

Tuberculosis in Children



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KEYWORDS

- Tuberculosis • Global epidemiology • Latent infection • Diagnosis • Management
- Prevention • Advocacy

KEY POINTS

- Although tuberculosis (TB) is a preventable condition, it remains a major cause of childhood morbidity and mortality worldwide.
- Young children are at especially high risk of progressing to active TB after exposure.
- Because an accurate diagnostic test for TB in children does not exist, making a confirmatory diagnosis is challenging and requires clinical acumen.
- TB treatment is lengthy, and child-friendly drug formulations are urgently needed.

INTRODUCTION

Despite achieving great public health strides to control tuberculosis (TB) within the United States, it remains an enormous public health issue worldwide. Accurate statistics on pediatric TB cases are difficult to obtain for a multitude of reasons, including under-recognition, challenges in confirming the diagnosis, and under-reporting to national TB programs. The clinical and radiographic manifestations are less specific in children compared with adults and are often confused with bacterial pneumonia. Microbiologic confirmation of disease is limited by the paucibacillary nature of TB in children. In general, TB cultures and newer rapid molecular tests are positive in the minority of children, generally less than 25% to 40% of children with TB disease.^{1,2} Additionally, there are often logistic challenges in obtaining adequate specimens from young children. However, in the era of multidrug-resistant TB, in which the organism is resistant to isoniazid and rifampin (the 2 most potent first-line agents), there is an increasing need to attempt culture-confirmation on all children suspected of having TB to inform treatment decisions. Among children who are started on TB therapy, families struggle with proper dose administration due to the lack of pediatric drug formulations and there are programmatic gaps in notifying the national TB programs, leading to under-reporting by the World Health Organization (WHO). Yet, with proper

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management, including timely treatment initiation with appropriate drug dosages, treatment outcomes are generally favorable.

EPIDEMIOLOGY

The global distribution of childhood TB mirrors that of adults (Fig. 1), with a heavy burden of disease in sub-Saharan Africa and Asia.³ The United States is considered a low-incidence country with less than 4 cases per 100,000 population. Domestically, most TB cases are associated with foreign birth.⁴ Between 2008 and 2010, there were 2660 children and adolescents diagnosed with TB.⁵ Among them, 31% were foreign born youth. Of the remaining US-born cases, 66% had at least 1 parent who was foreign-born. These trends suggest that most domestic TB cases in children may be exposed in international settings or through foreign-born parents, thus highlighting an opportunity for increased prevention efforts.

Only recently have systematic attempts been made to quantify the disease burden of TB in children on a global scale. In response to increasing attention and demand, the WHO published pediatric-specific disease estimates for the first time in 2012, reporting approximately 500,000 cases of TB among children younger than 15 years of age.⁶ However, these were based on extrapolations from adult data, which were heavily weighted on sputum-smear positivity and did not incorporate sufficient adjustments to account for underdetection and under-reporting in pediatric populations.⁷ Subsequent modifications to the mathematical models have been incorporated, relying more on transmission dynamics, household demographics, and population-based age structures.^{8–10} As a result, the WHO estimates for pediatric TB in the ensuing years doubled: in 2015, the children made up approximately 1 million (10%) of the 10.4 million incident cases.³ This immense variation in estimated disease burden highlights the challenges in detecting and reporting pediatric TB cases and stresses the importance in resolving these gaps to inform resource allocation and public health efforts.

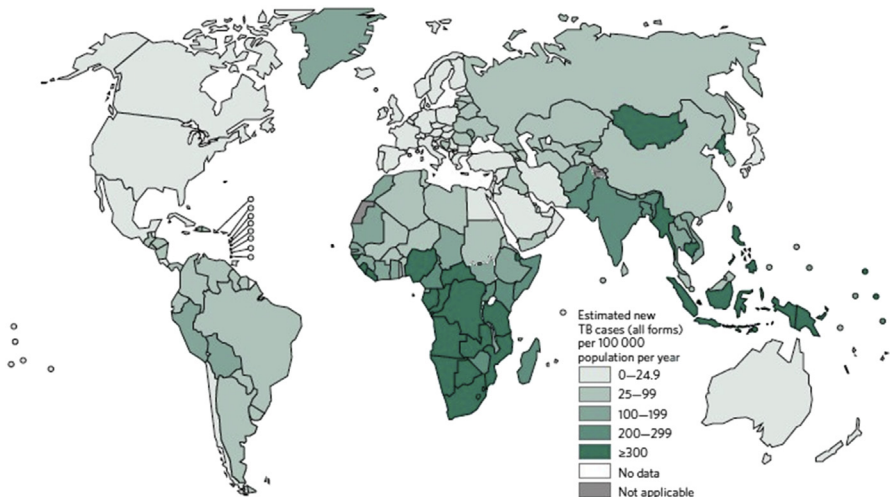


Fig. 1. Estimated TB incidence rates in 2015. (From WHO Global Tuberculosis Report 2016; with permission.)

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