

## Tuberculosis (TB)

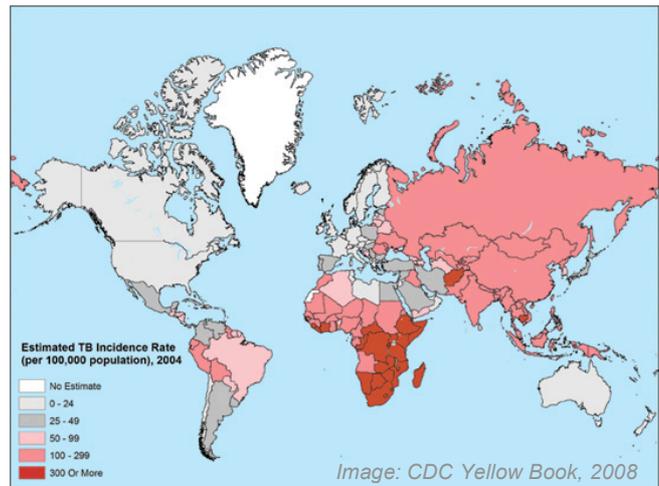
### Description

Tuberculosis (TB) is a contagious disease that spreads through the air from person to person. TB is a disease of poverty, affecting mostly young adults in their most productive years. TB usually affects the lungs, although it can affect other parts of the body such as the brain, kidneys or spine. Untreated, it can be fatal: it is estimated that 1.7 million people died of TB worldwide in 2006.<sup>1</sup> Only people who are experiencing symptoms of TB are infectious to others: the germs are spread when they cough, sneeze or speak, usually to people who are in close contact with them, such as family members and co-workers.

### Distribution

TB is a global problem. In 2006, there were an estimated 14.4 million cases of TB in 202 countries.

The African, South-East Asia and Western Pacific regions accounted for over 80% of cases.<sup>1</sup>



### Causative Agent

TB is a bacterial infection caused by *Mycobacterium tuberculosis* bacilli. There are different strains of TB. Multi-Drug Resistant TB (MDR-TB) is a form of TB that is difficult and expensive to treat and fails to respond to front line drugs. Extensively Drug-Resistant TB (XDR-TB) occurs when resistance to second-line drugs also develops. XDR-TB is virtually untreatable. The World Health Organisation (WHO) reported the highest ever levels of MDR-TB in 2008, with peaks of up to 22% of new cases in some areas of the Former Soviet Union. In the same region 1 in 10 cases of MDR-TB is XDR-TB.<sup>2</sup>

### Transmission

TB is spread by infected people who are experiencing symptoms of the disease ("active" TB). People who are infected but who are not showing symptoms ("latent" TB) are not infective to others. In order to become infected, a person has to spend a relatively long time in a closed environment where the air is contaminated by a person with untreated active TB.<sup>3</sup> When the sick person coughs or sneezes, *M. Tuberculosis* bacilli are released into the environment in secretions from the lungs or throat. These bacilli can remain in the air for several hours, depending on the environment. Infection is generally transmitted through the air; therefore, there is virtually no danger of its being spread by dishes, linens, and other items that are touched, or by most food products. However, it can be transmitted through unpasteurised milk or milk products (e.g. some cheeses) obtained from infected cattle.<sup>3</sup> People with active TB are most likely to spread the disease to people they spend time with every day, such as family members or co-workers. Left untreated, each person with active TB will infect on average between 10 and 15 people each year.<sup>4</sup>

### Symptoms

People with latent TB have been infected with the TB bacilli, but are not sick with the disease and experience no symptoms. In these cases the immune system has walled off the infection, which can lie dormant for years. The patient's immune factors determine when/whether latent TB develops into active TB. Many people who have latent TB never develop active TB.

