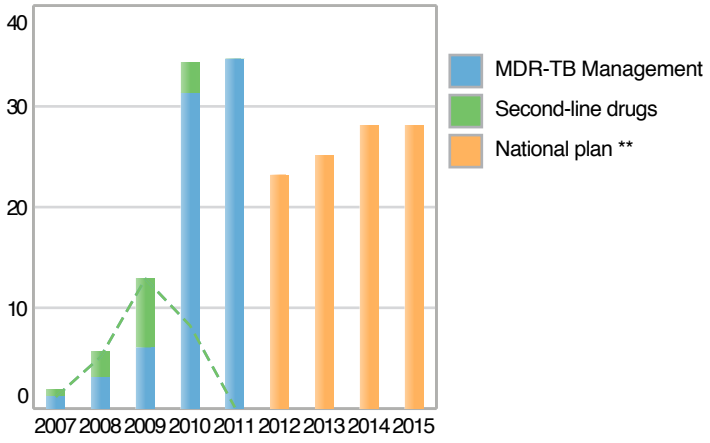
Please refer to Abbreviations on page v

Philippines *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	No
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: food packages, transport vouchers/reimbursement, counselling/psychosocial support, housing support, education	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	Department of Health
Prison care coordinated with NTP	Yes

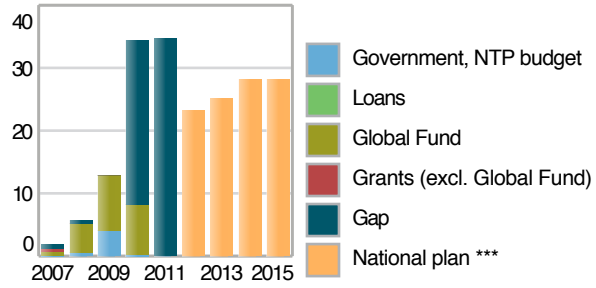
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



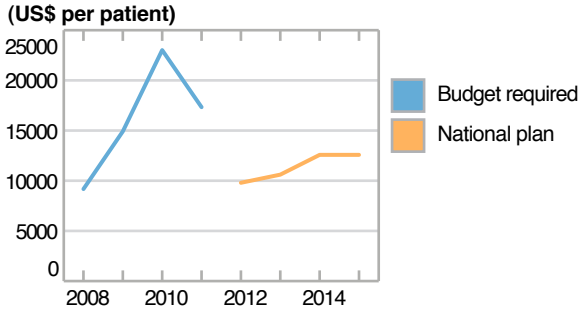
Financing (US$ millions)	2010	2011
Total NTP budget	94	97
MDR-TB financing component:		
second-line drugs budget	3	
total MDR-TB budget	34	35
available funding	8	<1
funding gap	26	35
% of budget funded	24	<1
% available funding from domestic sources	2	100
% available funding from Global Fund	98	

WHO TB planning and budgeting tool used	Yes (2010)

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Issues in case-finding or enrolment for treatment: continuous patient enrolment during the transition from the Tropical Disease Foundation to the Philippine Business for Social Progress.

Recording and reporting: electronic recording and reporting for MDR-TB available in 3/10 treatment centres.

Bottlenecks in 2010

Issues in case-finding or enrolment for treatment: patient enrolment remained below target enrolment; delay in the start of treatment caused by long waiting times for the results of culture and DST.

Programme management: limited monitoring of patients from case-finding to initiation of treatment; limited implementation of standardized treatment regimen; long installation process of culture and treatment centres.

Recording and reporting: laboratory and clinical data are not harmonized.

Laboratory capacity and quality assurance: rapid diagnosis is not used.

Qualified MDR/XDR-TB treatment (human resources, facilities): not yet accessible nationwide.

Access to quality-assured second-line drugs: issues of product registration of drugs resulted in delays in drug delivery; delays in shipments orders placed in 2009 caused by the transition from TDF to PBSP.

TB infection control: no specific infection control policy and guidelines for (MDR-)TB.

Other: the transition from TDF to PBSP was a major challenge.

** No breakdown by line item available for 2012–2015

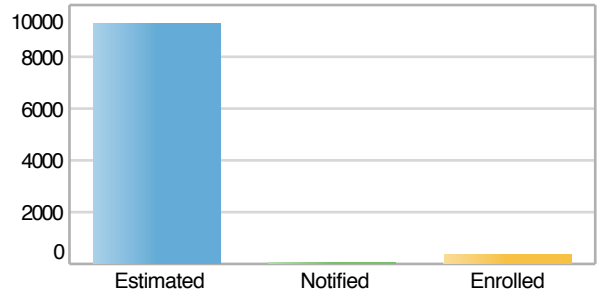
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Pakistan TB MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	181

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	2.8 (0.0–8.0)	[model 2008]
% of retreatment TB cases with MDR-TB	35 (0.0–75)	[model 2008]
MDR-TB cases among incident total TB cases in 2008	15 000 (1 200–29 000)	
MDR-TB cases among new pulmonary TB cases notified in 2009	6 000 (0–17 000)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	3 300 (0–6 900)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB	5	43	49
MDR-TB patients started treatment			368

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

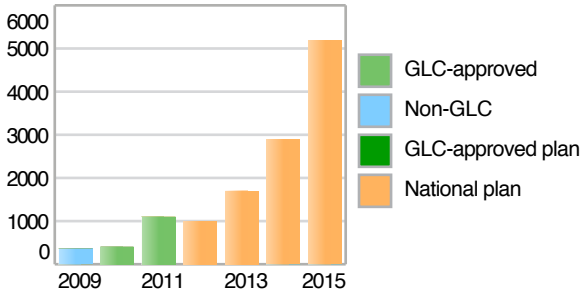
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	68 (43–100)	38 (24–56)
Prevalence (incl HIV/AIDS)	670 (300–1 100)	373 (163–621)
Incidence (incl HIV/AIDS)	420 (340–500)	231 (188–279)
Case detection, all forms (%)	63 (52–78)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	0.6	0.6	0.6
Culture (per 5 million population)	0.4	0.4	0.4
DST (per 10 million population)	0.6	0.6	0.6
LPA (per 10 million population)		0	<0.1
Number of DST units for which external quality assurance was carried out		0	0

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Antwerp, Belgium

First-line DST routinely performed for: (no patient groups identified)

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size		
% Treatment success		
% Deaths		

Drug management 2009	
First-line drugs available in private pharmacies	Yes
First-line drugs available without prescription	Yes
Drug management 2010	
Second-line drug procurement issues	
Drugs provided to treat side-effects	Yes

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs	Don't know	Don't know

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out	At MDR-TB pilot sites only
in the scope of MDR-TB	Yes
National infection control plan available	Under preparation
Tertiary hospitals with person in charge of TB infection control	29
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	Yes Electronic and paper-based
Representative survey/surveillance data on MDR-TB available	No representative data available; nationwide survey planned for 2011

* Ranges represent uncertainty intervals

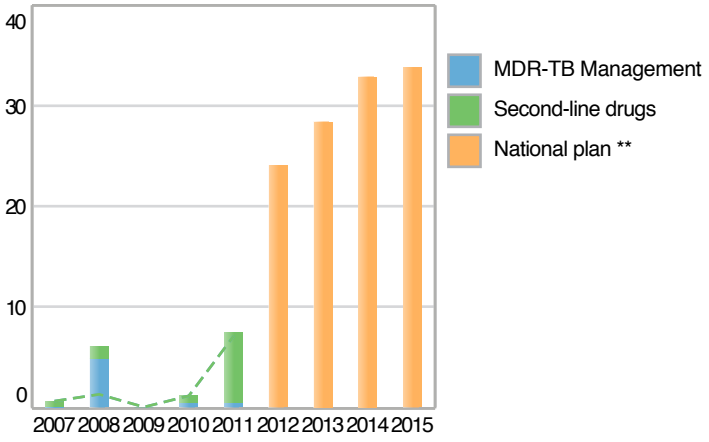
Please refer to Abbreviations on page v

Pakistan *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: food packages, transport vouchers/reimbursement, counselling/psychosocial support; treatment supporters hired (Islamabad, 2009)	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	
Prison care coordinated with NTP	

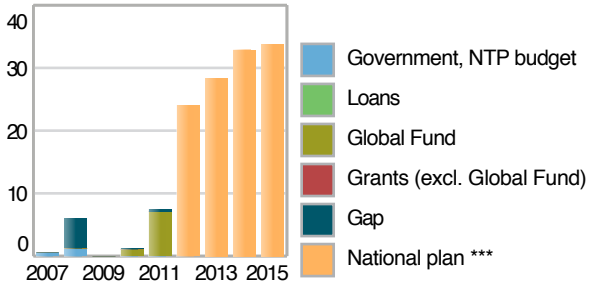
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



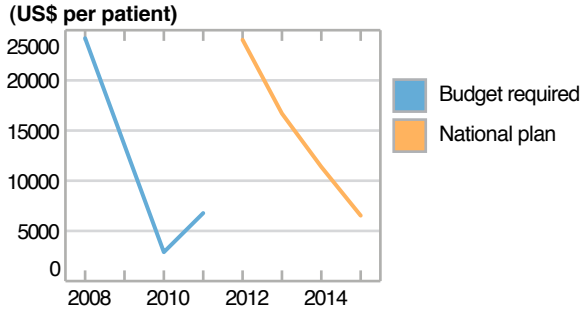
Financing (US$ millions)	2010	2011
Total NTP budget	54	60
MDR-TB financing component:		
second-line drugs budget	<1	7
total MDR-TB budget	1	7
available funding	1	7
funding gap	<1	<1
% of budget funded	97	95
% available funding from domestic sources	11	1
% available funding from Global Fund	89	99

WHO TB planning and budgeting tool used	Yes (2010)

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Bottlenecks in 2010

Issues in case-finding or enrolment for treatment: delay in negotiating Global Fund grant.

Programme management: limited experience.

Qualified MDR/XDR-TB treatment (human resources, facilities): limited number of prepared facilities and human resources.

Other: under-budgeting (using Global Fund Round 6) resulted in a request for half of the intended number of treatment target. MDR-TB care in prisons to be addressed after strengthening DOTS services.

** No breakdown by line item available for 2012–2015

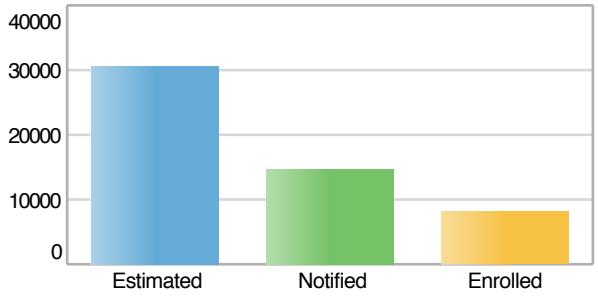
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Russian Federation TB HIV MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	141

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	16 (12–20)	[DRS 2008]
% of retreatment TB cases with MDR-TB	42 (38–47)	[DRS 2008]
MDR-TB cases among incident total TB cases in 2008	38 000 (30 000–45 000)	
MDR-TB cases among new pulmonary TB cases notified in 2009	17 000 (13 000–21 000)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	14 000 (12 000–15 000)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB	5 816	2 314	14 686
MDR-TB patients started treatment			8 143

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

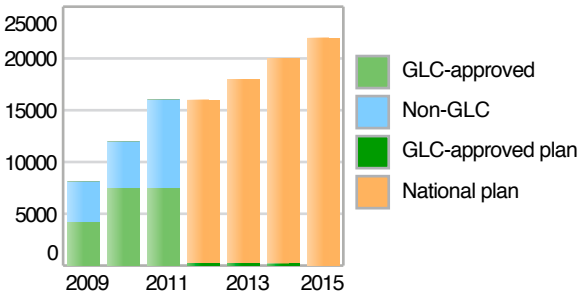
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	25 (17–37)	18 (12–26)
Prevalence (incl HIV/AIDS)	190 (65–320)	132 (46–226)
Incidence (incl HIV/AIDS)	150 (130–180)	106 (89–125)
Case detection, all forms (%)	84 (72–100)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	2.8	2.8	2.8
Culture (per 5 million population)	14.0	14.1	14.1
DST (per 10 million population)	19.2	19.3	19.4
LPA (per 10 million population)			
Number of DST units for which external quality assurance was carried out			

National reference laboratory in 2009	No
Link to supra-national laboratory	Solna, Sweden (Russia does not have an official link to one SRL)

First-line DST routinely performed for: all patients

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size		
% Treatment success		
% Deaths		

Drug management 2009	
First-line drugs available in private pharmacies	Yes
First-line drugs available without prescription	Yes
Drug management 2010	
Second-line drug procurement issues	
Drugs provided to treat side-effects	

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs	No	Yes

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	No
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out	No
in the scope of MDR-TB	No
National infection control plan available	
Tertiary hospitals with person in charge of TB infection control	419
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	Yes Data collection paper-based, entered in electronic database
Representative survey/surveillance data on MDR-TB available	Class B national routine surveillance data (2009); Class A subnational surveillance data from 12 regions (2008)

* Ranges represent uncertainty intervals

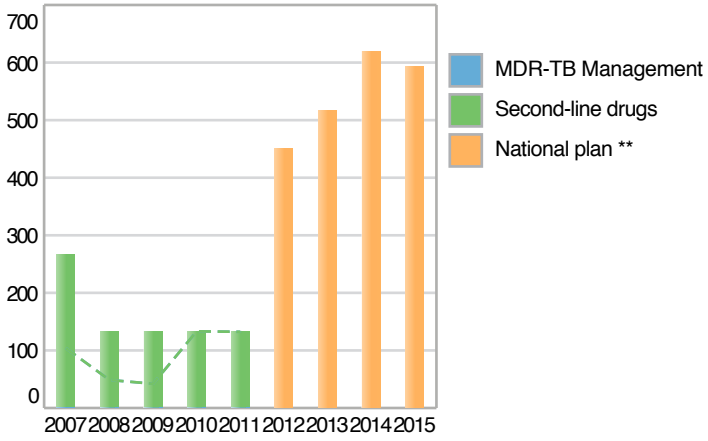
Please refer to Abbreviations on page v

Russian Federation *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: differs between regions and MDR-TB projects	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	
Prison care coordinated with NTP	No

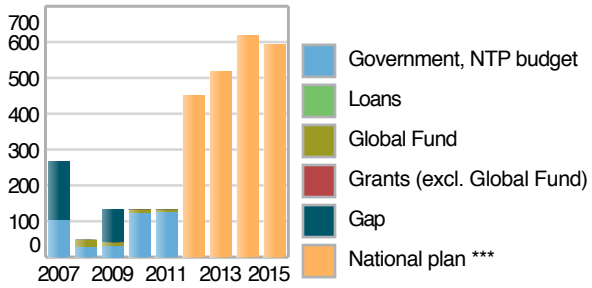
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



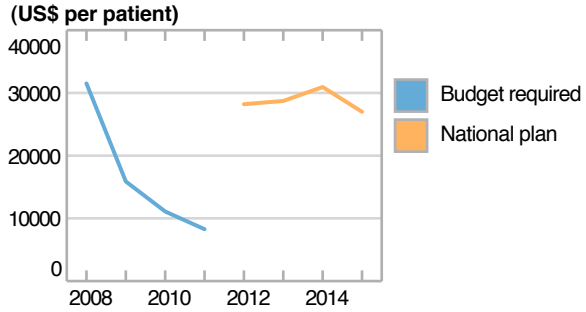
Financing (US$ millions)	2010	2011
Total NTP budget	1 258	1 278
MDR-TB financing component:		
second-line drugs budget	132	131
total MDR-TB budget	133	132
available funding	133	132
funding gap	0	0
% of budget funded	100	100
% available funding from domestic sources	94	96
% available funding from Global Fund	6	4

WHO TB planning and budgeting tool used	Yes (2009)

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Access to quality-assured second-line drugs: a new law on drugs became effective on 1 September 2010. The legislation provides for equal conditions for every national and international manufacturer and introduces a maximum permissible deadline of 210 days for drug registration, regardless of the manufacturer's origin. This will allow new and effective drugs to be available on the market more quickly.

