

## The emergency of tuberculosis

Tuberculosis (TB) is a paradox of our modern age. In an era of unprecedented—if inequitably distributed—wealth and scientific advancement, nearly two million people die each year from an infectious disease for which proven, cost-effective treatments have been available for decades.

Thanks to the discovery of antibiotics and better living standards, the epidemics of “galloping consumption” that ravaged Europe and North America in the nineteenth and early twentieth centuries had become almost a thing of the past in industrialized countries almost half a century ago. But those gains have not been shared by the rest of the world.

More recently, there have been new threats. First, the emergence of HIV/AIDS has fueled the TB epidemic, just as TB has contributed to the HIV/AIDS epidemic. Because of their suppressed immune systems, people co-infected with HIV and TB are many times more likely to develop active TB. In several African countries, the number of TB cases has increased up to fourfold in the past decade, mainly as a result of the HIV epidemic.

Second, the world has learned the hard way about the resilience of the TB bacillus. Arising from human misuse of anti-TB drugs, mutating forms of the bacterium have developed resistance to the standard forms of treatment. Thousands of people are becoming infected with resistant strains of TB that are more difficult, more complex, and more expensive to treat.

In 1993, the World Health Organization (WHO) declared TB to be a global health emergency. Despite considerable progress since then in developing institutional and strategic approaches, TB not only remains an emergency but its threat continues to grow.

One-third of the world’s population is latently infected with the bacillus that causes TB (*Mycobacterium tuberculosis*). Although only a small proportion of these people will develop active TB, the sheer scale is startling. In 2002,

## Control of TB rests on interruption of its transmission

there were nearly 9 million new cases of TB (WHO 2004j). Of these, nearly 4 million people had sputum smear–positive pulmonary TB—that is, the form of TB affecting the lungs that is most infectious. Normally the progression to clinical disease is a slow process, but for HIV co-infected patients, it can be rapid and fatal. Today TB is still one of the world’s leading causes of death and of the global burden of disease. It is a major killer of women, rivaling maternal mortality.

TB afflicts the poor above all. Vulnerability to active TB has always been strongly correlated with the conditions and consequences of poverty, such as malnutrition, inadequate and overcrowded housing, and unsanitary working conditions. Ninety-five percent of all TB sufferers live in developing countries. Most are poor people ages 15–54, who should be in their prime productive and reproductive years (WHO 2002). The impact of millions of individual deaths is multiplied by the wider impact on families and communities devastated by the loss of social and economic support networks. Too often TB traps patients and their families in a cycle of disease and impoverishment, and it disrupts the social fabric of society through the stigmatization of the sufferers (WHO/Stop TB 2001). TB exacts an appallingly high cost for patients and their families, for their health services, and for their societies as a whole. Urgent and effective action is needed now.

### The DOTS strategy to control tuberculosis

Control of TB rests on interruption of its transmission through the rapid identification and cure of infectious cases.

Fortunately, there is an internationally recommended strategy for delivering the basics of TB case finding and cure, known as DOTS (originally derived from directly observed therapy, short-course) (box 1.1). DOTS is not simply a clinical approach to patients, but rather a management strategy for public health systems that includes political commitment and technical elements (WHO 2004j). The principles of the DOTS strategy apply to all TB patients, of all ages and with all forms of TB (box 1.2).

#### **Box 1.1** **The five elements** **of the DOTS** **strategy for** **tuberculosis** **control**

Source: WHO 2004n.

1. Political commitment to sustained TB control activities
2. Case detection by sputum-smear microscopy among symptomatic patients self-reporting to health services
3. A standardized treatment regimen of six to eight months for at least all sputum smear–positive cases, with directly observed therapy for at least the initial two months
4. A regular, uninterrupted supply of all essential anti-TB drugs
5. A standardized recording and reporting system that allows assessment of treatment results for each patient and of the TB control program performance overall

**Box 1.2****DOTS and the patient**

Source: WHO 2004n.

- Patients with infectious TB are identified using microscopy (bacilli visible in a sputum smear).
- Health and community workers and trained volunteers observe and record patients swallowing the full course of the correct dosage of anti-TB medicines, over six to eight months.
- Sputum smear testing is repeated after two months to check progress, and again at the end of treatment.
- A recording and reporting system documents patients' progress and the final outcome of treatment.

The basic principles of the DOTS strategy were not new when it was introduced in the early 1990s. TB control professionals had generally agreed that the best approach included case finding among patients presenting mainly with chronic cough to general health services, short-course chemotherapy, ensuring patient compliance with treatment, maintaining adequate drug supply, and sound reporting and recording systems. The crucial innovations were the public health packaging and promotion of the strategy, and the addition of the human element—having healthcare workers or trained volunteers form a close bond with their patients to help them successfully complete the arduous six- to eight-month treatment, involving taking up to one hundred doses of medication.

