



Tuberculosis – the tide can be turned, the battle can be won

Alimuddin Zumla

University College London, Centre for Infectious Diseases and International Health, Windeyer Institute of Medical Sciences, London W1T 4JF, UK. E-mail: a.zumla@ucl.ac.uk

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'I know how debilitating this disease can be. I contracted Tuberculosis at the age of 14 years and was hospitalized for 20 months. I am here to witness that TB is a curable and preventable disease. The battle against TB has been long and hard, but we are making progress, more patients than ever are now detected and cured under the DOTS strategy. But we can and should do more to make available the highest quality of TB care to all and this is what the Global Plan to Stop TB is all about, to halve the number of deaths due to TB by 2015. Treating patients and saving lives is a moral and ethical imperative.'

The Reverend Archbishop Desmond Tutu of South Africa, Nobel Peace Prize Laureate

Globally, tuberculosis (TB) continues to kill 5000 people every day – that is, one person every 20 seconds. On 24 March 1882, Dr Robert Koch announced the discovery of *Mycobacterium tuberculosis*, the bacterium that causes TB.¹ Since then, however, the tubercle bacillus has been a hardy survivor, pushing science and medical research to its limits.^{2,3} Today, TB kills more people than any other infectious disease. One-third of the world's population is thought to be infected with *M. tuberculosis*, and 5–10% of infected people are likely to develop active TB at some point in their lives; for people co-infected with HIV, the likelihood of developing and dying from TB is much higher.

In 2005, an estimated 1.8 million people died of TB, 195,000 of whom were co-infected with HIV.⁴ Today, TB disproportionately affects young adults in their most productive years, and the deadly synergy between HIV/AIDS and TB has led to an increase in the number of new TB cases throughout the world. When adults or children are infected with both *M. tuberculosis* and HIV, the co-infection produces a lethal synergy that makes both infections more destructive. While current trends show levelling of both epidemics in many parts of the world, nowhere is

this terrible synergy more apparent than in Africa, where, according to the World Health Organization, TB cases are increasing by 10% each year in the wake of increasing levels of HIV infection. TB also now poses a whole new problem in children, the leaders of the future. Increasingly frequently, TB control programs around the world are faced with multi-drug-resistant TB (MDR-TB) and extensively drug-resistant TB (XDR-TB) that is unresponsive to treatment. A large investment in resources to curtail this is underway.

The huge mortality rate of the TB epidemic underscores the importance of continuing clinical, fundamental basic science and operational research to better understand how *M. tuberculosis* interacts with the host. The findings of this work could be translated into new health care interventions to improve the diagnosis, treatment and prevention of TB. The pessimism, doom and gloom at the turn of the last century^{5–10} has now been replaced by a new wave of enthusiasm.^{11,12} The usual western funders of medical and scientific research were until recently out of touch with reality, only providing miniscule funding which was allocated restrictively so that its overall impact was limited and made no headway towards achieving improved TB management. Fortunately, over the past seven years there has been a wind of change in the funding of infectious diseases research, particularly for TB, malaria and HIV/AIDS. The European Commission and The Gates Foundation have generously committed large resources for individual researchers, research organizations and private–public partnerships to develop new tools for the campaign against TB, focusing on new diagnostics, drugs and therapeutic regimens to shorten the course of chemotherapy, and the development of novel vaccines. The Gates Foundation have supported the formation of the not-for-profit Global Alliance for TB Drug Development, FIND (Foundation for Innovative New Diagnostics) for coordinating

work on newer diagnostics, and the Aeras Foundation for research into TB vaccines. Promising initiatives supported by several European countries such as the European Developing Country Clinical Trials Partnership (EDCTP) have been slow to start¹³ but they are now actively facilitating TB clinical trials research and capacity development in Africa.

A major outcome of these activities is the formation of a conglomerate of official and non-governmental agencies, in which several WHO branches are represented together with leaders of the pharmaceutical industry, the World Bank, UNAIDS, the European Commission and the Bill & Melinda Gates Foundation. Through its Framework Programmes and EDCTP, the European Commission now fosters basic research and development in TB, and at the same time strengthens TB research capacities in developing countries. Realizing the glaring omission of operational and implementation research from the international funding agenda, the WHO and the STOP TB Partnership have now included research into their main agenda and have formed the TB Research Movement.¹² The need to enable and promote research, a key element of the new STOP TB strategy, is the ultimate call for research funding agencies to provide the resources to carry out the research.¹¹

Over the past decade, the global TB fraternity has thankfully unified in stating its strategy.⁶ The 2006 report of the WHO-STOP TB Partnership Global Plan to Stop TB clearly sets out the detailed strategies that need to be implemented over the ten-year period 2006–2015.¹² Implementation of the Global Plan to Stop TB with existing tools will cost an estimated US\$56 billion and will save 14 million lives over the next 10 years. Globally, it seems feasible that it will be possible to meet the UN Millennium Development Goal target to halve prevalence and death rates of TB from the 1990 levels by 2015. In Africa and Eastern Europe, HIV

and the escalating problem of *M. tuberculosis* drug resistance, as well as wider societal and health system issues,¹⁰ will require continued intensive action.¹⁴ The sustained and increased investment in development of new tools for TB control and the recent focus on operational, implementation and programmatic health systems research with the current multidisciplinary approach will eventually result in the control of TB worldwide. Total elimination of this disease will not occur and diligent surveillance will be required. Scientists, clinicians and funding agencies have now demonstrated that they can work in unison to turn the tide and win the battle against TB – and rid the world of one of the most lethal infectious diseases in human history.

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