Bottlenecks in 2010

Programme management: insufficient integration of TB control with the health-care system.

Recording and reporting: electronic recording and reporting under approval by the Ministry of Health; some pilot projects exist; federal government budget is available for software modules but not for training.

Qualified M/XMDR-TB treatment (human resources, facilities): limited human resource capacity for MDR-TB.

Access to quality-assured second-line drugs: continuing supply of second-line drugs for GLC-approved projects and in other regions; potential risk of discontinued support from the Global Fund.

Other: extensive hospitalization in some regions.

** No breakdown by line item available for 2012–2015

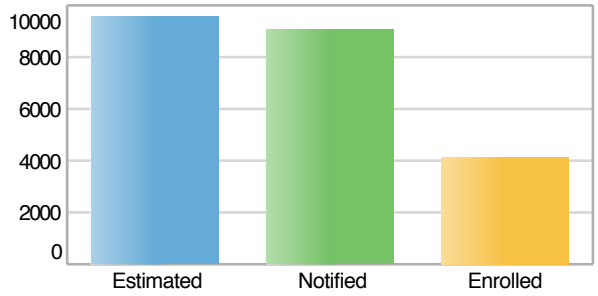
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

South Africa TB HIV MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	50

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	1.8 (1.5–2.3)	[DRS 2002]
% of retreatment TB cases with MDR-TB	6.7 (5.5–8.1)	[DRS 2002]
MDR-TB cases among incident total TB cases in 2008	13 000 (10 000–16 000)	
MDR-TB cases among new pulmonary TB cases notified in 2009	5 200 (4 300–6 600)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	4 400 (3 600–5 300)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB			9 070
MDR-TB patients started treatment			4 143

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

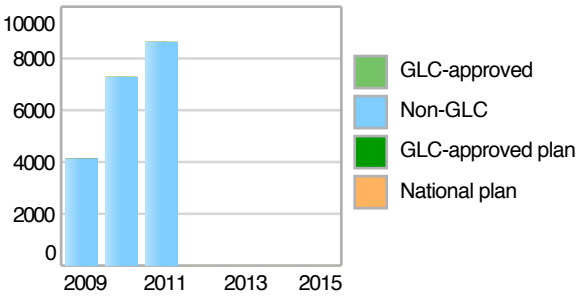
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	26 (14–42)	52 (29–85)
Prevalence (incl HIV/AIDS)	400 (180–650)	808 (362–1 288)
Incidence (incl HIV/AIDS)	490 (400–590)	971 (791–1 169)
Case detection, all forms (%)	74 (61–91)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	0.5	0.5	0.5
Culture (per 5 million population)	1.5	1.6	2.0
DST (per 10 million population)	2.4	3.2	4.0
LPA (per 10 million population)		1.6	4.0
Number of DST units for which external quality assurance was carried out		0	20

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Pretoria, South Africa

First-line DST routinely performed for: all retreatment cases, cases failing a retreatment regimen, cases failing one or more retreatment regimens, cases that are contacts of MDR-TB cases

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size		3815
% Treatment success		42
% Deaths		20

Drug management 2009	
First-line drugs available in private pharmacies	Yes
First-line drugs available without prescription	No
Drug management 2010	
Second-line drug procurement issues	
Drugs provided to treat side-effects	

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	Yes	No
Second-line drugs	Yes	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out in the scope of MDR-TB	No
National infection control plan available	Yes
Tertiary hospitals with person in charge of TB infection control	
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	Yes Electronic
Representative survey/surveillance data on MDR-TB available	Class B routine surveillance data (2008); nationwide survey (2002); second nationwide survey planned for 2011

* Ranges represent uncertainty intervals

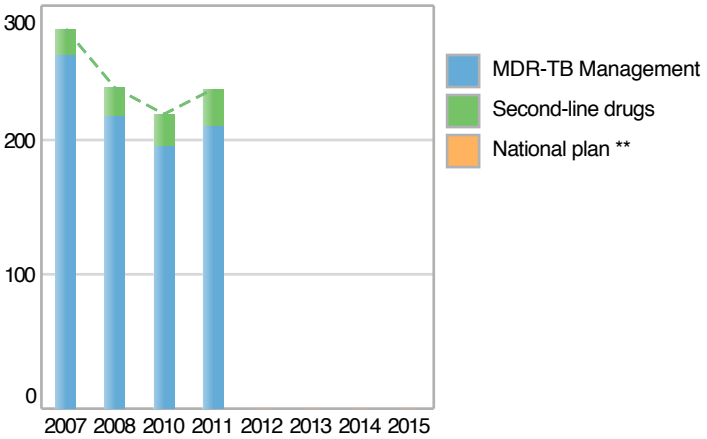
Please refer to Abbreviations on page v

South Africa *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	MoH
Prison care coordinated with NTP	

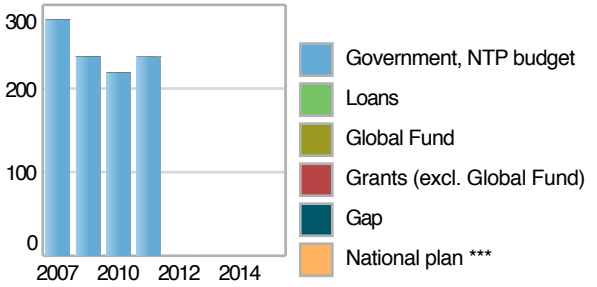
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



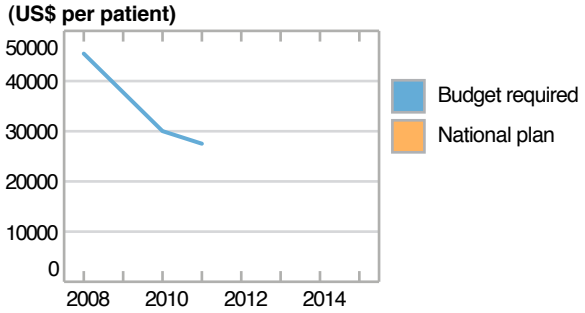
Financing (US$ millions)	2010	2011
Total NTP budget	386	436
MDR-TB financing component:		
second-line drugs budget	24	27
total MDR-TB budget	219	238
available funding	219	238
funding gap	0	0
% of budget funded	100	100
% available funding from domestic sources	100	100
% available funding from Global Fund		

WHO TB planning and budgeting tool used	Yes (2007-2010)

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Bottlenecks in 2010

Issues in case-finding or enrolment for treatment: gap between patient diagnosis and enrolment for treatment.

Programme management: centralized model; poor patient tracking mechanism.

Recording and reporting: system not keeping pace with decentralization of MDR-TB services.

TB infection control: inadequate implementation of medical surveillance of health-care workers.

Other: there are no GLC-approved projects in South Africa.

** No breakdown by line item available for 2012–2015

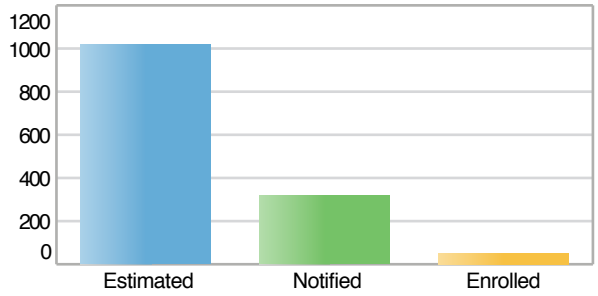
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Tajikistan MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	7

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	17 (11–24)	[DRS 2008]
% of retreatment TB cases with MDR-TB	62 (53–70)	[DRS 2008]
MDR-TB cases among incident total TB cases in 2008	4 000 (2 900–5 100)	
MDR-TB cases among new pulmonary TB cases notified in 2009	690 (470–990)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	330 (280–370)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB	62	257	319
MDR-TB patients started treatment			52

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

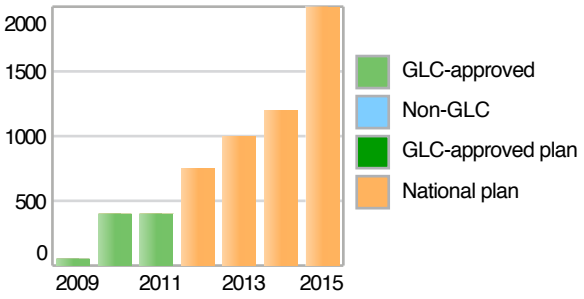
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	3.4 (2.5–4.4)	48 (36–63)
Prevalence (incl HIV/AIDS)	26 (12–42)	373 (173–610)
Incidence (incl HIV/AIDS)	14 (11–17)	202 (164–243)
Case detection, all forms (%)	44 (36–54)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	1.5	1.4	1.4
Culture (per 5 million population)	1.5	0.7	2.1
DST (per 10 million population)	2.9	1.4	2.8
LPA (per 10 million population)		0	2.8
Number of DST units for which external quality assurance was carried out		0	2

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Gauting, Germany

First-line DST routinely performed for: all patients

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size		
% Treatment success		
% Deaths		

Drug management 2009	
First-line drugs available in private pharmacies	No
First-line drugs available without prescription	No
Drug management 2010	
Second-line drug procurement issues	Registration of SLD mandatory
Drugs provided to treat side-effects	Yes

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out	Yes (2009)
in the scope of MDR-TB	Yes
National infection control plan available	Under preparation
Tertiary hospitals with person in charge of TB infection control	
TB notification rate (all forms) in health care workers (all staff) over rate in general population	16.8
Recording and reporting for MDR-TB in place	Yes Paper-based
Representative survey/surveillance data on MDR-TB available	Routine surveillance data not representative; survey in the city of Dushanbe and Rudaki district (2009); nationwide survey under way

* Ranges represent uncertainty intervals

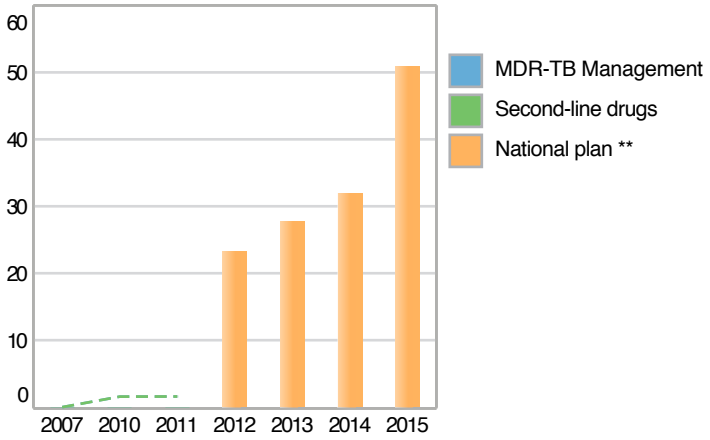
Please refer to Abbreviations on page v

Tajikistan *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: food packages, transport vouchers/reimbursement	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	MOH, MOJ, International Organization, NGO-Caritas Luxemburg, UNDP PIU GFATM, Quality Health Care Project USAID
Prison care coordinated with NTP	Yes

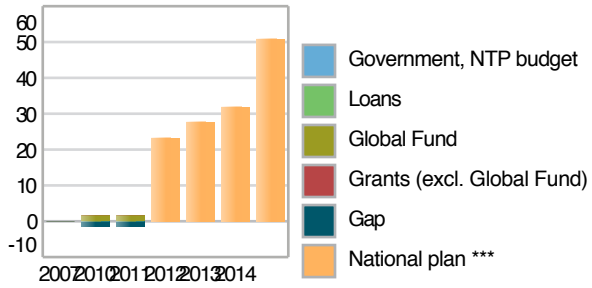
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



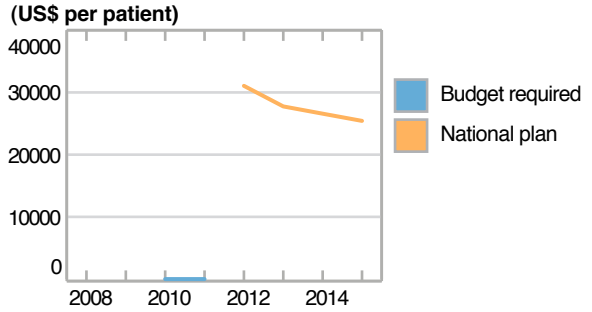
Financing (US$ millions)	2010	2011
Total NTP budget	0	
MDR-TB financing component:		
second-line drugs budget		
total MDR-TB budget		
available funding	2	2
funding gap	<1	<1
% of budget funded		
% available funding from domestic sources		
% available funding from Global Fund	100	100

WHO TB planning and budgeting tool used

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Bottlenecks in 2010

Issues in case-finding or enrolment for treatment: weak integration with primary health-care providers.

Programme management: weak health systems and integration with the health system; no electronic-based data management system.

Recording and reporting: logistics management information system for second-line drugs is under development.

Laboratory capacity and quality assurance: no electronic-based data management system.

Qualified MDR/XDR-TB treatment (human resources, facilities): limited human resource capacity for MDR-TB management; weak infection control measures; low adherence to treatment of MDR-TB patients; work overloading and low motivation of primary health-care personnel.

TB infection control: weak infection control in TB facilities.

Financing: weak domestic financing.

