TUBERCULOSIS (TB)

Tuberculosis (TB) is a significant health problem in both industrialized and developing countries. Approximately, one-third of the world's population is currently infected with the bacterium that causes TB and 5% to 10% of those infected will become sick or infectious at some point during their lifetime. The World Health Organization (WHO) estimates that there are more than 14 million people currently living with TB worldwide.

Tuberculosis is a bacterial infection caused by *Mycobacterium tuberculosis*. The disease usually affects the lungs (referred to as pulmonary TB), but can spread to other parts of the body (referred to as extra-pulmonary TB) in serious cases.

Most people who become infected with TB are able to fight the bacteria and stop them from multiplying, keeping the pathogen dormant–this is called "latent TB" infection. People with latent TB infection have no symptoms, don't feel sick, and cannot spread TB to others. However, the TB bacteria remain alive in the bodies of those with latent TB and can become "active TB" disease at a later point in time if treatment is not received. People with active TB can and often do exhibit TB symptoms such as coughing, fatigue, chills, and fever. In addition, they can also be infectious and can pass the TB pathogen onto others by coughing, sneezing, or spitting.

Although a health concern worldwide, TB is especially problematic in developing countries, where poverty, overcrowding and other diseases and viruses, particularly HIV, help facilitate its spread. About 85% of all new TB patients are in Africa, Southeast Asia and the Western Pacific. Even though more than a third of all new TB cases occur in Southeast Asia, the estimated incidence (new cases) per capita is highest in sub-Saharan Africa. In addition, TB-related deaths and mortality rates per capita are highest in sub-Saharan Africa.

HIV disease has significantly fueled the TB epidemic in the developing world. In fact, researchers estimate that the HIV epidemic is the principal reason for the resurgence of TB over the past decade; the two are so closely connected that the terms "co-epidemic" or "dual epidemic" often are used to describe their synergistic relationship. When someone is infected with HIV, and his or her immune system becomes compromised, there is an increased likelihood of acquiring new TB infection. HIV also can facilitate both the progression of latent TB infection to active disease and the relapse of the disease in previously treated patients. TB is one of the leading causes of death in HIV-positive people. The WHO estimates that almost one-third of all people living with HIV/AIDS are also infected with TB. Because the prevalence of HIV is highest in sub-Saharan Africa, the HIV-TB co-infection epidemic is also most severe in this region of the world.

Although responsible for considerable morbidity and mortality worldwide, TB can be successfully prevented, treated and controlled, even if someone is HIV-positive. The internationally recommended strategy for TB control is DOTS, or "directly observed therapy short-course" which aims to decrease TB-related morbidity, prevent TB deaths, and decrease TB transmission. Under DOTS, once patients are diagnosed with infectious TB, health workers or trained volunteers supervise them as they take the full course of medications. DOTS is cost-effective and can cure most TB patients. The WHO currently estimates that 93% of the world's population lives in countries where DOTS is in place and that the worldwide success rate of the strategy is 85%.

Expanding access to DOTS and ensuring patient adherence to therapy is critical because if medications are not taken as prescribed, the mycobacteria responsible for TB can become resistant to treatment. TB that is resistant to at least two of the most effective first-line therapies is called multi-drug resistant TB (MDR-TB). MDR-TB is more serious than non-resistant TB and can be deadly, especially in people also infected with HIV. Although treatment for MDR-TB does exist in the form of second line therapies, it is significantly more expensive, takes much longer, and results in more severe side effects than treatment for TB that is not drug-resistant. Rates of MDR-TB are high in several regions around the world, including in the former Soviet republics. In recent years, a new and much more virulent type of MDR-TB has emerged called extensively drug resistant TB or XDR-TB. In addition to not being

responsive to first-line TB drugs, patients with XDR-TB are also resistant to two of the second-line TB therapies, making the condition extremely difficult, if not impossible, to treat. Although XDR-TB remains relatively rare as compared to non-drug-resistant TB or MDR-TB, it presents an increasing global threat to TB control efforts.

With the rise of HIV/TB co-infection and growth of drug-resistant strains of TB, international recognition of the seriousness of TB has grown, with various organizations and donor agencies attempting to curb the spread of the disease. Two institutions that have made important strides in alleviating the worldwide burden of TB are the Stop TB Partnership and The Global Fund to Fight AIDS, Tuberculosis and Malaria. The Stop TB Partnership is a network of 500 public and private organizations including international agencies, governmental and non-governmental organizations, research institutions, and donor organizations that aim to strengthen social and political support for stopping the spread of TB. The Stop TB Partnership focuses on DOTS expansion, reducing the impact of HIV-TB co-infection, the prevention of MDR-TB, and the development of new drugs, vaccines, and diagnostic procedures. The Global Fund is an independent grant-making organization and a major financier for TB control in developing countries. Together the Global Fund and the Stop TB Initiative have helped coordinate global TB control efforts and ensure that they remain a priority in the international arena.

PEPFAR, the President's Emergency Plan for AIDS Relief, a major U.S. Initiative created in 2003, also provides significant funding for global TB efforts directly to countries and through contributions to the Global Fund. The Bill & Melinda Gates Foundation, a private, philanthropic organization, also has established major global TB initiatives, supporting efforts to develop rapid TB diagnostics, more effective TB treatments, TB vaccines and the acceleration of access to new TB tools.

ADDITIONAL RESOURCES

Kaiser Family Foundation. *Global Health Reporting* website, *TB FAQs,* http://www.globalhealthreporting.org/tb.asp?id=69

Bill & Melinda Gates Foundation. http://www.gatesfoundation.org/GlobalHealth/Pri_Diseases/Tuberculosis/

U.S. Department of Health and Human Services (DHHS) Centers for Disease Control and Prevention, National Center for HIV, STD, and TB Prevention. *Questions and Answers about TB* (2007), http://www.cdc.gov/tb/faqs/default.htm

The Global Fund to Fight AIDS, Tuberculosis and Malaria. *Fighting Tuberculosis,* http://www.theglobalfund.org/en/about/tuberculosis/

World Health Organization. *Global tuberculosis control – surveillance, planning, financing* (2008), http://www.who.int/tb/publications/global_report/en/index.html

World Health Organization. *Tuberculosis Fact Sheet* (March 2007), http://www.who.int/mediacentre/factsheets/fs104/en/

Stop TB. *About the Stop TB Partnership*, http://www.stoptb.org/stop_tb_initiative/

PEPFAR. http://www.pepfar.gov/pepfar/press/81964.htm