“Stop TB—Use DOTS” became a clarion call for TB control programs around the world. The World Bank's *World Development Report 1993: Health* (1993) concluded that TB control using DOTS was one of the most cost-effective of all health interventions. This finding has been reinforced by more recent studies on cost-effectiveness. Globally, TB costs more than \$3.3 billion each year in lost productivity. Investment in TB control and treatment is a sound one, with immediate returns (see, for example, de Jonghe and others 1994; Jha 1998; World Bank 1993). For each dollar invested in DOTS, the expected return in increased economic output is more than \$3.50 (for example, from increased productivity, deaths prevented, and hospital beds freed).

Despite widespread agreement on the need to implement DOTS worldwide, more than 10 years later residents of some of the world's poorest communities where TB incidence is highest have yet to see the benefits of the proven DOTS remedy. Intensified implementation and expansion of DOTS control strategies are needed as a minimum if TB trends are to be deflected from their present trajectory (Stop TB Partnership/WHO 2001).

**The need for modern tools: diagnostics, drugs, and vaccines**

One prime and urgent need to complement DOTS is for a modern armamentarium to beat back TB and combat the challenges posed by HIV/AIDS and multidrug-resistant TB (MDR-TB). It is critical to update TB control with modern tools designed for ease of use in poor countries:

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- New diagnostics to replace the basic sputum smear microscopy test, which was developed over 120 years ago, with cheap, quick, reliable tests that are effective in screening for latent TB and in diagnosing TB and MDR-TB.
- New drugs to shorten and simplify the treatment of TB and to treat MDR-TB and latent TB infection more effectively.
- A new vaccine to replace the current Bacillus Camille Guerin vaccine, first used in 1921, which provides moderate protection against severe childhood forms of TB but has little effect on the development of the predominant pulmonary form of the disease in adults.

The good news is that, in addition to existing research bodies, three new research agencies have been formed to ensure the delivery of better and affordable diagnostics, drugs, and—ultimately—vaccines: the Foundation for Innovative New Diagnostics, the Global Alliance for TB Drug Development, and the Aeras Global TB Vaccine Foundation. Each has adopted a public-private partnership approach and aims to create and to manage a portfolio within its field. The resulting products will leverage earlier investments in TB control to give TB patients and healthcare workers the best tools that modern science can deliver.

### **The Millennium Development Goals**

At the United Nations Millennium Summit in September 2000, world leaders placed development at the heart of the global political agenda by adopting the Millennium Declaration. All 191 UN member states have pledged to meet the eight Millennium Development Goals.<sup>1</sup> Together, the Millennium Development Goals constitute an ambitious agenda to improve the human condition significantly by 2015. There are clear goals, each with its own targets and indicators, for reducing poverty, hunger, disease, illiteracy, environmental degradation, and discrimination against women (see Goals on page xviii).

TB is covered by the target to have halted and begun to reverse the incidence of HIV/AIDS, malaria, and other major diseases by 2015 (box 1.3). The TB-specific indicators relate to both impact measures (prevalence and death rates) and process measures (cases detected and cured under the DOTS strategy).

Given the huge burden of disease and mortality created by TB, the Working Group on TB feels strongly that TB should be explicitly named in Millennium Goal 6. It should be noted that the United Nations has set TB-specific indicators under Target 8. The working group therefore recommends that:

- Millennium Development Goal 6 should be amended to read “Combat HIV/AIDS, malaria, TB, and other diseases.”
- The global TB control target should be to halve the prevalence of TB disease and deaths between 1990 and 2015, a measurable target that is demanding yet feasible.

**Box 1.3**  
**Millennium**  
**Development**  
**Goal, target, and**  
**indicators for**  
**tuberculosis**

Millennium Development Goal 6: Combat HIV/AIDS, malaria, and other diseases.

Target 8: Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases.

Indicator 23: Prevalence and death rates associated with tuberculosis.

Indicator 24: Proportion of tuberculosis cases detected and cured under DOTS (internationally recommended tuberculosis control strategy).

*Recommended tuberculosis control target: to halve the prevalence of tuberculosis disease and deaths between 1990 and 2015.*

The objectives set by the Millennium Development Goal require a commitment to controlling TB worldwide. The Millennium Declaration goes further, insisting that the means for achieving that end must reflect specified fundamental values, including solidarity: “Global challenges must be managed in a way that distributes the costs and burdens fairly in accordance with basic principles of equity and social justice.”<sup>2</sup>

The full set of Millennium Development Goals provides a crucial framework for helping reverse the TB epidemic by linking TB control to overall health sector development and development activities in general. Action taken to meet the TB target will both reflect and contribute to action taken to meet other targets, particularly those relating to poverty, gender issues, HIV/AIDS, and access to essential medicines.