** No breakdown by line item available for 2012–2015

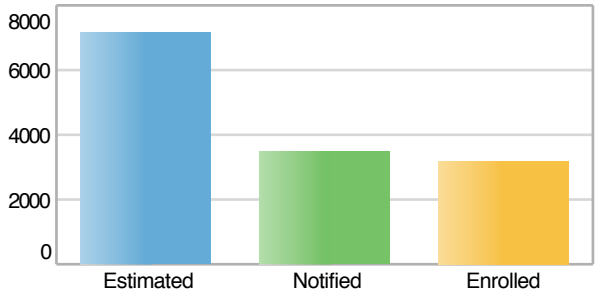
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Ukraine HIV MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	46

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	16 (14–18)	[DRS 2006]
% of retreatment TB cases with MDR-TB	44 (40–49)	[DRS 2006]
MDR-TB cases among incident total TB cases in 2008	8 700 (6 800–11 000)	
MDR-TB cases among new pulmonary TB cases notified in 2009	4 700 (4 100–5 400)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	2 400 (2 200–2 700)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB	1 437	2 045	3 482
MDR-TB patients started treatment			3 186

% of MDR-TB patients living with HIV/AIDS	23.8 [2006 survey Donetsk oblast]
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	1.5 (1.1-2.0) [2006 survey Donetsk oblast]

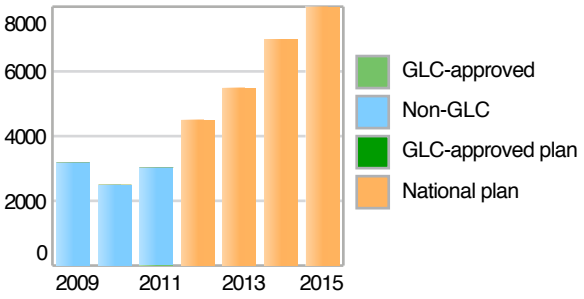
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	12 (7.9–18)	26 (17–39)
Prevalence (incl HIV/AIDS)	59 (23–100)	130 (49–222)
Incidence (incl HIV/AIDS)	46 (38–56)	101 (83–122)
Case detection, all forms (%)	78 (65–95)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	4.1	2.2	1.8
Culture (per 5 million population)	11.6	11.3	11.3
DST (per 10 million population)	10.2	10.1	6.8
LPA (per 10 million population)		0	
Number of DST units for which external quality assurance was carried out			

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Riga, Latvia

First-line DST routinely performed for: all patients

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size		
% Treatment success		
% Deaths		

Drug management 2009	
First-line drugs available in private pharmacies	Yes
First-line drugs available without prescription	No
Drug management 2010	
Second-line drug procurement issues	Product registration mandatory
Drugs provided to treat side-effects	Yes

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs	Yes	Yes

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, including XDR-TB
Training material developed	No
Training conducted specifically for DR-TB	No
TB infection control national situation assessment carried out	Yes (2009)
in the scope of MDR-TB	Yes
National infection control plan available	Under preparation
Tertiary hospitals with person in charge of TB infection control	
TB notification rate (all forms) in health care workers (all staff) over rate in general population	1.1
Recording and reporting for MDR-TB in place	Yes Electronic
Representative survey/surveillance data on MDR-TB available	Class B routine surveillance data (2009); survey in Donetsk oblast (2006)

* Ranges represent uncertainty intervals

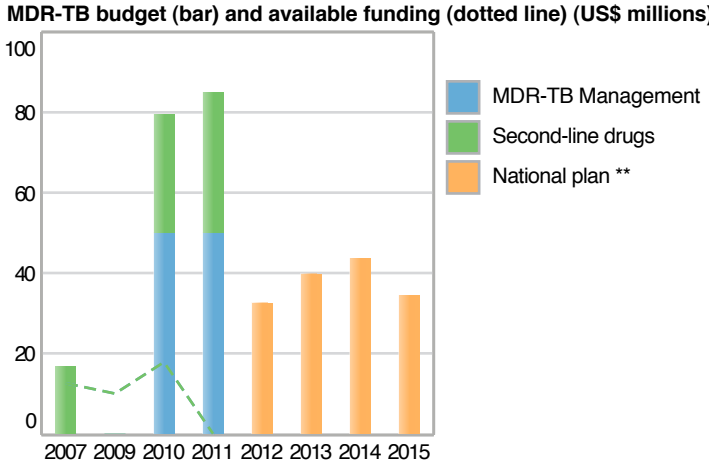
Please refer to Abbreviations on page v

Ukraine *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: limited support	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	
Prison care coordinated with NTP	Yes

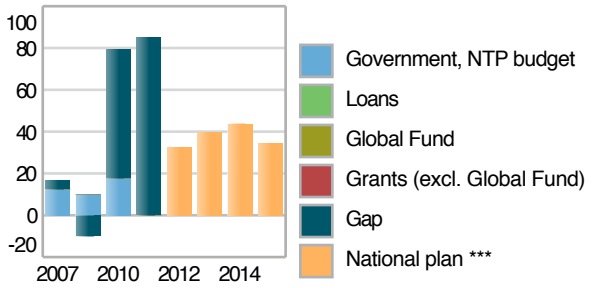
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



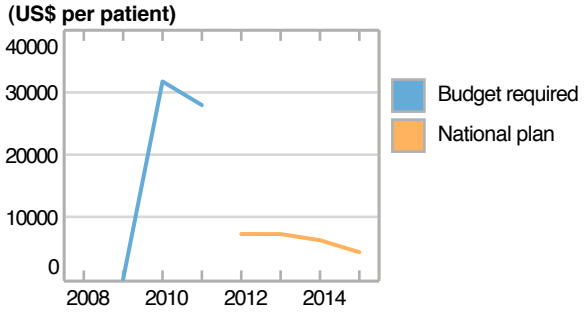
Financing (US$ millions)	2010	2011
Total NTP budget	203	211
MDR-TB financing component:		
second-line drugs budget	29	35
total MDR-TB budget	79	85
available funding	18	
funding gap	62	85
% of budget funded	22	
% available funding from domestic sources	100	
% available funding from Global Fund		

WHO TB planning and budgeting tool used

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Bottlenecks in 2010

Programme management: frequent changes of management in the Ministry of Health.

Recording and reporting: technical assistance needed for training in MDR-TB data management.

Laboratory capacity and quality assurance: low laboratory capacity; quality assurance is partially implemented.

Qualified M/XMDR-TB treatment (human resources, facilities): patient-oriented approach is not implemented.

Access to quality-assured second-line drugs: there is legislation on drug registration.

TB infection control: poor infection control.

Financing: lack of financing.

** No breakdown by line item available for 2012–2015

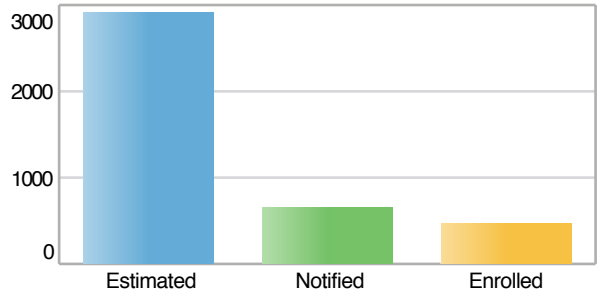
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Uzbekistan MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	27

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	14 (10–18)	[DRS 2005]
% of retreatment TB cases with MDR-TB	50 (36–64)	[DRS 2005]
MDR-TB cases among incident total TB cases in 2008	8 700 (6 500–11 000)	
MDR-TB cases among new pulmonary TB cases notified in 2009	1 700 (1 200–2 200)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	1 200 (880–1 600)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB	115	539	654
MDR-TB patients started treatment			464

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

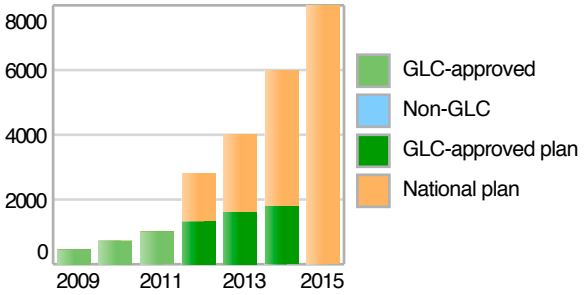
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	5.1 (3.8–6.7)	19 (14–24)
Prevalence (incl HIV/AIDS)	63 (29–100)	227 (105–374)
Incidence (incl HIV/AIDS)	35 (29–42)	128 (104–154)
Case detection, all forms (%)	50 (41–61)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	1.1	1.2	1.1
Culture (per 5 million population)	0.4	0.4	1.3
DST (per 10 million population)	0.7	0.7	0.7
LPA (per 10 million population)		0.7	0.7
Number of DST units for which external quality assurance was carried out		2	2

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Gauting, Germany

First-line DST routinely performed for: new cases, all retreatment cases, cases failing a retreatment regimen, cases failing one or more retreatment regimens

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size	330	
% Treatment success	55	
% Deaths	10	

Drug management 2009	
First-line drugs available in private pharmacies	Yes
First-line drugs available without prescription	Yes
Drug management 2010	
Second-line drug procurement issues	
Drugs provided to treat side-effects	Yes

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, not including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out	
in the scope of MDR-TB	
National infection control plan available	
Tertiary hospitals with person in charge of TB infection control	
TB notification rate (all forms) in health care workers (all staff) over rate in general population	0.2
Recording and reporting for MDR-TB in place	Yes Electronic
Representative survey/surveillance data on MDR-TB available	Routine surveillance data not representative; surveys in the city of Tashkent (2005) and Republic of Karakalpakstan (2002); nationwide survey under way

* Ranges represent uncertainty intervals

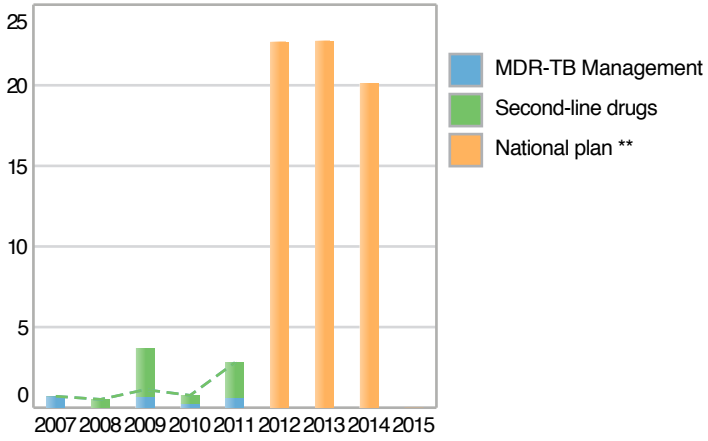
Please refer to Abbreviations on page v

Uzbekistan *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: food packages, transport vouchers/reimbursement, counselling/psychosocial support	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	
Prison care coordinated with NTP	

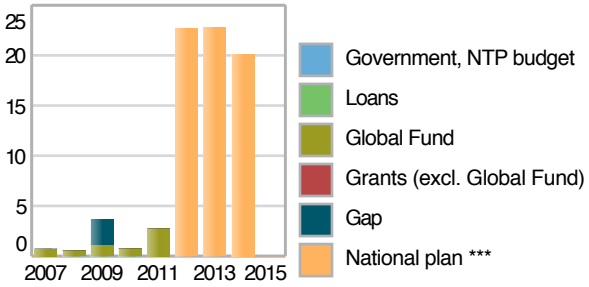
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



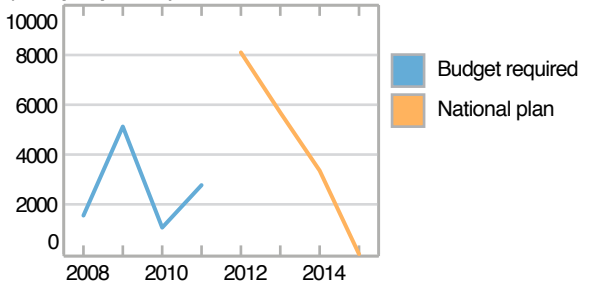
Financing (US$ millions)	2010	2011
Total NTP budget	13	19
MDR-TB financing component:		
second-line drugs budget	<1	2
total MDR-TB budget	<1	3
available funding	<1	3
funding gap	0	0
% of budget funded	100	100
% available funding from domestic sources		
% available funding from Global Fund	100	100

WHO TB planning and budgeting tool used

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Bottlenecks in 2010

Programme management: weak health systems and integration with the health system.

Qualified MDR/XDR-TB treatment (human resources, facilities): limited human resource capacity for MDR-TB.

** No breakdown by line item available for 2012–2015

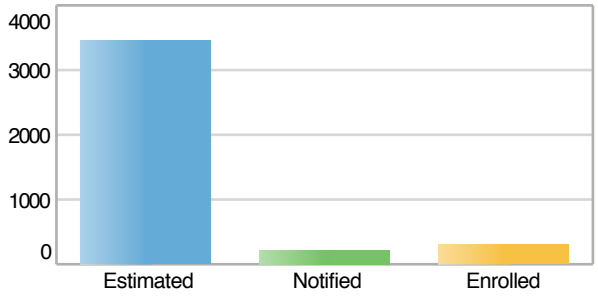
*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

Viet Nam TB HIV MDR-TB

Generated: February 23, 2011
Source: www.who.int/tb/data

Progress towards universal access to diagnosis and treatment of MDR-TB and XDR-TB:
Estimated MDR-TB cases among notified pulmonary TB, notified cases and cases started on treatment (as reported to WHO) 2009



Population (millions) 2009	88	

MDR-TB estimates of burden *		
% of new TB cases with MDR-TB	2.7 (2.0–3.6)	[DRS 2006]
% of retreatment TB cases with MDR-TB	19 (15–25)	[DRS 2006]
MDR-TB cases among incident total TB cases in 2008	5 900 (3 800–8 100)	
MDR-TB cases among new pulmonary TB cases notified in 2009	1 900 (1 400–2 500)	
MDR-TB cases among retreated pulmonary TB cases notified in 2009	1 600 (1 200–2 000)	

MDR-TB notified cases 2009	New	Retreat-ment	Total
Confirmed cases of MDR-TB			217
MDR-TB patients started treatment			307

% of MDR-TB patients living with HIV/AIDS	No representative data available
Odds of HIV-positive TB patient having MDR-TB over odds of HIV-negative TB patient having MDR-TB	No representative data available

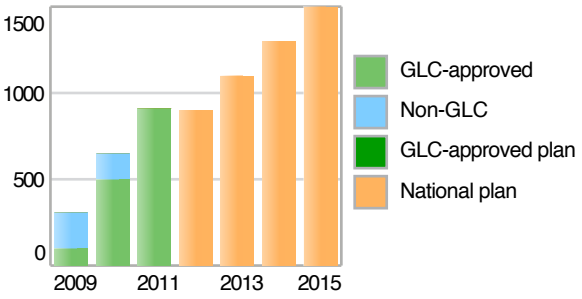
Estimates of burden * 2009 (All forms of TB)	Number (thousands)	Rate (per 100 000 pop)
Mortality (excluding HIV/AIDS)	32 (18–49)	36 (21–56)
Prevalence (incl HIV/AIDS)	290 (130–510)	333 (143–580)
Incidence (incl HIV/AIDS)	180 (130–230)	200 (151–256)
Case detection, all forms (%)	54 (42–72)	

