



## Tuberculosis: A Terrible Transmitted Disease

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### Abstract

Tuberculosis (TB) is the most common and deadly infectious disease associated with significant mortality and morbidity. Mycobacterium tuberculosis is the causative agent of tuberculosis which is an acid fast bacterium. Mycobacterium tuberculosis is responsible for more human mortality than any other single microbial species. Due to the emergence of multi-drug resistant tuberculosis, this remains a major global health problem and ever increasing and it became a terrible transmitted disease.

**Keywords:** Tuberculosis; Lungs; Mycobacterium tuberculosis; Cough; Anemia

### Introduction

Tuberculosis (TB) is the most common and deadly infectious disease associated with significant mortality and morbidity. Mycobacterium tuberculosis is the causative agent of tuberculosis, which is transmitted through aerosol droplets that are deposited in the lungs which will become the reservoir for infection. This infection initially occurs in the upper part of the lungs and causes pulmonary tuberculosis, as well affect meninges, intestine, lymph nodes, bone, joints, skin and other tissues of the body [1-4].

Mycobacterium tuberculosis is responsible for more human mortality than any other single microbial species [5]. It is difficult to grow in vitro and takes more than a month for colony formation. Mycobacterium tuberculosis lives longer than most other bacteria [6]. One-third of the world's population has latent-TB, a condition in which mycobacteria can survive within a host for years without causing disease [6]. It affects all ages, sex and all the body parts [7]. Tuberculosis remains one of the world's top ten leading causes of death [8]. The latest estimates included in the Global tuberculosis report are that there were 8.6 million new TB cases in 2012 and 1.3 million TB deaths worldwide. Of those, 530,000 cases and 74,000 deaths were children. Clinical and radiological findings, such as hemoptysis, cough, caverns or upper-lobe condensations, might be reliable and well established in adults. By contrast, these findings might be more difficult to evaluate in children due to more nonspecific symptoms and heterogeneous radiological findings [9].

The emergence of multi-drug and extreme drug-resistant tuberculosis has emphasized the need of methods that will allow quick detection of microbial agent. Due to the long generation time of Mycobacterium tuberculosis, antimicrobial susceptibility test is taking few weeks, thus, delaying treatment, which may negatively affect the patient's health and lead to an increase in disease transmission. The Alamar blue oxidation-reduction dye is a general indicator of cellular growth and it can be measured with a fluorometer or spectrophotometer and determined by a visual color change [5].

Increase in drug-resistant strains of tuberculosis has emphasized the need for better treatments and vaccines for the disease [10].

Multidrug-resistant tuberculosis that is resistant to at least isoniazid and rifampicin. Treatment of multidrug-resistant isolates requires the use of more costly and more toxic second-line drugs. Inappropriate treatment can result in the development of resistance to additional antibiotics and will increase mortality. The detection of rifampicin resistance serves as surrogate marker for detecting multidrug-resistant-tuberculosis. 95% of rifampicin-resistant strains of *M. tuberculosis* have a mutation within an 81 bp region of *rpoB* gene, this region is called rifampicin-resistance-determining region corresponding to codons 507-533 [11].

Patients can have various hematological abnormalities, most common being normocytic normochromic anemia, i.e. anemia of chronic disease. Anemia in tuberculosis is most often due to nutritional deficiency, malabsorption syndromes, failure of iron utilization, and bone marrow suppression [12]. Culture-based identification remains the 'gold standard' method for diagnosis of tuberculosis. However, culture-based identification can take up to 6 weeks due to the low growth rate of an organism. A delay in diagnosis of Multidrug-resistant tuberculosis will lead to the transmission of resistant isolates. Molecular bases of drug resistance have been identified for the entire main anti tubercular drugs, and drug resistance can be detected by changes in the several target genes, some of which are still undefined. The mutations can be detected by different molecular techniques, such as polymerase chain reaction, PCR-single strand conformation polymorphism, DNA sequencing, PCR-reversed line blot hybridization, PCR-hetero duplex and line probe assay [11].

Despite the availability of highly efficacious treatment for decades, tuberculosis (TB) remains a major global health problem and ever increasing. The latest estimates showed that there were almost 9 million new TB cases in 2011 and 1.4 million TB deaths. Most of the high burden countries (HBCs) have rates of around 150-300 cases per 100,000 population [13] and it is emerging like a terrible transmitted disease.

## Conclusion

Although Tuberculosis is a terrible transmitted disease, we are having many advanced technologies and curative drugs to fight against this disease. Finally I would like to conclude that we will add this terrible transmitted disease very soon to the list of eradicated diseases and can see a tuberculosis free world in our very near future.

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