Indicator 24 for TB echoes earlier targets set by the World Health Assembly in 1991, which were to detect 70 percent of new infectious cases and to treat successfully 85 percent of detected sputum-positive patients.

Originally intended for achievement by the year 2000, reaching the World Health Assembly targets was postponed to 2005 when it became clear that most of the countries with the highest burden of disease would not meet the 2000 deadline (box 1.4). The target of an 85 percent treatment success rate should be attained globally on time in 2005. However, it will also be necessary to address the marked regional differences, given substantially poorer treatment success rates in Africa (71 percent) and in Eastern Europe (70 percent). Timely success in reaching the case detection target is proving more elusive although, encouragingly, progress appears to have been accelerating since 2000.

Evidence suggests that meeting these World Health Assembly process targets could reduce TB incidence by 6 percent per year, effectively halving TB

**Box 1.4**  
**World Health**  
**Assembly Targets**  
**for 2005**

- Detect at least 70 percent of new infectious cases of TB.
- Successfully treat at least 85 percent of those detected.

**Meeting these process targets could reduce TB incidence by 6 percent per year**

incidence within 10 years (MSF 2004). These process targets are critical benchmarks. Achieving them should lead to reaching the Millennium Development Goal's impact target of reversing the incidence of TB everywhere except in high HIV areas.

**The UN Millennium Project Working Group on TB and the Stop TB Partnership**

As a core part of its work, the UN Millennium Project is working with UN country teams and governments in selected low-income countries to identify the best ways to integrate Millennium Development Goals (MDG) targets and time horizons into existing policy processes. This includes helping each government in a three-step planning process:

- Conducting a detailed MDG needs assessment that estimates the long-term infrastructural, human, and financial resources needed to achieve the Goals.
- Mapping out a strategy through 2015 that outlines the policies, institutions, and investments needed to achieve the Millennium Development Goals, building on the MDG needs assessment.
- Constructing the short-term (3–5 year) poverty reduction strategy and budgetary framework necessary to initiate the long-term MDG strategy.

The Working Group on TB drew from existing material to develop four country case studies to begin discussing how the countries concerned can best meet the MDG target of reversing the incidence of TB by 2015. A detailed study has been undertaken for Kenya, and a briefer analysis is provided for three other countries: Cambodia, the Dominican Republic, and Ethiopia.

The Working Group on TB has worked closely with the Stop TB Partnership, an international coalition of governments, organizations, and individuals committed to controlling, and eventually eliminating, TB as a public health problem in the world. It has over 300 partners meeting regularly at a Partners' Forum, a Secretariat hosted by the WHO, a Global Drug Facility (GDF), and seven working groups to address key priorities: DOTS expansion; TB/HIV; DOTS-Plus for treating MDR-TB; new drug, diagnostics, and vaccine development; and advocacy and communications.

The Stop TB Partnership has committed itself to a range of short-, medium-, and long-term global targets:

- The World Health Assembly targets for 2005 described above.
- An ambitious target for 2010 of reducing the global burden of TB disease (deaths and prevalence) by 50 percent, compared with 2000 levels (derived from the G8 Okinawa 2010 targets).
- The MDG target to have halted and begun to reverse the incidence of TB by 2015.
- A longer term target that the global incidence of TB disease should be less than 1 per million population by 2050.

**The global TB control target should be to halve the prevalence of disease and death by 2015**

While the Working Group on TB is an independent entity with its own specific outputs and recommendations, the two groups are closely aligned and share a common view of the key strategies needed to defeat TB.

In particular, the working group has drawn from the *Global Plan to Stop TB 2001–2005* launched by the then newly established Global Partnership in 2001, and its subsequent progress report published in 2004 (Stop TB/WHO 2001; 2004). The full range of strategies identified by the *Global Plan to Stop TB* constitutes a comprehensive approach for both implementation and research that will be essential in meeting the Millennium Development Goals target of reversing the incidence of TB by 2015. The Stop TB Partnership in turn has formally agreed that its next Global Plan should cover the period 2006–15, to align with the MDG target for TB.

The Working Group on TB is also indebted to the work of a committee—the 2nd Ad Hoc Committee on the TB Epidemic—established in 2003 by the Global Partnership’s DOTS Expansion Working Group to review progress in TB control and constraints, based on a series of consultations. The committee’s recommendations and its background document are cited extensively throughout this report (Stop TB Partnership/WHO 2004b).<sup>3</sup>

### **Recommendations**

- Millennium Development Goal 6 should be amended to read: “Combat HIV/AIDS, malaria, tuberculosis, and other diseases” instead of “Combat HIV/AIDS, malaria, and other diseases.”
- To provide a measurable target that is demanding but feasible, in practice the global TB control target should be to halve the prevalence of TB disease and deaths by 2015.