Number of laboratories	2008	2009	2010
Sputum smear (per 100 000 population)	0.9	0.9	0.9
Culture (per 5 million population)	1.7	1.3	1.4
DST (per 10 million population)	0.2	0.2	0.2
LPA (per 10 million population)		0.2	0.2
Number of DST units for which external quality assurance was carried out		0	0

National reference laboratory in 2009	Yes
Link to supra-national laboratory	Adelaide, Australia

First-line DST routinely performed for: (no patient groups identified)

MDR-TB patients who started treatment (2009) and projected numbers to treat



Treatment outcomes 2007 cohort	GLC	Non-GLC
Cohort size		
% Treatment success		
% Deaths		

Drug management 2009	
First-line drugs available in private pharmacies	Yes
First-line drugs available without prescription	Yes
Drug management 2010	
Second-line drug procurement issues	Registration of SLD mandatory
Drugs provided to treat side-effects	Yes

Stock-outs (at least 1 day) 2009	Central level	Peripheral level
First-line drugs	No	No
Second-line drugs	No	No

MDR-TB management 2009	
Guidelines for programmatic management of DR-TB developed	Yes, including XDR-TB
Training material developed	Yes
Training conducted specifically for DR-TB	Yes
TB infection control national situation assessment carried out	Yes (2009-2010)
in the scope of MDR-TB	Yes
National infection control plan available	Yes
Tertiary hospitals with person in charge of TB infection control	
TB notification rate (all forms) in health care workers (all staff) over rate in general population	
Recording and reporting for MDR-TB in place	Yes Paper-based
Representative survey/surveillance data on MDR-TB available	Routine surveillance data not representative; representative nationwide surveys (1997 and 2006)

* Ranges represent uncertainty intervals

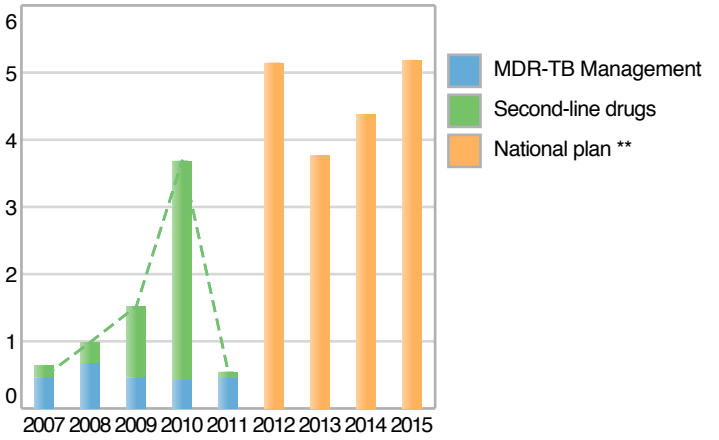
Please refer to Abbreviations on page v

Viet Nam *(continued)*

Model of care for MDR-TB treatment 2010	
MDR-TB patients hospitalized during intensive phase	Yes
Treatment (drugs and care) free of charge	Yes
Patient support available (GLC projects)	Yes
Type of support: counselling/psychosocial support; EUR 500 (equiv. USD 700) per year available to patient and DOT supporter for provision of supportive measures	

MDR-TB programme 2010	
MDR-TB expansion plan:	
approved by NTP/Ministry of Health	Yes
includes a budget	Yes
part of NTP	Yes
MDR-TB management programme part of NTP	Yes
Provider of MDR-TB care in prisons	None currently. Planned to be provided by NTP via agreement between MoH and MoJ
Prison care coordinated with NTP	No

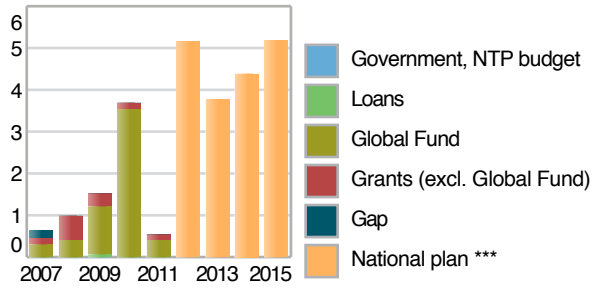
MDR-TB budget (bar) and available funding (dotted line) (US$ millions)



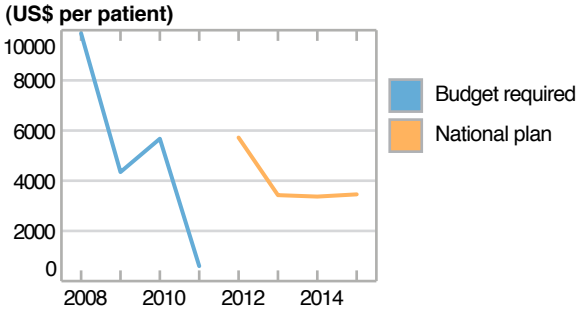
Financing (US$ millions)	2010	2011
Total NTP budget	13	12
MDR-TB financing component:		
second-line drugs budget	3	<1
total MDR-TB budget	4	<1
available funding	4	<1
funding gap	0	0
% of budget funded	100	100
% available funding from domestic sources		
% available funding from Global Fund	97	78

WHO TB planning and budgeting tool used	Yes (2010)

MDR-TB budget by source of funding (US$ millions)



MDR-TB budget required per MDR-TB patient to be treated (US$ per patient)



Progress since 2009 World Health Assembly resolution 62.15 †

Laboratory capacity and quality assurance: almost sufficient.

TB infection control: in place.

Bottlenecks in 2010

Recording and reporting: "e-TB Manager" (etbmanager.org) has not yet been implemented.

Qualified M/XMDR-TB treatment (human resources, facilities): limited human resources capacity for MDR-TB.

Access to quality-assured second-line drugs: delays in drug delivery; weak drug management capacity.

Financing: plan approved for Global Fund Round 9 and National Strategic Plan calling for further funding from other donors.

** No breakdown by line item available for 2012–2015

*** No breakdown by sources of funding available for 2012–2015

† Resolution WHA 62.15 "Prevention and control of multi-drug resistant tuberculosis and extensively drug-resistant tuberculosis" and Annex 1.

ANNEX 3:

Update on drug resistance surveillance data

3.1 MDR estimates and indicators by country

Country	WHO region	Source of estimates	Estimated % of all new TB cases with MDR-TB (2008)			Estimated % of all retreated TB cases with MDR-TB (2008)			Estimated cases of MDR-TB emerging in 2008						Estimated cases of MDR-TB among notified cases of pulmonary TB in 2009 (A)			Proportion of TB cases reported in 2009 with DST results[b]		Notified cases of MDR-TB in 2009 (B)	Notified cases of MDR-TB as % of estimated cases of MDR-TB among all notified cases of pulmonary TB (B/A)[c]	Cases of MDR-TB enrolled on treatment in 2009	Availability of Class A or B drug resistance surveillance data
									N			Per 100 000 population											
			Best	Low	High	Best	Low	High	Best	Low	High	Best	Low	High	Best	Low	High	New	Retreated				
Algeria	AFR	DRS, 2001	1.2	0.5	2.5	14.4	0	38.1	270	69	470	0.8	0.2	1.4	210	88	390	–	–	–	–	93	–
Angola	AFR	model	0.9	0	2.4	14.4	0	38.1	790	110	1500	4.4	0.6	8.3	1100	290	2400	–	–	–	–	0	–
Benin	AFR	DRS, 1997	0.3	0	1.7	14.4	0	38.1	58	0	120	0.7	0.0	1.4	49	9	120	–	35%	14	29	7	–
Botswana	AFR	DRS, 2008	3.4	2.4	4.8	13.1	8.6	19.6	520	330	710	27.1	17.2	37.0	370	280	470	3%	22%	101	27	111	–
Burkina Faso	AFR	model	0.9	0	2.4	14.4	0	38.1	720	100	1300	4.7	0.7	8.5	120	31	270	0%	9%	19	16	19	–
Burundi	AFR	model	1.8	0	4.3	7.7	0	18.1	600	13	1200	7.4	0.2	14.9	110	29	250	0%	0%	0	0	32	–
Cameroon	AFR	model	1.8	0	4.3	7.7	0	18.1	780	46	1500	4.1	0.2	7.9	490	140	1000	0%	14%	26	5	8	–
Cape Verde	AFR	model	0.9	0	2.4	14.4	0	38.1	12	2	23	2.4	0.4	4.6	7	2	16	0%	0%	0	0	0	–
Central African Republic	AFR	DRS[a], 1998	1.1	0.5	2.5	18.2	8.6	34.4	220	69	380	5.1	1.6	8.8	190	100	310	3%	3%	7	4	0	–
Chad	AFR	model	0.9	0	2.4	14.4	0	38.1	530	80	970	4.9	0.7	8.9	160	45	340	–	–	–	–	0	–
Comoros	AFR	model	0.9	0	2.4	14.4	0	38.1	3	0	6	0.5	0.0	0.9	2	1	4	0%	0%	0	0	0	–
Congo	AFR	model	1.8	0	4.3	7.7	0	18.1	310	17	600	8.6	0.5	16.6	160	45	340	–	–	–	–	0	–
Côte d'Ivoire	AFR	DRS, 2006	2.5	1.3	4.9	7.7	0	18.1	2500	820	4100	12.1	4.0	19.9	530	260	890	0%	22%	43	8	0	–
Democratic Republic of the Congo	AFR	model	1.8	0	4.3	7.7	0	18.1	5600	530	11000	8.7	0.8	17.1	2200	700	4600	–	1%	91	4	176	–
Equatorial Guinea	AFR	model	2.2	0	10.7	10.8	0	34.5	38	0	83	5.8	0.0	12.6	18	1	61	–	–	–	–	0	–
Eritrea	AFR	model	0.9	0	2.4	14.4	0	38.1	57	3	110	1.2	0.1	2.2	47	13	100	–	–	–	–	–	–
Ethiopia	AFR	DRS, 2005	1.6	0.9	2.7	11.8	6.4	21	5200	2400	8000	6.4	3.0	9.9	2000	1200	2900	0%	8%	233	12	88	–
Gabon	AFR	model	1.8	0	4.3	7.7	0	18.1	150	11	280	10.4	0.8	19.3	98	35	190	–	–	–	–	–	–
Gambia	AFR	DRS, 2000	0.5	0	2.6	0	0	20.4	42	0	90	2.5	0.0	5.4	15	1	51	0%	0%	0	0	0	–
Ghana	AFR	model	0.9	0	2.4	14.4	0	38.1	640	82	1200	2.7	0.4	5.1	240	72	510	–	–	–	–	0	–
Guinea	AFR	DRS, 1998	0.6	0.2	1.6	28.1	15.6	45.4	460	200	710	4.7	2.0	7.2	200	120	310	0%	11%	69	34	54	–

a Estimates based on subnational drug resistance data

b The proportion may be overestimated or exceed 100% if TB notification data are incomplete, especially in systems where reporting of TB and DST are not linked. Denominator includes all new or retreated cases regardless of culture result; cases with previous history unknown not included.

c The percentage is calculated on the point estimate of expected MDR-TB cases and may therefore exceed 100% (please refer to uncertainty bounds of estimate). The ratio of notified MDR-TB cases to expected cases may also exceed 100% as a result of conservative estimates of % MDR-TB among notified TB patients, notification of MDR-TB cases from a previous year, and incomplete notification of TB in systems where reporting of TB and MDR-TB are not linked.