Active TB occurs when the infection is no longer walled off by the body. Patients with active TB develop symptoms including:

- A persistent cough – there may also be lots of phlegm, sometimes containing blood
- Fever
- Swollen glands, especially in the neck
- Tiredness
- Loss of appetite
- Weight loss

<sup>1</sup> WHO Report 2008: Global Tuberculosis Control – surveillance, planning, financing. At [http://www.who.int/tb/publications/global\\_report/2008/en/index.html](http://www.who.int/tb/publications/global_report/2008/en/index.html)

<sup>2</sup> WHO Stop TB Partnership: 2008 Tuberculosis Facts. At [http://www.who.int/tb/publications/2008/factsheet\\_april08.pdf](http://www.who.int/tb/publications/2008/factsheet_april08.pdf)

<sup>3</sup> Centers for Disease Control and Prevention. 2008. Travellers' Health: Yellow Book. CDC Health Information for International Travel 2008. At <http://wwwn.cdc.gov/travel/yellowBookCh4-TB.aspx>

<sup>4</sup> WHO Factsheet Number 104: Tuberculosis. Revised 2007. At <http://www.who.int/mediacentre/factsheets/fs104/en/index.html>

- Night sweats
- Chest pain on breathing in, caused by inflammation of the membranes lining your lungs (pleurisy)

At first, a TB infection normally affects the lungs. This is called pulmonary TB. However, TB often spreads to the lymph nodes (glands throughout the body that are part of the immune system). It can also affect the bones, joints and kidneys, as well as cause meningitis (inflammation of the membranes surrounding the brain and spinal cord). The symptoms experienced depend on the part of the body affected.

## Diagnosis

1. Skin testing (the Mantoux test): tuberculin (protein taken from the TB bacillus) is injected into the skin. The injection site is examined 2-3 days later to check for a reaction. A raised red reaction indicates a positive result, meaning the patient has been exposed to TB. (NB. The Heaf test was a TB skin test used in the UK until 2005; the Mantoux test is now used in its place).
2. Blood testing (the QuantiFERON-TB Gold test): measuring the body's immune response to the TB bacilli.
3. Sputum testing: a sputum sample is tested for the presence of the TB bacilli. This can indicate the presence of active TB.
4. Chest x-rays: to detect TB lesions in the lungs.
5. Other tests: as indicated, including other scans, blood tests and/or surgical biopsies.

## Treatment

Patients with both latent and active TB require treatment with antibiotics. Treating latent TB prevents the patient developing active TB. There are several different treatment options, but in all cases treatment is likely to last at least six months. As there are fewer bacilli present in a latent infection treatment is simpler than for active TB and usually only one drug is required.

A combination of drugs is required to treat active TB. The standard treatment is a combination of three or four antibiotics for a period of two months and then two antibiotics for a further four months. The four main antibiotics for treating TB are called Isoniazin, Rifampicin, Pyrazinamide and Ethambutol. Rifater and Rifanah are single tablets that contain a combination of drugs to make it easier for the patient.

It is important to have a combination of antibiotics to reduce the risk of the bacteria becoming resistant to one or more of the drugs. Even so, resistance to TB drugs is growing. The main cause of drug resistant TB is incomplete treatment, either because the drugs were not prescribed or not taken correctly or because treatment was interrupted.

Sometimes longer courses of treatment are needed, for example for TB meningitis, or if the bacteria are resistant to one or more of the antibiotics and different drugs need to be used.

Once treatment has started, people normally become non-infectious after about two weeks and begin to feel better after two to four weeks, but at least six months treatment is required to cure the disease.

## Prevention and Control

The heart of the WHO's Stop TB strategy is DOTS (Directly Observed Treatment, Short-course). DOTS is an inexpensive and highly effective means of treating patients already infected with TB and preventing new infections and the development of drug resistance. The DOTS strategy has several elements:

- Appropriate diagnosis of TB
- Registration of each patient detected
- Standardised multi-drug treatment
- A secure supply of high quality anti-TB drugs for all patients in treatment
- Individual patient outcome evaluation to ensure cure
- Cohort evaluation to monitor overall programme performance

Based on WHO recommendations, the Bacille Calmette-Guérin (BCG) vaccine is used once at birth in most low-income countries to reduce the severe consequences of tuberculosis in infants and children. However, BCG vaccine has variable success in preventing the adult forms of tuberculosis and interferes with testing for latent infection. Therefore, it is not routinely recommended for use in many high-income countries.

## Additional References

- BUPA Health Factsheets 2008: Tuberculosis. At [http://hcd2.bupa.co.uk/fact\\_sheets/html/Tuberculosis.html](http://hcd2.bupa.co.uk/fact_sheets/html/Tuberculosis.html)
- TB Alert – the UK's national tuberculosis charity. At <http://www.tbalert.org>
- WHO Tuberculosis programme. At <http://www.who.int/tb/en/>
- The Stop TB Partnership. At <http://www.stoptb.org/>