



## Tuberculosis

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### Tuberculosis Is the Principal Cause of Death From a Curable Infectious Disease, But Treatment is Highly Cost Effective

Tuberculosis is the second-largest cause of death from an infectious agent worldwide—killing approximately 1.7 million people in 2003. Despite steady drops in the number of cases in some parts of the world, the number of new cases appears to be growing, with an estimated 8.8 million new cases in 2003. Sub-Saharan Africa has the highest incidence rate at 345 new cases per 100,000 inhabitants per year, while one-half of the world's cases are in Bangladesh, China, India, Indonesia, and Pakistan. Striking increases have occurred in former Soviet republics since the 1990s and in Sub-Saharan Africa since the mid 1980s. Recent resurgences of TB have been driven by the spread of HIV in Africa and are linked to the rise of drug resistance in former Soviet republics.

Due to suppressed immune systems, people living with HIV/AIDS are more likely to become infected with TB. TB is a major cause of death among those with HIV/AIDS. Globally, 12 percent of new adult TB cases were infected with HIV in 2003 but there was marked variation among regions—from an estimated 2 percent in East Asia and the Pacific to 33 percent in Sub-Saharan Africa. The increase in new TB cases in Africa is strongly associated with the high prevalence of HIV infection.

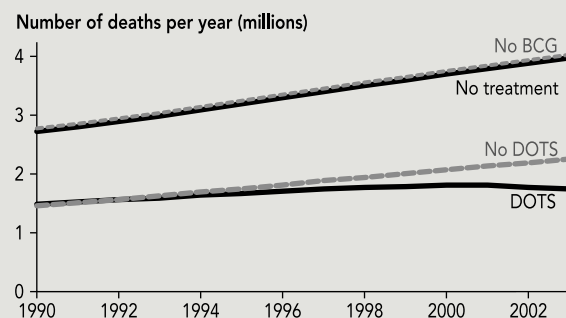
#### Controlling and Eliminating Tuberculosis

**Vaccinate children against endemic TB.** About 80 percent of infants worldwide currently receive the Bacille Calmette-Guérin (BCG) vaccination that protects against meningitis and TB in children. Although the vaccine does not protect adults against pulmonary TB, it is still cost-effective in places where incidence is high.

#### Treat all forms of active TB with short-course chemotherapy to cure TB patients and reduce the spread of the disease.

Identifying and treating active cases is currently the primary and most effective measure to control TB. Short-course chemotherapy is the cornerstone of the DOTS strategy and is one of the most cost-effective of all health interventions. DOTS entails diagnosis; short-course chemotherapy treatment with regular supervision to ensure that the patient is correctly taking the medication; regular drug supplies; and monitoring to evaluate outcomes for every patient. The DOTS approach also allows for more specialized treatment methods in certain risk groups, such as those individuals who are infected with both TB and HIV. Many of the 182 national DOTS programs

#### Estimated Number of TB Deaths Worldwide Under Various Hypothetical Scenarios



Note: Broken and solid lines represent various hypothetical scenarios; the bottom solid black line represents DOTS programs. The interventions are, from top to bottom: no BCG vaccination and no anti-TB treatment, no treatment, no DOTS programs, and DOTS expansion from zero to 45 percent case detection over the period 1990–2003. To make a conservative assessment of effect, the treatment of active TB is assumed to change the case-fatality rate without affecting the TB incidence rate.

Source: Dye, C., and K. Floyd. 2006. "Tuberculosis." In *Disease Control Priorities in Developing Countries*, 2nd ed., ed. D. T. Jamison, J. G. Breman, A. R. Measham, G. Alleyne, M. Claeson, D. B. Evans, P. Jha, A. Mills, and P. Musgrove, figure 16.3. New York: Oxford University Press.

in existence by the end of 2003 have shown that they can achieve high cure rates: The average treatment success rate was 82 percent.

Short-course chemotherapy, delivered through the DOTS strategy, typically costs between US\$5 and US\$350 per disability-adjusted life year (DALY)\* gained. In countries with high levels of TB, the cost per DALY gained is much lower than in countries with a lower burden of the disease. For a comparison of TB deaths under various treatment scenarios, see figure on page 1.

**Support the development of a low-cost vaccine that could protect adults against pulmonary TB.** A low-cost vaccine to protect adults against pulmonary TB would be more effective than the BCG vaccination and would shift the emphasis from treatment to prevention.

**Manage multidrug-resistant TB with new drugs and combinations.** TB becomes resistant to treatment when the treatment schedule is interrupted or when inadequate drugs are administered. Multidrug-resistant TB (MDR-TB) is both more costly to treat and has lower cure rates. Despite this challenge, new ways to manage MDR-TB must be found.

## Next Steps

**Expand DOTS.** Extensions to DOTS could include the treatment of MDR-TB with different combinations of drugs,

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\* DALYs—Disability-Adjusted Life Years—a unit measuring the amount of health lost due to a particular disease or condition. DALYs are useful for policymakers because they are a more comprehensive measure of population health than merely counting deaths and because they allow comparisons among a wide range of health interventions. *Global Burden of Disease and Risk Factors* provides comprehensive DALY information.

preventive therapy during outbreaks and for people infected with both HIV and TB, and antiretroviral therapy for HIV-infected TB patients.

**Improve the health system and service delivery.** Many TB patients visit private providers whose diagnosis and treatment methods may not meet international standards. Collaborations between public and private health services would improve diagnosis, treatment, and disease control. Success in controlling TB is closely related to the capacity of local health systems to maintain an effective system for identifying cases, beginning treatment, and ensuring adherence. International financial assistance must be continued so that TB control can be maintained in the world's poorest countries.

## For More Information

Dye, C., and K. Floyd. 2006. "Tuberculosis." In *Disease Control Priorities in Developing Countries*, 2nd ed., ed. D. T. Jamison, J. G. Breman, A. R. Measham, G. Alleyne, M. Claeson, D. B. Evans, P. Jha, A. Mills, and P. Musgrove, 289–309. New York: Oxford University Press.

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