NA = not applicable

DRS = drug resistance survey/surveillance

– = data not available

Country	WHO region	Source of estimates	Estimated % of all new TB cases with MDR-TB (2008)			Estimated % of all retreated TB cases with MDR-TB (2008)			Estimated cases of MDR-TB emerging in 2008						Estimated cases of MDR-TB among notified cases of pulmonary TB in 2009 (A)			Proportion of TB cases reported in 2009 with DST results[b]		Notified cases of MDR-TB in 2009 (B)	Notified cases of MDR-TB as % of estimated cases of MDR-TB among all notified cases of pulmonary TB (B/A)[c]	Cases of MDR-TB enrolled on treatment in 2009	Availability of Class A or B drug resistance surveillance data
									N			Per 100 000 population											
			Best	Low	High	Best	Low	High	Best	Low	High	Best	Low	High	Best	Low	High	New	Retreated				
Guinea-Bissau	AFR	model	0.9	0	2.4	14.4	0	38.1	38	0	77	2.4	0.0	4.9	30	8	64	–	–	–	–	0	–
Kenya	AFR	DRS, 1995	0	0	0.9	0	0	7.7	3300	580	6000	8.5	1.5	15.5	390	47	1100	0%	18%	150	38	140	–
Lesotho	AFR	DRS, 1995	0.9	0.3	2.6	5.7	1.9	15.4	200	37	350	9.8	1.8	17.1	190	65	390	–	–	–	–	429	–
Liberia	AFR	model	0.9	0	2.4	14.4	0	38.1	120	8	240	3.2	0.2	6.3	61	16	140	–	–	–	–	5	–
Madagascar	AFR	DRS, 2007	0.5	0.2	1.3	3.9	1.1	13.2	330	65	600	1.7	0.3	3.1	170	50	350	0%	1%	3	2	0	–
Malawi	AFR	model	1.8	0	4.3	7.7	0	18.1	1200	180	2200	8.1	1.2	14.8	490	170	990	0%	1%	0	0	6	–
Mali	AFR	model	0.9	0	2.4	14.4	0	38.1	640	110	1200	5.0	0.9	9.4	110	33	240	0%	3%	22	20	0	–
Mauritania	AFR	model	0.9	0	2.4	14.4	0	38.1	130	0	250	4.0	0.0	7.8	44	13	94	–	–	–	–	0	–
Mauritius	AFR	model	0.9	0	2.4	14.4	0	38.1	3	0	6	0.2	0.0	0.5	2	1	4	88%	100%	1	60	1	Class B (2009)
Mozambique	AFR	DRS, 2006	3.5	2.5	4.7	11.2	4.2	30	3600	2300	4800	16.1	10.3	21.4	1700	1100	2300	0%	6%	140	8	103	–
Namibia	AFR	model	1.8	0	4.3	7.7	0	18.1	370	23	720	17.4	1.1	33.8	350	120	680	0%	–	301	87	292	–
Niger	AFR	model	0.9	0	2.4	14.4	0	38.1	350	33	670	2.4	0.2	4.6	170	50	360	0%	5%	24	14	34	–
Nigeria	AFR	model	1.8	0	4.3	7.7	0	18.1	11000	1300	20000	7.3	0.9	13.2	2100	660	4400	0%	0%	28	1	0	–
Rwanda	AFR	DRS, 2005	3.9	2.6	5.7	9.4	4.8	17.5	1600	950	2200	16.5	9.8	22.6	260	180	350	1%	29%	78	30	77	–
Sao Tome and Principe	AFR	model	0.9	0	2.4	14.4	0	38.1	2	0	5	1.2	0.0	3.1	1	0	2	–	–	–	–	0	–
Senegal	AFR	DRS, 2006	2.1	0.9	4.8	16.7	8.3	30.6	1100	360	1800	9.0	2.9	14.7	380	200	630	1%	3%	11	3	0	–
Seychelles	AFR	model	0.9	0	2.4	14.4	0	38.1	0	0	0	0.0	0.0	0.0	0	0	0	–	–	–	NA	0	–
Sierra Leone	AFR	DRS, 1997	0.9	0	4.7	23.1	8.2	50.3	470	0	1000	8.5	0.0	18.0	200	30	540	–	–	–	–	–	–
South Africa	AFR	DRS, 2002	1.8	1.5	2.3	6.7	5.5	8.1	13000	10000	16000	26.2	20.1	32.2	9600	8200	11000	–	–	9070	94	4143	Class B (2008)
Swaziland	AFR	DRS, 1995	0.9	0.3	2.6	9.1	3.6	21.2	270	67	470	23.1	5.7	40.2	200	79	380	23%	–	190	94	166	–
Togo	AFR	model	0.9	0	2.4	14.4	0	38.1	430	70	790	6.7	1.1	12.2	53	16	110	0%	2%	4	7	0	–
Uganda	AFR	DRS[a], 1997	0.5	0.1	1.9	4.4	1.2	14.8	730	0	1500	2.3	0.0	4.7	350	68	870	1%	6%	57	16	2	–
United Republic of Tanzania	AFR	DRS, 2007	1.1	0.4	2.8	0	0	7.3	1200	250	2100	2.8	0.6	4.9	590	160	1300	1%	4%	24	4	16	–
Zambia	AFR	DRS, 2000	1.8	0.9	3.5	2.3	0.1	11.8	1100	400	1900	8.7	3.2	15.1	670	290	1200	0%	1%	29	4	0	–
Zimbabwe	AFR	DRS, 1995	1.9	1.1	3.3	8.3	2.9	21.8	2400	1200	3600	19.3	9.6	28.9	1000	550	1700	–	–	–	–	0	–
Antigua and Barbuda	AMR	model	2.2	0	10.7	10.8	0	34.5	0	0	0	0.0	0.0	0.0	0	0	1	–	50%	0	0	0	–
Argentina	AMR	DRS, 2005	2.2	1.3	3.6	15.4	10.3	22.5	490	310	670	1.2	0.8	1.7	270	190	360	–	–	–	–	0	–
Bahamas	AMR	model	2.2	0	10.7	10.8	0	34.5	2	0	5	0.6	0.0	1.5	1	0	4	93%	80%	0	0	0	Class B (2009)

Country	WHO region	Source of estimates	Estimated % of all new TB cases with MDR-TB (2008)			Estimated % of all retreated TB cases with MDR-TB (2008)			Estimated cases of MDR-TB emerging in 2008						Estimated cases of MDR-TB among notified cases of pulmonary TB in 2009 (A)			Proportion of TB cases reported in 2009 with DST results[b]		Notified cases of MDR-TB in 2009 (B)	Notified cases of MDR-TB as % of estimated cases of MDR-TB among all notified cases of pulmonary TB (B/A)[c]	Cases of MDR-TB enrolled on treatment in 2009	Availability of Class A or B drug resistance surveillance data
									N			Per 100 000 population											
			Best	Low	High	Best	Low	High	Best	Low	High	Best	Low	High	Best	Low	High	New	Retreated				
Barbados	AMR	model	2.2	0	10.7	10.8	0	34.5	0	0	0	0.0	0.0	0.0	0	0	0	0%	–	0	NA	0	–
Belize	AMR	model	2	0	6	12.1	0	28.3	3	0	7	1.0	0.0	2.3	3	1	7	1%	0%	1	32	1	–
Bolivia (Plurinational State of)	AMR	DRS, 1996	1.2	0.6	2.6	4.7	2	10.5	190	54	330	2.0	0.6	3.4	110	54	200	–	92%	60	53	37	Class A, previously treated cases only (2009)
Brazil	AMR	DRS, 1996	0.9	0.6	1.4	5.4	4.1	7.2	1400	900	1800	0.7	0.5	0.9	1100	820	1400	–	–	449	41	398	–
Canada	AMR	DRS, 2008	0.8	0.4	1.6	4.4	1.7	10.8	17	7	27	0.1	0.0	0.1	12	6	20	91%	–	18	>100	18	Class A (2009)
Chile	AMR	DRS, 2001	0.7	0.3	1.5	3.8	2.1	6.6	17	5	28	0.1	0.0	0.2	23	13	37	3%	72%	23	99	11	Class A, previously treated cases only (2009)
Colombia	AMR	DRS, 2000	1.5	0.9	2.4	12.1	0	28.3	320	170	470	0.7	0.4	1.0	210	110	330	4%	79%	110	53	90	Class A, previously treated cases only (2009)
Costa Rica	AMR	DRS, 2006	1.5	0.6	3.8	4.8	0.2	22.7	7	0	15	0.2	0.0	0.3	7	2	14	–	–	–	–	0	–
Cuba	AMR	DRS, 2005	0	0	2.2	5.3	0.3	24.6	19	0	39	0.2	0.0	0.3	6	1	17	26%	37%	3	51	–	–
Dominica	AMR	model	2	0	6	12.1	0	28.3	0	0	0	0.0	0.0	0.0	0	0	0	–	–	–	–	0	–
Dominican Republic	AMR	DRS, 1995	6.6	4.3	10	19.7	13.5	27.8	590	370	810	5.9	3.7	8.1	310	220	420	0%	0%	0	0	93	–
Ecuador	AMR	DRS, 2002	4.9	3.6	6.6	24.3	18.7	31	730	520	950	5.4	3.9	7.0	360	300	440	–	–	156	43	452	–
El Salvador	AMR	DRS, 2001	0.3	0.1	1.2	7	3.4	13.7	9	0	18	0.1	0.0	0.3	12	5	22	4%	75%	2	17	2	Class A, previously treated cases only (2009)
Grenada	AMR	model	2	0	6	12.1	0	28.3	0	0	0	0.0	0.0	0.0	0	0	0	–	–	–	NA	0	–
Guatemala	AMR	DRS, 2002	3	1.9	4.6	26.5	20.1	33.9	330	200	470	2.4	1.5	3.4	110	79	150	5%	>100%	230	>100	28	–
Guyana	AMR	model	2	0	6	12.1	0	28.3	35	5	65	4.6	0.7	8.5	37	11	78	0%	–	0	0	–	–
Haiti	AMR	model	2	0	6	12.1	0	28.3	640	0	1300	6.5	0.0	13.2	0	0	0	–	–	–	NA	–	–
Honduras	AMR	DRS, 2004	1.8	0.9	3.4	12.3	6.6	21.8	100	35	170	1.4	0.5	2.3	71	41	110	1%	19%	4	6	5	–
Jamaica	AMR	model	2	0	6	12.1	0	28.3	5	0	10	0.2	0.0	0.4	5	1	10	52%	–	0	0	0	Class B (2009)
Mexico	AMR	DRS[a], 1997	2.4	1.2	4.7	22.4	15.6	31.2	670	310	1000	0.6	0.3	0.9	700	450	1000	0%	1%	11	2	18	–
Nicaragua	AMR	DRS, 2006	0.6	0.2	2.2	7.8	4	14.6	26	1	51	0.5	0.0	0.9	33	14	60	–	–	–	–	0	–
Panama	AMR	model	2	0	6	12.1	0	28.3	58	7	110	1.7	0.2	3.2	53	16	110	–	–	8	15	–	–

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									N			Per 100 000 population												
			Best	Low	High	Best	Low	High	Best	Low	High	Best	Low	High	Best	Low	High	New	Retreated					
Paraguay	AMR	DRS, 2001	2.1	0.9	4.9	3.9	1.1	13.2	67	13	120	1.1	0.2	1.9	48	17	95	3%	26%	6	12	7	–
Peru	AMR	DRS, 2006	5.3	4.3	6.4	23.6	19.5	28.3	2600	2000	3100	9.0	6.9	10.8	2300	2000	2600	3%	19%	1578	70	1856	–
Saint Kitts and Nevis	AMR	model	2	0	6	12.1	0	28.3	0	0	0	0.0	0.0	0.0	0	0	0	–	–	–	NA	0	–
Saint Lucia	AMR	model	2	0	6	12.1	0	28.3	0	0	1	0.0	0.0	0.6	1	0	1	0%	0%	0	0	0	–
Saint Vincent and the Grenadines	AMR	model	2	0	6	12.1	0	28.3	1	0	2	0.9	0.0	1.8	0	0	1	–	–	–	0	0	–
Suriname	AMR	model	2	0	6	12.1	0	28.3	19	0	38	3.7	0.0	7.4	5	1	11	1%	0%	1	20	1	–
Trinidad and Tobago	AMR	model	2.2	0	10.7	10.8	0	34.5	18	0	37	1.3	0.0	2.8	12	1	33	0%	0%	0	0	0	–
United States of America	AMR	DRS, 2007	1.1	0.9	1.3	3.8	2.5	5.9	190	150	230	0.1	0.0	0.1	91	74	110	70%	>100%	115	>100	115	Class A (2009)
Uruguay	AMR	DRS, 2005	0	0	1.1	6.1	1.7	19.6	22	0	44	0.7	0.0	1.3	4	1	10	–	–	–	–	1	–
Venezuela (Bolivarian Republic of)	AMR	DRS, 1999	0.5	0.2	1.3	13.5	8.2	21.3	93	37	150	0.3	0.1	0.5	83	49	130	0%	37%	21	25	21	–
Afghanistan	EMR	model	2.8	0	8	35.4	0	75.1	2400	420	4300	8.8	1.5	15.8	980	300	2000	–	–	0	0	–	–
Bahrain	EMR	model	2.2	0	10.7	10.8	0	34.5	16	0	35	2.1	0.0	4.5	4	0	20	13%	–	0	0	0	–
Djibouti	EMR	model	0.9	0	2.4	14.4	0	38.1	61	1	120	7.2	0.1	14.1	47	13	100	–	–	–	–	0	–
Egypt	EMR	DRS, 2002	2.2	1.3	3.7	38.2	32	44.9	590	370	800	0.7	0.5	1.0	430	340	520	1%	>100%	204	48	73	–
Iran (Islamic Republic of)	EMR	DRS, 1998	5	3.5	6.9	48.2	35.7	61	870	570	1200	1.2	0.8	1.6	730	580	890	–	–	–	–	38	–
Iraq	EMR	model	2.8	0	8	35.4	0	75.1	820	95	1500	2.7	0.3	5.0	430	150	860	0%	22%	72	17	72	–
Jordan	EMR	DRS, 2004	5.4	2.5	11.3	40	24.6	57.7	24	9	40	0.4	0.1	0.7	17	10	26	26%	35%	8	46	9	Class A (2009)
Kuwait	EMR	model	2.2	0	10.7	10.8	0	34.5	46	0	99	1.6	0.0	3.4	12	0	52	46%	100%	9	75	9	Class A (2009)
Lebanon	EMR	DRS, 2003	1.1	0.3	3.8	62.5	38.6	81.5	18	9	27	0.4	0.2	0.6	9	5	15	3%	100%	4	43	6	Class A, previously treated cases only (2009)
Libyan Arab Jamahiriya	EMR	model	2.8	0	8	35.4	0	75.1	120	20	210	1.9	0.3	3.3	47	9	120	–	–	–	–	3	–
Morocco	EMR	DRS, 2006	0.5	0.2	1.1	12.2	8.2	17.7	200	59	330	0.6	0.2	1.0	270	180	370	–	–	–	–	0	–
Oman	EMR	DRS, 2008	2.2	0.7	6.2	8.3	0.4	35.4	8	0	16	0.3	0.0	0.6	5	1	12	76%	100%	5	100	5	Class A (2009)
Pakistan	EMR	model	2.8	0	8	35.4	0	75.1	15000	1200	29000	8.5	0.7	16.4	9300	2500	20000	0%	1%	49	1	368	–
Qatar	EMR	model	2.2	0	10.7	10.8	0	34.5	4	0	9	0.3	0.0	0.7	6	0	31	52%	–	3	47	3	Class A (2009)
Saudi Arabia	EMR	model	2.2	0	10.7	10.8	0	34.5	210	0	460	0.8	0.0	1.8	77	2	280	–	–	–	–	0	–
Somalia	EMR	model	0.9	0	2.4	14.4	0	38.1	390	55	730	4.4	0.6	8.2	170	51	360	–	–	–	–	0	–
Sudan	EMR	model	0.9	0	2.4	14.4	0	38.1	850	140	1600	2.1	0.3	3.9	460	130	990	0%	10%	94	20	94	–

