

EPIDEMIOLOGY OF TUBERCULOSIS

There are four distinct phases in the initiation and progression of tuberculosis (Fig. 38–1):

1. **Transmission** occurs when an uninfected person inhales infected airborne particles that are exhaled by an infected person. Major factors affecting transmission are the number of bacteria expelled by the infected person and the closeness and duration of the contact between the infected and the uninfected person.
2. **Primary infection.** It is estimated that 30% of persons exposed to tuberculosis bacilli become infected and develop a mild, pneumonia-like illness that is often undiagnosed. About 6 to 8 weeks after exposure, those infected have positive reactions to tuberculin skin tests. Within approximately 6 months of exposure, spontaneous healing occurs as the bacilli are encapsulated in calcified tubercles.
3. **Latent tuberculosis infection (LTBI).** In most people who become infected with TB bacteria, the immune

system is able to stop bacterial growth. The bacteria become inactive, but they remain alive in the body and can become active later. People with inactive or latent TB infection have no symptoms, do not feel sick, do not spread TB to others, usually have a positive skin test reaction, and can develop active TB disease years later if the latent infection is not effectively treated. In many people with LTBI, the infection remains inactive throughout their lives. In others, the TB bacteria become active and cause tuberculosis, usually when a person's immune system becomes weak as a result of disease, immunosuppressive drugs, or aging.

4. **Active tuberculosis** usually results from reactivation of latent infection, although new infection can also occur. Both reactivated and new infections are more likely to occur in people whose immune systems are depressed by disease (eg, human immunodeficiency virus [HIV] infection, diabetes mellitus, cancer) or drug therapy (eg, for cancer or organ transplantation). Among people with LTBI, signs and symptoms of active disease (eg, cough

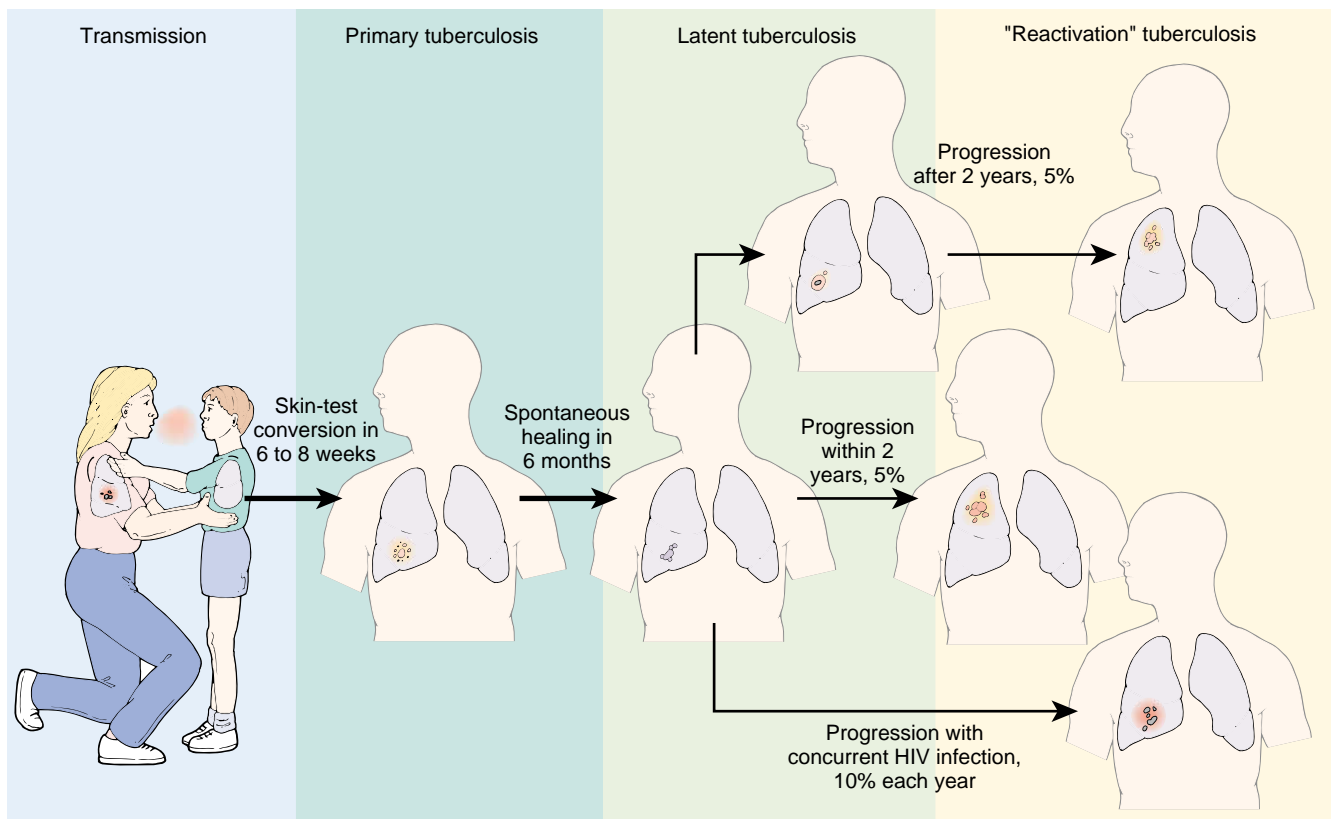


Figure 38–1 Transmission of Tuberculosis and Progression from Latent Infection to Reactivated Disease. Among persons who are seronegative for the human immunodeficiency virus (HIV), approximately 30 percent of heavily exposed persons will become infected. In 5% of persons with latent infection, active disease will develop within two years, and in an additional 5%, progression to active disease will occur later. The rate of progression to active disease is dramatically increased among persons who are coinfecting with HIV. (Adapted from Small, P.M. & Fujiwara, P.I. [2001]. Management of tuberculosis in the United States. *New England Journal of Medicine*, 345(3), 189–200.)