

What is the global burden of tuberculosis among children?



Tuberculosis in children (younger than 15 years) has often been considered a minor problem by national tuberculosis programmes. The low bacterial load of tuberculosis in children, which confers a lower risk of disease transmission,¹ has made the identification and treatment of tuberculosis and tuberculosis infection in this age group a lower priority than in older individuals. Only from 2012 onwards has the WHO tuberculosis programme begun to publish estimates on the number of paediatric cases and deaths from tuberculosis. These estimates have progressively become more robust, with the incorporation of data from national tuberculosis inventory studies done in countries with high tuberculosis burden and the inclusion of information on BCG coverage and HIV status of children affected by tuberculosis. In 2020, WHO emphasised the need to prioritise the quality of information on tuberculosis in children, improving case definition and reporting coverage.² From that year, data on children and adolescents were disaggregated by age (0–4 years, 5–9 years, 10–14 years, and 15–19 years) and by profile of drug sensitivity or drug resistance to anti-tuberculosis medications, and treatment outcomes were incorporated into the Global Tuberculosis Report.²

Although on one hand, young children more often have less transmissible tuberculosis than do adolescents and adults, on the other, they are at greater risk of disease and severe forms of tuberculosis, particularly children younger than 5 years and without BCG vaccine.^{1,3,4} Tuberculosis diagnosis in children is hampered by barriers such as children's low bacillary load or inadequate access to more sensitive diagnostic tests, leading to inaccurate reporting of cases and deaths from tuberculosis among children due to not only underdiagnosis and underreporting but also, less often, overdiagnosis.² The estimated mortality of children with tuberculosis who do not receive specific treatment is 22% (up to 43% in children younger than 5 years), compared with 0.9% in treated children.³ Therefore, the development of more accurate estimates of paediatric tuberculosis cases represents an urgent need for public policy programming and resource allocation and, consequently, reduction of tuberculosis morbidity and mortality among children.

In this context, the Article by Sita Yerramsetti and colleagues⁵ in *The Lancet Global Health* is very

welcome. The authors developed a mathematical model to estimate paediatric tuberculosis incidence and underreporting in 185 countries from 2013 to 2019, representing more than 99% of all paediatric tuberculosis notifications in the world. They propose a different estimation method that considers several factors known to influence paediatric risks of tuberculosis infection and disease (HIV, malnutrition, and BCG non-vaccination), adding new parameters to previous models proposed by others.^{2,6,7}

For 2019, Yerramsetti and colleagues estimated that 997 500 (95% credible interval 868 700–1 163 100) new tuberculosis cases occurred in children, almost half (481 000 cases, 398 400–587 400) among those aged 0–4 years, which was 18% (1–35) lower than the 1 175 000 cases estimated by WHO in the same year. This discrepancy was attributed to the higher incidence estimates produced by WHO for some countries, particularly for India, which alone represented 78% of the difference between estimates. However, even with these differences in numbers, the estimates presented by Yerramsetti and colleagues support the relevance of tuberculosis underreporting among children previously estimated by WHO.

In their proposed novel mathematical model of paediatric tuberculosis incidence, Yerramsetti and colleagues estimated that undernutrition, no BCG vaccination, and HIV infection might account for approximately 25% of new tuberculosis cases in children. This information becomes even more relevant if we consider that countries with the highest tuberculosis burden and tuberculosis–HIV coinfection, which are among the poorest or most socially unequal in the world, are the ones that will probably suffer the most from the COVID-19 pandemic. The COVID-19 pandemic has led to an 18% reduction in the number of new tuberculosis cases reported, reduced access to tuberculosis diagnosis and treatment, and an increase in the estimated number of tuberculosis deaths (more than 1.5 million in 2020).⁸ The economic consequences of the pandemic have generated more poverty and inequality,⁹ which could directly increase malnutrition rates in children and, consequently, the risk of tuberculosis in this age group. BCG vaccine coverage in many countries was severely affected by the

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COVID-19 pandemic.⁸ A 50% drop in BCG vaccination was observed in some areas.¹⁰ Therefore, the real effect of COVID-19 pandemic on tuberculosis incidence, case detection rates, treatment outcomes, and mortality among children will need to be better assessed in the coming years. All predictive mathematical models have limitations and, as such, this model could not consider all the determinants of tuberculosis disease. But the constant improvement of the models for estimating the burden of tuberculosis in children and its associated risk factors represents an important tool in the fight to reduce the harms caused by tuberculosis in children.

We declare no competing interests.

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