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									N			Per 100 000 population											
			Best	Low	High	Best	Low	High	Best	Low	High	Best	Low	High	Best	Low	High	New	Retreated				
Syrian Arab Republic	EMR	model	2.8	0	8	35.4	0	75.1	250	57	440	1.2	0.3	2.1	120	38	230	–	8%	14	12	15	–
Tunisia	EMR	model	2.8	0	8	35.4	0	75.1	110	20	190	1.1	0.2	1.9	47	12	110	18%	–	5	11	10	–
United Arab Emirates	EMR	model	2.2	0	10.7	10.8	0	34.5	8	0	18	0.2	0.0	0.4	2	0	8	–	–	–	–	2	–
Yemen	EMR	DRS, 2004	2.9	1.8	4.8	11.3	5.3	22.6	490	260	720	2.1	1.1	3.1	200	120	300	1%	10%	13	6	–	–
Albania	EUR	model	0.4	0	1.3	5.6	0	13.1	2	0	5	0.1	0.0	0.2	2	1	5	29%	43%	0	0	0	Class B (2009)
Andorra	EUR	DRS, 2008	0	0	56.1	10.8	0	34.5	0	0	0	0.0	0.0	0.0	1	0	3	29%	50%	0	0	0	Class B (2009)
Armenia	EUR	DRS, 2007	9.4	7.3	12.1	43.2	38.1	48.5	480	380	580	15.6	12.3	18.8	180	160	210	33%	>100%	156	85	134	Class B (2009)
Austria	EUR	DRS, 2005	1.9	1.1	3.4	12.5	3.5	36	–	–	–	–	–	–	11	6	18	61%	53%	22	>100	–	Class A (2009)
Azerbaijan	EUR	DRS[a], 2007	22.3	19	26	55.8	51.6	59.9	4000	3300	4700	45.8	37.8	53.8	2400	2200	2500	–	–	–	–	–	–
Belarus	EUR	model	12.5	0	25.3	42.1	11.9	72.2	800	260	1300	8.3	2.7	13.4	900	390	1500	45%	>100%	1342	>100	–	Class B (2009)
Belgium	EUR	DRS, 2008	2.4	1.4	3.9	12.5	5.9	24.7	30	16	43	0.3	0.2	0.4	15	9	25	77%	71%	10	66	–	Class A (2009)
Bosnia and Herzegovina	EUR	DRS, 2005	0.4	0.2	1	6.6	3.2	13	9	1	16	0.2	0.0	0.4	13	7	22	51%	58%	2	15	0	Class B (2008)
Bulgaria	EUR	model	12.5	0	25.3	42.1	11.9	72.2	460	98	810	6.1	1.3	10.7	420	180	730	28%	33%	43	10	43	Class B (2009)
Croatia	EUR	DRS, 2005	0.5	0.2	1.5	4.9	1.7	13.5	8	1	14	0.2	0.0	0.3	7	2	14	60%	66%	7	>100	–	–
Cyprus	EUR	DRS, 2008	0	0	11.7	33.3	1.7	79.2	2	0	4	0.2	0.0	0.5	2	0	5	66%	67%	4	>100	–	Class A (2009)
Czech Republic	EUR	DRS, 2008	2.1	1.1	3.8	2.7	0.1	13.8	20	8	32	0.2	0.1	0.3	11	6	20	65%	61%	8	72	–	Class A (2009)
Denmark	EUR	DRS, 2008	0	0	1.5	0	0	12.1	20	0	41	0.4	0.0	0.8	1	0	4	73%	80%	2	>100	–	Class A (2009)
Estonia	EUR	DRS, 2008	15.4	11.6	20.1	42.7	32.1	53.9	93	71	120	6.9	5.3	8.9	82	67	98	74%	78%	86	>100	86	Class A (2009)
Finland	EUR	DRS, 2008	0.4	0	2.3	0	0	29.9	3	0	7	0.1	0.0	0.1	2	0	8	73%	50%	6	>100	–	Class A (2009)
France	EUR	DRS, 2007	1	0.5	1.7	6.9	3.4	13.5	62	32	93	0.1	0.1	0.1	22	11	38	100%	30%	30	>100	30	Class B (2009)
Georgia	EUR	DRS, 2006	6.8	5.2	8.7	27.4	23.7	31.4	670	550	780	15.6	12.8	18.1	370	310	430	40%	>100%	369	99	266	Class A (2009)
Germany	EUR	DRS, 2008	0.7	0.4	1.1	11	7.5	15.8	55	37	73	0.1	0.0	0.1	50	36	66	66%	47%	61	>100	–	Class A (2009)
Greece	EUR	DRS, 2008	2.7	1.6	4.5	50	2.6	97.4	58	15	100	0.5	0.1	0.9	13	7	20	30%	31%	14	>100	–	Class B (2009)
Hungary	EUR	model	2.2	0	10.7	10.8	0	34.5	78	0	170	0.8	0.0	1.7	49	5	140	40%	26%	20	41	–	Class A (2009)
Iceland	EUR	DRS, 2008	20	1	62.4	10.8	0	34.5	1	0	3	0.3	0.0	1.0	2	0	5	86%	100%	0	0	–	Class A (2009)
Ireland	EUR	DRS, 2005	0.5	0	2.8	10	0.5	40.4	5	0	12	0.1	0.0	0.3	3	0	9	48%	32%	0	0	–	Class A (2009)
Israel	EUR	DRS, 2005	3.6	1.8	6.9	33.3	1.7	79.2	16	5	26	0.2	0.1	0.4	11	6	19	76%	75%	7	62	7	Class A (2009)
Italy	EUR	DRS[a], 2005	1.6	0.8	3.2	17.7	10.9	27.6	120	66	170	0.2	0.1	0.3	31	15	61	39%	75%	82	>100	–	Class B (2009)
Kazakhstan	EUR	DRS, 2001	14.2	11	18.2	56.4	50.9	61.8	8100	6400	9700	52.2	41.2	62.5	7300	6600	8100	25%	47%	3644	50	3209	Class B (2009)

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									N			Per 100 000 population											
			Best	Low	High	Best	Low	High	Best	Low	High	Best	Low	High	Best	Low	High	New	Retreated				
Kyrgyzstan	EUR	model	12.5	0	25.3	42.1	11.9	72.2	1400	350	2400	25.9	6.5	44.3	800	350	1400	12%	35%	785	98	545	Three subnational regions: Class B (2009)
Latvia	EUR	DRS, 2008	12.1	9.9	14.8	31.9	24.9	39.9	170	140	200	7.5	6.2	8.9	140	120	160	74%	91%	131	92	124	Class A (2009)
Lithuania	EUR	DRS, 2008	9	7.5	10.7	47.5	42.9	52.2	330	270	390	9.9	8.1	11.7	330	300	360	64%	100%	322	98	322	Class A (2009)
Luxembourg	EUR	DRS, 2005	0	0	9.6	10.8	0	34.5	–	–	–	–	–	–	–	–	–	–	–	0	NA	0	Class A (2009)
Malta	EUR	DRS, 2005	0	0	25.9	10.8	0	34.5	2	0	5	0.5	0.0	1.2	3	0	9	41%	–	0	0	0	Class A (2009)
Monaco	EUR	model	2.2	0	10.7	10.8	0	34.5	–	–	–	–	–	–	–	–	–	–	–	–	NA	–	–
Montenegro	EUR	DRS, 2008	0	0	4.9	0	0	29.9	0	0	1	0.0	0.0	0.2	0	0	0	74%	82%	1	NA	1	Class A (2009)
Netherlands	EUR	DRS, 2008	1.6	0.9	2.8	6.3	1.7	20.1	19	8	29	0.1	0.0	0.2	12	7	20	66%	60%	20	>100	–	Class A (2009)
Norway	EUR	DRS, 2008	0.6	0	3.1	14.3	4	39.9	5	0	12	0.1	0.0	0.3	1	0	6	81%	65%	8	>100	–	Class A (2009)
Poland	EUR	DRS, 2004	0.3	0.1	0.6	8.2	6.2	10.9	73	47	100	0.2	0.1	0.3	77	56	100	–	–	0	0	0	–
Portugal	EUR	DRS, 2008	1.3	0.8	2	6.2	3.3	11.4	48	28	68	0.4	0.3	0.6	45	30	64	54%	55%	22	49	–	Class A (2009)
Republic of Moldova	EUR	DRS, 2006	19.4	16.8	22.2	50.8	48.7	53	2100	1700	2400	57.8	46.8	66.1	1500	1400	1600	34%	68%	1069	72	334	Class B (2009)
Romania	EUR	DRS, 2004	2.8	1.9	4.2	11	8.2	14.5	1300	840	1700	6.1	3.9	8.0	1000	800	1300	12%	30%	435	42	–	–
Russian Federation	EUR	DRS[a], 2008	15.8	11.9	19.7	42.4	38.1	46.7	38000	30000	45000	26.9	21.2	31.8	31000	26000	35000	31%	21%	14686	48	8143	National: Class B (2009); Twelve subnational regions: Class A (2008)
San Marino	EUR	model	2.2	0	10.7	10.8	0	34.5	–	–	–	–	–	–	–	–	–	–	–	–	NA	–	–
Serbia	EUR	DRS, 2008	0.7	0.3	1.4	7.7	4.2	13.6	18	7	30	0.2	0.1	0.3	26	15	40	–	–	–	–	–	Class A (2008)
Slovakia	EUR	DRS, 2008	0.3	0	1.9	3.2	0.9	11	2	0	7	0.0	0.0	0.1	4	0	10	47%	46%	1	28	–	Class A (2009)
Slovenia	EUR	DRS, 2008	0.5	0	3	7.7	0.4	33.3	1	0	4	0.0	0.0	0.2	2	0	5	93%	100%	1	69	–	Class A (2009)
Spain	EUR	DRS[a], 2005	0.1	0	0.4	5.1	0	13.7	120	0	310	0.3	0.0	0.7	5	0	18	17%	96%	56	>100	–	–
Sweden	EUR	DRS, 2008	2	1	4.1	13.3	5.3	29.7	15	6	24	0.2	0.1	0.3	5	3	11	82%	76%	13	>100	–	Class A (2009)
Switzerland	EUR	DRS, 2008	1.2	0.4	3.4	2.9	0.2	14.9	5	0	11	0.1	0.0	0.1	3	1	7	81%	>100%	5	>100	–	Class A (2009)
Tajikistan	EUR	DRS[a], 2008	16.5	11.3	23.6	61.6	52.8	69.7	4000	2900	5100	58.5	42.4	74.6	1000	770	1300	14%	>100%	319	31	52	–
The Former Yugoslav Republic of Macedonia	EUR	model	0.4	0	1.3	5.6	0	13.1	2	0	5	0.1	0.0	0.2	4	1	8	46%	58%	1	26	1	Class A (2009)
Turkey	EUR	model	0.4	0	1.3	5.6	0	13.1	150	23	270	0.2	0.0	0.4	120	36	260	23%	41%	222	>100	222	Class B (2009)

Country	WHO region	Source of estimates	Estimated % of all new TB cases with MDR-TB (2008)			Estimated % of all retreated TB cases with MDR-TB (2008)			Estimated cases of MDR-TB emerging in 2008						Estimated cases of MDR-TB among notified cases of pulmonary TB in 2009 (A)			Proportion of TB cases reported in 2009 with DST results[b]		Notified cases of MDR-TB in 2009 (B)	Notified cases of MDR-TB as % of estimated cases of MDR-TB among all notified cases of pulmonary TB (B/A)[c]	Cases of MDR-TB enrolled on treatment in 2009	Availability of Class A or B drug resistance surveillance data
									N			Per 100 000 population											
			Best	Low	High	Best	Low	High	Best	Low	High	Best	Low	High	Best	Low	High	New	Retreated				
Turkmenistan	EUR	DRS[a], 2002	3.8	1.5	9.4	18.4	11.9	27.2	160	34	290	3.2	0.7	5.7	89	35	220	5%	>100%	39	44	–	–
Ukraine	EUR	DRS[a], 2002	16	13.8	18.3	44.3	40	48.7	8700	6800	11000	18.9	14.8	23.9	7200	6500	7900	36%	>100%	3482	49	3186	Class B (2009)
United Kingdom of Great Britain and Northern Ireland	EUR	DRS, 2007	1	0.7	1.3	6.4	3.3	12.1	98	65	130	0.2	0.1	0.2	34	24	44	56%	45%	58	>100	–	Class A (2009)
Uzbekistan	EUR	DRS[a], 2005	14.2	10.4	18.1	49.8	35.8	63.8	8700	6500	11000	32.0	23.9	40.5	2900	2400	3500	3%	30%	654	22	464	–
Bangladesh	SEA	model	2.2	0	5.6	14.7	0	39.6	9800	1000	19000	6.1	0.6	11.9	3600	830	8200	–	–	–	–	352	Class A, previously treated cases only (2008)
Bhutan	SEA	model	2.2	0	5.6	14.7	0	39.6	32	3	61	4.7	0.4	8.9	27	8	56	1%	11%	8	30	11	–
Democratic People's Republic of Korea	SEA	model	2.2	0	5.6	14.7	0	39.6	3900	660	7200	16.4	2.8	30.2	3500	990	7500	–	–	–	–	0	–
India	SEA	DRS[a], 2005	2.3	1.8	2.8	17.2	14.9	19.5	99000	79000	120000	8.4	6.7	10.2	73000	65000	81000	–	1%	1660	2	1136	–
Indonesia	SEA	DRS[a], 2004	2	0.5	6.9	14.7	0	39.6	9300	0	21000	4.1	0.0	9.2	6400	770	18000	–	–	–	–	20	–
Maldives	SEA	model	2.2	0	5.6	14.7	0	39.6	3	0	6	1.0	0.0	2.0	2	1	4	–	–	–	–	0	–
Myanmar	SEA	DRS, 2007	4.2	3.2	5.6	10	7.1	14	9300	6400	12000	18.8	12.9	24.2	4800	3800	6000	–	10%	815	17	64	–
Nepal	SEA	DRS, 2007	2.9	1.9	4.3	11.7	7.6	17.6	1700	990	2300	5.9	3.4	8.0	1100	790	1500	0%	7%	58	5	156	–
Sri Lanka	SEA	DRS, 2006	0.2	0	1	0	0	10.2	63	0	130	0.3	0.0	0.6	24	2	76	9%	>100%	4	17	4	–
Thailand	SEA	DRS, 2006	1.7	1.1	2.6	34.5	28.2	41.5	2900	2100	3800	4.3	3.1	5.6	2300	1800	2700	–	–	–	–	296	–
Timor-Leste	SEA	model	2.2	0	5.6	14.7	0	39.6	130	5	260	11.8	0.5	23.7	100	20	250	0%	12%	4	4	1	–
Australia	WPR	model	2.2	0	10.7	10.8	0	34.5	20	8	32	0.1	0.0	0.2	21	1	70	–	–	31	>100	26	Class A (2009)
Brunei Darussalam	WPR	model	2.2	0	10.7	10.8	0	34.5	12	0	26	3.1	0.0	6.6	3	0	16	77%	>100%	0	0	0	Class A (2009)
Cambodia	WPR	DRS, 2001	0	0	0.6	3.1	1.1	8.8	2200	0	4600	15.1	0.0	31.6	84	17	200	–	–	–	–	–	–
China	WPR	DRS, 2007	5.7	5	6.6	25.6	22.6	28.3	100000	79000	120000	7.5	5.9	9.0	66000	59000	73000	–	–	474	1	458	–
Cook Islands	WPR	model	1.9	0	7.5	13.8	0	36.2	0	0	0	0.0	0.0	0.0	–	–	–	0%	–	0	NA	0	–
Fiji	WPR	model	1.9	0	7.5	13.8	0	36.2	5	0	11	0.6	0.0	1.3	2	0	7	–	100%	0	0	0	Class A, previously treated cases only (2009)
Japan	WPR	DRS, 2002	0.7	0.5	1.1	9.8	7.3	13.1	290	180	390	0.2	0.1	0.3	290	230	370	–	–	–	–	–	–
Kiribati	WPR	model	1.9	0	7.5	13.8	0	36.2	10	0	22	10.4	0.0	22.8	5	0	15	–	–	–	–	0	–

Country	WHO region	Source of estimates	Estimated % of all new TB cases with MDR-TB (2008)			Estimated % of all retreated TB cases with MDR-TB (2008)			Estimated cases of MDR-TB emerging in 2008						Estimated cases of MDR-TB among notified cases of pulmonary TB in 2009 (A)			Proportion of TB cases reported in 2009 with DST results[b]		Notified cases of MDR-TB in 2009 (B)	Notified cases of MDR-TB as % of estimated cases of MDR-TB among all notified cases of pulmonary TB (B/A)[c]	Cases of MDR-TB enrolled on treatment in 2009	Availability of Class A or B drug resistance surveillance data
									N			Per 100 000 population												
			Best	Low	High	Best	Low	High	Best	Low	High	Best	Low	High	Best	Low	High	New	Retreated					
Lao People's Democratic Republic	WPR	model	1.9	0	7.5	13.8	0	36.2	280	0	590	4.5	0.0	9.5	90	9	260	–	–	–	–	–	–
Malaysia	WPR	DRS[a], 1997	0.1	0	0.6	0	0	19.4	100	0	220	0.4	0.0	0.8	72	4	230	–	–	55	77	0	–
Marshall Islands	WPR	model	1.9	0	7.5	13.8	0	36.2	3	0	8	4.9	0.0	13.2	3	0	9	30%	50%	1	38	1	Class B (2009)
Micronesia (Federated States of)	WPR	model	1.9	0	7.5	13.8	0	36.2	3	0	6	2.7	0.0	5.4	3	1	9	33%	22%	3	91	3	Class B (2009)
Mongolia	WPR	DRS, 1999	1	0.4	2.5	13.8	0	36.2	110	20	190	4.2	0.8	7.2	100	27	230	3%	89%	168	>100	88	Class A, previously treated cases only (2009)
Nauru	WPR	model	1.9	0	7.5	13.8	0	36.2	0	0	0	0.0	0.0	0.0	0	0	0	–	–	0	NA	–	–
New Zealand	WPR	DRS, 2008	0	0	1.6	0	0	39	15	0	33	0.4	0.0	0.8	0	0	0	81%	89%	7	NA	–	Class A (2009)
Niue	WPR	model	1.9	0	7.5	13.8	0	36.2	–	–	–	–	–	–	–	–	–	–	–	–	NA	–	–
Palau	WPR	model	1.9	0	7.5	13.8	0	36.2	0	0	0	0.0	0.0	0.0	0	0	1	–	–	0	NA	0	–
Papua New Guinea	WPR	model	1.9	0	7.5	13.8	0	36.2	600	0	1200	9.1	0.0	18.2	320	69	760	–	–	–	–	–	–
Philippines	WPR	DRS, 2004	4	3	5.5	20.9	14.8	28.7	13000	8900	17000	14.4	9.9	18.8	7600	5900	9600	1%	0%	1073	14	491	–
Republic of Korea	WPR	DRS, 2004	2.7	2.1	3.4	14	10.4	18.6	1900	1400	2300	3.9	2.9	4.8	1700	1400	2100	–	–	–	–	–	–
Samoa	WPR	model	1.9	0	7.5	13.8	0	36.2	1	0	2	0.6	0.0	1.1	0	0	1	–	–	–	NA	–	–
Singapore	WPR	DRS, 2008	0.1	0	0.6	2.9	1	8.2	3	0	8	0.1	0.0	0.2	5	1	12	63%	64%	3	60	3	Class A (2009)
Solomon Islands	WPR	model	1.9	0	7.5	13.8	0	36.2	20	0	41	3.9	0.0	8.0	5	0	16	1%	>100%	0	0	0	–
Tonga	WPR	model	1.9	0	7.5	13.8	0	36.2	0	0	1	0.0	0.0	1.0	0	0	0	–	–	–	NA	0	–
Tuvalu	WPR	model	1.9	0	7.5	13.8	0	36.2	0	0	1	0.0	0.0	10.1	0	0	0	0%	0%	0	NA	0	–
Vanuatu	WPR	DRS, 2006	0	0	11.7	13.8	0	36.2	4	0	10	1.7	0.0	4.3	3	0	8	0%	0%	0	0	0	–
Viet Nam	WPR	DRS, 2006	2.7	2	3.6	19.3	14.5	25.2	5900	3800	8100	6.8	4.4	9.3	3500	2800	4200	–	–	217	6	307	–

3.2 Continuous drug resistance surveillance data quality indicators

Class A surveillance data

Country or area	WHO region	Year	Case detection rate (%)	Culture positivity rate[a] (%)	DST coverage (%)	Satisfactory External Quality Assurance (Yes/No)
Australia	WPR	2009	89	132	100	Yes
Austria	EUR	2009	87	66	98	Yes
Belgium	EUR	2009	88	89	95	Yes
Bosnia and Herzegovina	EUR	2009	91	58	100	Yes
Brunei Darussalam	WPR	2009	89	108	100	Yes
Canada	AMR	2009	93	117	100	Yes
China, Hong Kong SAR	WPR	2009	89	65	76	Yes
China, Macao SAR	WPR	2009	89	70	100	Yes
Cyprus	EUR	2009	91	79	76	Yes
Czech Republic	EUR	2009	70	74	95	Yes
Denmark	EUR	2009	79	77	100	Yes
Estonia	EUR	2009	89	79	99	Yes
Finland	EUR	2009	110	73	98	Yes
French Polynesia	WPR	2009	89	118	100	Yes
Georgia	EUR	2009	100	55	92	Yes
Germany	EUR	2009	91	74	90	Yes
Guam	WPR	2009	89	57	98	Yes
Hungary	EUR	2009	82	51	76	Yes
Iceland	EUR	2009	110	80	100	Yes
Ireland	EUR	2009	89	57	85	Yes
Israel	EUR	2009	89	107	100	Yes
Italy	EUR	2009	66	90	100	Yes
Jordan	EMR	2009	100	60	86	Yes
Kuwait	EMR	2009	89	79	100	Yes
Latvia	EUR	2009	94	83	97	Yes
Lithuania	EUR	2009	81	77	100	Yes
Luxembourg	EUR	2009	NA	100	100	Yes
Malta	EUR	2009	89	53	85	Yes
Montenegro	EUR	2009	85	82	100	Yes
Netherlands	EUR	2009	89	115	100	Yes
New Zealand	WPR	2009	89	123	100	Yes
Northern Mariana Islands	WPR	2009	89	66	100	Yes
Norway	EUR	2009	91	87	99	Yes
Oman	EMR	2009	89	123	100	Yes
Portugal	EUR	2009	86	77	81	Yes
Puerto Rico	AMR	2009	89	104	96	Yes
Qatar	EMR	2009	89	100	100	Yes
Serbia	EUR	2008	95	72	80	Yes
Singapore	WPR	2009	89	75	100	Yes
Slovakia	EUR	2009	89	53	100	Yes
Slovenia	EUR	2009	80	102	98	Yes

Country or area	WHO region	Year	Case detection rate (%)	Culture positivity rate[a] (%)	DST coverage (%)	Satisfactory External Quality Assurance (Yes/No)
Sweden	EUR	2009	89	129	100	Yes
Switzerland	EUR	2008	87	81	99	Yes
The Former Yugoslav Republic of Macedonia	EUR	2009	98	67	92	Yes
United Kingdom of Great Britain and Northern Ireland	EUR	2009	94	88	98	Yes
United States of America	AMR	2009	89	97	95	Yes
For previously treated cases only						
Bangladesh	SEAR	2008	NA	59	100	Yes
Bolivia (Plurinational State of)	AMR	2009	NA	92	100	Yes
Chile	AMR	2009	NA	72	100	Yes
Colombia	AMR	2009	NA	100	79	Yes
Fiji	WPR	2009	NA	100	100	Yes
Lebanon	EMR	2009	NA	100	100	Yes
Mongolia	WPR	2009	NA	89	100	Yes
El Salvador	AMR	2009	NA	80	94	Yes

Class B surveillance data

Country or area	WHO region	Year	Case detection rate (%)	Culture positivity rate[a] (%)	DST coverage (%)	Satisfactory External Quality Assurance (Yes/No)
Albania	EUR	2009	94	67	61	Yes
Andorra	EUR	2009	89	38	100	Yes
Armenia	EUR	2009	70	40	100	Yes
Bahamas	AMR	2009	89	102	100	No
Belarus	EUR	2009	140	43	100	No
Bulgaria	EUR	2009	86	52	66	Yes
France	EUR	2009	77	66	64	Yes
Greece	EUR	2009	92	56	57	Yes
Jamaica	AMR	2009	78	46	100	Yes
Kazakhstan	EUR	2009	80	35	98	Yes
Marshall Islands	WPR	2009	110	37	84	Yes
Mauritius	AFR	2009	41	94	100	Yes
Micronesia (Federated States of)	WPR	2009	150	43	100	Yes
New Caledonia	WPR	2009	89	88	100	No
Republic of Moldova	EUR	2009	68	47	100	Yes
Russian Federation	EUR	2009	84	47	85	No
South Africa	AFR	2008	72	40	55	NR
Turkey	EUR	2009	77	51	74	No
Ukraine	EUR	2009	78	54	96	No

a Culture positivity rate: the number of culture positive cases divided by the number of notified pulmonary cases

NA = not applicable; NR = not reported

3.3 Continuous drug resistance surveillance

CLASS A

			New cases					Previously treated cases					All cases				
			Cases with DST results (H+R)	Multidrug resistant		Any isoniazid resistance		Cases with DST results (H+R)	Multidrug resistant		Any isoniazid resistance		Cases with DST results (H+R)	Multidrug resistant		Any isoniazid resistance	
				Number	(%)	Number	(%)		Number	(%)	Number	(%)		Number	(%)	Number	(%)
Australia	WPR	2009	–	–	–	–	–	–	–	–	–	–	1056	31	2.9	150	14.2
Austria	EUR	2009	265	5	1.9	13	4.9	23	8	34.8	10	43.5	439	22	5.0	42	9.6
Belgium	EUR	2009	621	4	0.6	24	3.9	56	3	5.4	6	10.7	774	10	1.3	37	4.8
Bosnia and Herzegovina	EUR	2009	854	0	0.0	5	0.6	66	2	3.0	8	12.1	920	2	0.2	13	1.4
Brunei Darussalam	WPR	2009	164	0	0.0	3	1.8	13	0	0.0	0	0.0	177	0	0.0	3	1.7
Canada	AMR	2009	–	–	–	–	–	–	–	–	–	–	1321	18	1.4	116	8.8
China, Hong Kong SAR	WPR	2009	2056	15	0.7	94	4.6	234	6	2.6	18	7.7	2290	21	0.9	112	4.9
China, Macao SAR	WPR	2009	201	3	1.5	12	6.0	27	0	0.0	1	3.7	228	3	1.3	13	5.7
Cyprus	EUR	2009	27	4	14.8	6	22.2	4	0	0.0	0	0.0	31	4	12.9	6	19.4
Czech Republic	EUR	2009	413	5	1.2	12	2.9	39	3	7.7	4	10.3	452	8	1.8	16	3.5
Denmark	EUR	2009	209	1	0.5	14	6.7	33	1	3.0	4	12.1	242	2	0.8	18	7.4
Estonia	EUR	2009	245	54	22.0	66	26.9	62	32	51.6	33	53.2	307	86	28.0	99	32.2
Finland	EUR	2009	295	6	2.0	18	6.1	7	0	0.0	0	0.0	302	6	2.0	18	6.0
French Polynesia	WPR	2009	42	0	0.0	0	0.0	4	0	0.0	0	0.0	46	0	0.0	0	0.0
Georgia	EUR	2009	1777	183	10.3	417	23.5	594	185	31.1	270	45.5	2372	369	15.6	688	29.0
Germany	EUR	2009	2261	36	1.6	138	6.1	151	15	10.6	28	18.5	2702	56	2.1	181	6.7
Guam	WPR	2009	50	1	2.0	3	6.0	1	0	0.0	0	0.0	51	1	2.0	3	5.9
Hungary	EUR	2009	486	16	3.3	41	8.4	55	4	7.3	10	18.2	542	20	3.7	51	9.4
Iceland	EUR	2009	6	0	0.0	2	33.3	1	0	0.0	0	0.0	8	0	0.0	2	25.0
Ireland	EUR	2009	160	0	0.0	7	4.4	12	0	0.0	1	8.3	206	0	0.0	8	3.9
Israel	EUR	2009	259	5	1.9	28	10.8	6	2	33.3	2	33.3	265	7	2.6	30	11.3
Italy	EUR	2009	1051	34	3.2	88	8.4	264	33	12.5	56	21.2	2511	82	3.3	248	9.9
Jordan	EMR	2009	95	6	6.3	9	9.5	7	2	28.6	2	28.6	102	8	7.8	11	10.8
Kuwait	EMR	2009	427	9	2.1	10	2.3	1	0	0.0	1	100.0	428	9	2.1	11	2.6

			New cases					Previously treated cases					All cases				
			Cases with DST results (H+R)	Multidrug resistant		Any isoniazid resistance		Cases with DST results (H+R)	Multidrug resistant		Any isoniazid resistance		Cases with DST results (H+R)	Multidrug resistant		Any isoniazid resistance	
				Number	(%)	Number	(%)		Number	(%)	Number	(%)		Number	(%)	Number	(%)
Latvia	EUR	2009	618	83	13.4	161	26.1	134	48	35.8	69	51.5	752	131	17.4	230	30.6
Lithuania	EUR	2009	1074	114	10.6	230	21.4	404	208	51.5	249	61.6	1478	322	21.8	479	32.4
Luxembourg	EUR	2009	–	–	–	–	–	–	–	–	–	–	27	0	0.0	3	11.1
Malta	EUR	2009	17	0	0.0	1	5.9	0	0	–	0	–	17	0	0.0	1	5.9
Montenegro	EUR	2009	80	0	0.0	1	1.3	9	1	11.1	1	11.1	89	1	1.1	2	2.2
Netherlands	EUR	2009	720	16	2.2	58	8.1	30	3	10.0	5	16.7	760	20	2.6	66	8.7
New Zealand	WPR	2009	237	6	2.5	22	9.3	8	1	12.5	1	12.5	245	7	2.9	23	9.4
Northern Mariana Islands	WPR	2009	21	0	0.0	1	4.8	0	0	–	0	–	21	0	0.0	1	4.8
Norway	EUR	2009	210	8	3.8	19	9.0	20	0	0.0	2	10.0	283	8	2.8	24	8.5
Oman	EMR	2009	248	4	1.6	21	8.5	7	1	14.3	1	14.3	255	5	2.0	22	8.6
Portugal	EUR	2009	1391	13	0.9	95	6.8	148	9	6.1	13	8.8	1539	22	1.4	108	7.0
Puerto Rico	AMR	2009	54	0	0.0	2	3.7	1	0	0.0	0	0.0	55	0	0.0	2	3.6
Qatar	EMR	2009	322	3	0.9	15	4.7	0	0	–	0	–	322	3	0.9	15	4.7
Serbia	EUR	2008	923	6	0.7	18	2.0	130	10	7.7	16	12.3	1058	16	1.5	34	3.2
Singapore	WPR	2009	915	3	0.3	35	3.8	85	0	0.0	3	3.5	1000	3	0.3	38	3.8
Slovakia	EUR	2009	191	0	0.0	6	3.1	36	1	2.8	2	5.6	235	1	0.4	8	3.4
Slovenia	EUR	2009	167	1	0.6	4	2.4	8	0	0.0	0	0.0	179	1	0.6	4	2.3
Sweden	EUR	2009	424	8	1.9	40	9.4	35	4	11.4	7	20.0	515	13	2.5	51	9.9
Switzerland	EUR	2008	258	3	1.2	7	2.7	34	1	2.9	7	20.6	415	5	1.2	17	4.1
The Former Yugoslav Republic of Macedonia	EUR	2009	191	0	0.0	4	2.1	28	1	3.6	2	7.1	219	1	0.5	6	2.7
United Kingdom of Great Britain and Northern Ireland	EUR	2009	3957	37	0.9	262	6.6	364	12	3.3	28	7.7	4991	58	1.2	344	6.9
United States of America	AMR	2009	8071	94	1.2	784	9.7	323	19	5.9	68	21.1	8495	114	1.3	864	10.2

			New cases					Previously treated cases					All cases				
			Cases with DST results (H+R)	Multidrug resistant		Any isoniazid resistance		Cases with DST results (H+R)	Multidrug resistant		Any isoniazid resistance		Cases with DST results (H+R)	Multidrug resistant		Any isoniazid resistance	
				Number	(%)	Number	(%)		Number	(%)	Number	(%)		Number	(%)	Number	(%)
For previously treated cases only																	
Bangladesh	SEAR	2009						599	168	28.0	225	37.6					
Bolivia (Plurinational State of)	AMR	2009						670	60	9.0	104	15.5					
Chile	AMR	2009						221	20	9.0	37	16.7					
Colombia	AMR	2009						487	102	20.9	147	30.2					
Fiji	WPR	2009						2	0	0.0	0	0.0					
Lebanon	EMR	2009						10	3	30.0	4	40.0					
Mongolia	WPR	2009						508	165	32.5	178	35.0					
El Salvador	AMR	2009						85	1	1.2	5	5.9					

CLASS B

			New cases					Previously treated cases					All cases				
Country or area	WHO region	year	Cases with DST results (H+R)	Multidrug resistant		Any isoniazid resistance		Cases with DST results (H+R)	Multidrug resistant		Any isoniazid resistance		Cases with DST results (H+R)	Multidrug resistant		Any isoniazid resistance	
				Number	(%)	Number	(%)		Number	(%)	Number	(%)		Number	(%)	Number	(%)
Albania	EUR	2009	119	0	0.0	3	2.5	9	0	0.0	1	11.1	128	0	0.0	4	3.1
Andorra	EUR	2009	2	0	0.0	0	0.0	1	0	0.0	0	0.0	3	0	0.0	0	0.0
Armenia	EUR	2009	480	80	16.7	178	37.1	200	76	38.0	114	57.0	680	156	22.9	292	42.9
Bahamas	AMR	2009	38	0	0.0	2	5.3	4	0	0.0	0	0.0	42	0	0.0	2	4.8
Belarus	EUR	2009	2071	280	13.5	362	17.5	1754	558	31.8	620	35.3	3985	867	21.8	1025	25.7
Bulgaria	EUR	2009	716	12	1.7	57	8.0	128	31	24.2	44	34.4	844	43	5.1	101	12.0
France	EUR	2009	1304	13	1.0	39	3.0	106	14	13.2	18	17.0	1564	30	1.9	106	6.8
Greece	EUR	2009	140	9	6.4	16	11.4	14	4	28.6	7	50.0	174	14	8.0	25	14.4

Country or area	WHO region	year	New cases					Previously treated cases					All cases				
			Cases with DST results (H+R)	Multidrug resistant		Any isoniazid resistance		Cases with DST results (H+R)	Multidrug resistant		Any isoniazid resistance		Cases with DST results (H+R)	Multidrug resistant		Any isoniazid resistance	
				Number	(%)	Number	(%)		Number	(%)	Number	(%)		Number	(%)	Number	(%)
Jamaica	AMR	2009	67	0	0.0	1	1.5	0	0	–	0	–	67	0	0.0	1	1.5
Kazakhstan	EUR	2009	4140	981	23.7	1606	38.8	4413	2329	52.8	2376	53.8	9578	3644	38.0	4902	51.2
Marshall Islands	WPR	2009	40	1	2.5	1	2.5	1	0	0.0	0	0.0	41	1	2.4	1	2.4
Mauritius	AFR	2009	98	1	1.0	2	2.0	5	0	0.0	0	0.0	103	1	1.0	2	1.9
Micronesia (Federated States of)	WPR	2009	48	3	6.3	6	12.5	2	0	0.0	0	0.0	50	3	6.0	6	12.0
New Caledonia	WPR	2009	43	0	0.0	2	4.7	1	0	0.0	0	0.0	44	0	0.0	2	4.5
Republic of Moldova	EUR	2009	1284	289	22.5	403	31.4	1129	780	69.1	844	74.8	2413	1069	44.3	1157	47.9
Russian Federation	EUR	2009	36888	5816	15.8	–	–	6798	2314	34.0	–	–	58716	14686	25.0	–	–
South Africa	AFR	2008	–	–	–	–	–	–	–	–	–	–	84012	8026	9.6	16960	20.2
Turkey	EUR	2009	3714	99	2.7	381	10.3	599	123	20.5	183	30.6	4313	222	5.1	564	13.1
Ukraine	EUR	2009	12007	1437	12.0	2186	18.2	6348	2045	32.2	2671	42.1	18355	3482	19.0	4857	26.5

3.4 (a) XDR-TB and resistance to fluoroquinolones: continuous surveillance data

Country or territory	Year	Number of MDR-TB cases	MDR-TB cases tested for second-line drug resistance	Number of fluoro-quinolone-resistant cases	% fluoro-quinolone resistant	Number of XDR-TB cases	% XDR
Surveillance data from 2008–2009							
Australia	2009	31	31	2	6.5	0	0.0
Austria	2008–2009	37	37	–	–	5	13.5
Bangladesha	2008	168	168	15	8.9	1	0.6
Belgium	2008–2009	31	31	8	25.8	5	16.1
Bulgaria	2008	32	28	0	0.0	0	0.0
Canada	2008–2009	32	32	2	6.3	1	3.1
China, Hong Kong SAR	2008	18	16	5	31.3	1	6.3
China, Macao SAR	2008–2009	10	10	1	10.0	0	0.0
Cyprus	2008–2009	5	3	–	–	0	0.0
Czech Republic	2008–2009	19	14	4	28.6	2	14.3
Estonia	2008–2009	160	156	48	30.8	17	10.9
Georgia	2009	369	306	42	13.7	32	10.5
Greece	2009	14	9	3	33.3	3	33.3
Guam	2009	1	1	0	0.0	0	0.0
Iceland	2008–2009	1	1	1	100.0	0	0.0
Israel	2008–2009	16	16	1	6.3	1	6.3
Italy	2009	82	32	5	15.6	1	3.1
Latvia	2008–2009	259	258	42	16.3	35	13.6
Marshall Islands	2009	1	1	0	0.0	0	0.0
Micronesia (Federated States of)	2009	3	3	0	0.0	0	0.0
Montenegro	2009	1	1	0	0.0	0	0.0
Norway	2008–2009	12	8	–	–	0	0.0
Oman	2008–2009	9	3	0	0.0	0	0.0
Qatar	2009	3	3	0	0.0	0	0.0
Singapore	2008–2009	7	7	0	0.0	0	0.0

Country or territory	Year	Number of MDR-TB cases	MDR-TB cases tested for second-line drug resistance	Number of fluoro-quinolone-resistant cases	% fluoro-quinolone resistant	Number of XDR-TB cases	% XDR
Slovakia	2008–2009	5	5	–	–	0	0.0
South Africa	2008	8 026	5 451	776	14.2	573	10.5
Sweden	2008–2009	25	20	–	–	1	5.0
Switzerland	2008	5	5	1	20.0	0	0.0
The Former Yugoslav Republic of Macedonia	2009	1	0	0	0.0	0	0.0
United Kingdom of Great Britain and Northern Ireland	2009	58	40	2	5.0	2	5.0
United States of America	2008–2009	217	93	5	5.4	3	3.2
Surveillance data from settings that have not reported 2008–2009 data							
Croatia	2003–2006	5	1	–	–	0	0.0
Denmark	2007	2	2	–	–	0	0.0
France	2003–2006	152	149	–	–	1	0.7
Ireland	2005	3	3	–	–	1	33.3
Japan	2002	60	55	21	38.2	17	30.9
Lithuania	2003–2006	656	173	–	–	25	14.5
Netherlands	2003–2006	34	33	–	–	1	3.0
Poland	2005	46	2	–	–	1	50.0
Romania	2003–2006	50	44	–	–	2	4.5
Russian Federation, Tomsk Oblast	2005	201	201	–	–	11	5.5
Slovenia	2003–2007	3	3	–	–	1	33.3
Spain, Barcelona	2005	4	4	–	–	0	0.0
Spain, Galicia	2006	2	2	0	0.0	0	0.0

a Damien Foundation Area, only previously treated cases

XDR-TB and resistance to fluoroquinolones: survey data

3.4 (b) XDR-TB and resistance to fluoroquinolones: survey data

Country or territory	Year	Number of MDR-TB cases	MDR-TB cases tested for second-line drug resistance	Number of fluoro-quinolone-resistant cases	% fluoro-quinolone resistant	Lower CI % fluoro-quinolone resistant	Upper CI % fluoro-quinolone resistant	Number of XDR-TB cases	% XDR	Lower CI % XDR	Upper CI % XDR
Argentina	2005	36	36	3	8.3	1.8	22.5	2	5.6	0.7	18.7
Armenia	2007	199	199	25	12.6	8.3	18.0	10	5.0	2.4	9.0
Azerbaijan, Baku	2007	431	431	125	29.0	24.8	33.5	55	12.8	9.8	16.3
Botswana	2008	32	24	2	8.3	1.0	27.0	0	0.0	0.0	14.2
China	2008	401	401	110	27.4	23.1	32.1	29	7.2	4.9	10.2
India, Gujarat State	2006	216	216	52	24.1	18.5	30.3	7	3.2	1.2	6.6
Namibia	2008	100	100	2	2.0	0.2	7.0	0	0.0	0.0	3.6
Paraguay	2008	8	8	0	0.0	0.0	36.9	0	0.0	0.0	36.9
Republic of Korea	2004	110	110	13	11.8	0.1	19.3	2	1.8	0.0	6.4
Republic of Moldova	2006	203	47	11	23.4	12.3	38.0	3	6.4	1.3	17.5
Rwanda	2005	32	32	3	9.4	2.0	25.0	0	0.0	0.0	8.9
Spain, Aragon	2005	4	4	1	25.0	0.6	80.6	1	25.0	0.6	80.6
Swaziland	2009	122	122	10	8.2	4.0	14.6	1	0.8	0.0	4.5
Tajikistan, Dushanbe & Rudaki	2009	100	100	25	25.0	16.9	34.7	21	21.0	13.5	30.3
Ukraine, Donetsk Oblast	2006	379	20	3	15.0	3.2	37.9	3	15.0	3.2	37.9
United Republic of Tanzania	2007	6	6	0	0.0	0.0	39.3	0	0.0	0.0	39.3

3.5 Countries and settings reporting data from drug resistance surveys since 2008

Country or setting	WHO region	Year	New cases				Previously treated cases			
			Cases with DST results (H+R)	Multidrug resistant		Any isoniazid resistance	Cases with DST results (H+R)	Multidrug resistant		Any isoniazid resistance
				% (95% CI)		% (95% CI)		% (95% CI)		% (95% CI)
Botswana	African	2008	924	2.5%	(1.5–3.5)	7.6% (6.0–9.5)	137	6.6%	(2.4–10.7)	10.2% (5.7–16.6)
China	Western Pacific	2007	3 037	5.7%	(4.6–7.1)	16.0% (14.7–17.4)	892	25.6%	(21.7–30.0)	38.6% (35.4–41.8)
Indonesia (Central Java province)	South-East Asia	2006	1 126	1.8%	(1.0–2.6)	11.4% (9.6–13.4)	70	17.1%	(8.1–26.2)	24.3% (14.8–36.0)
Mexico	Americas	2009	1584	2.4%	(2.1–2.8)	6.1% (5.6–6.6)	191	6.5%	(5.1–7.8%)	9.0% (7.0–11.0)
Mongolia	Western Pacific	2007	650	1.4%	(0.7–1.6)	12.6% 10.2–15.4)	200	27.5%	(21.8–34.1)	36.5% (29.8–43.6)
Mozambique	African	2007	1 102	3.5%	(2.2–4.8)	7.8% (6.0–9.6)	25	11.2%	(0.0–25.2)	15.0% (0.0–31.0)
Myanmar	South-East Asia	2008	1 071	4.2%	(3.1–5.6)	5.2% (4.0–6.7)	299	10.0%	(6.9–14.0)	11.7% (8.3–15.9)
Namibia	African	2008	1 054	3.8%	(2.7–5.1)	13.5% (11.5–15.7)	354	16.4%	(12.7–20.7)	38.4% (33.3–43.7)
Paraguay	Americas	2008	319	0.3%	(0.0–1.7)	1.9% (0.7–4.0)	48	14.6%	(6.1–27.8)	16.7% (7.5–30.2)
Swaziland	African	2009	352	7.7%	(4.8–10.5)	13.4% (10.0–17.4)	281	33.9%	(28.3–39.3)	45.2% (39.3–51.2)
Tajikistan (Dushanbe city and Rudaki district)	European	2009	139	16.5%	(10.8–23.8)	26.6% (19.5–34.8)	125	61.6%	(52.5–70.2)	74.4% (65.8–81.8)
Uganda (Kampala)	African	2008	473	1.1%	(0.3–2.5)	5.7% (3.8–8.2)	60	11.7%	(4.8–22.6)	20.0% (10.8–32.2)

CI = confidence interval

DST = drug susceptibility testing

H+R = isoniazid plus rifampicin

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