

# Burden of tuberculosis in India for the year 2000

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Tuberculosis Research Centre (TRC), Chennai proposed to undertake a series of disease and tuberculin surveys from 1999 onwards to estimate various epidemiological indices such as prevalence and incidence of tuberculosis (TB) among those 15 years of age and above, and the annual risk of tuberculosis infection (ARTI) among children below 10 years of age. This is being done to assess the impact of Directly Observed Treatment, Short-course (DOTS) strategy implemented in 1999 in the Tiruvallur district of Tamil Nadu. These specific and unique surveys are meticulously carried out at regular intervals for ten years to measure the trend of TB. Chest symptoms and X-ray examinations were used as screening tools in these surveys unlike in the National Sample Survey (NSS) conducted during 1955–58 where only X-ray was used as a screening tool. The prevalence cases considered for estimation of the burden of disease were adjusted for non-coverage of X-ray and sputum examinations in the survey as done in the NSS.

The prevalence obtained from the first survey was used for estimating the burden of TB in the year 2000. The prevalence of smear-positive cases was estimated to be 333/100,000 population in the age group of  $\geq 15$  years. The corresponding figure for smear-negative, culture-positive cases was 332/100,000 population. The ARTI, estimated by the mirror image method using the mode at 15 mm, was 2%. To estimate the prevalence of sputum-negative X-ray abnormality, those who were classified by at least two independent readers, as probably or possibly having TB on mass miniature radiography (MMR) were included. Using this definition, the prevalence of sputum-negative X-ray abnormal cases was estimated to be 2360/100,000 population in the study area.

As there are no data available from the TRC on the prevalence of bacillary or X-ray abnormal cases for children in the age group of 0–14 years, we used the estimate of prevalence obtained from one of the surveys conducted by the National Tuberculosis Institute (NTI).<sup>1</sup> The prevalence of bacillary cases was 150/100,000 in the age group of 5–14 years (17/11,345) and that of X-ray abnormal cases was 304/100,000 (50/16,451). Assuming there were no bacillary cases among those in the age group of 0–4 years,

the prevalence of smear-positive cases, smear-negative, culture-positive cases was estimated to be 26/100,000 and 123/100,000, respectively. The prevalence of the ARTI in the south zone obtained from the NSS study on ARTI was 1%.

The recently concluded NSS on ARTI, jointly carried out by TRC and NTI among children in four zones of the country has given reliable estimates of ARTI in rural (north: 1.5%, south: 0.8%, west: 1.4%, east: 1.2%) and urban (north: 3.3%, south: 1.6%, west: 2.1%, east: 1.6%) areas.<sup>2</sup>

The population of India was estimated to be about 100.5 crore using the Census Population of India, 1991 and the decadal growth rate of 21.34%. The burden of disease was estimated at the national level (with its inherent limitations in such exercises and based on different assumptions) using data on adults  $\geq 15$  years of age generated by the TRC, data on children 0–14 years of age obtained by the NTI and estimates of ARTI obtained from different parts of the country. This was done by obtaining the prevalence of 1% ARTI from TRC data and proportionately estimating the prevalence for rural and urban areas of the four zones from corresponding ARTI estimates and adding them together to get the overall estimate of burden of the disease in the country.

The number of bacillary cases was estimated to be 0.38 crore and that for sputum-negative X-ray abnormal cases as 1.29 crore. All the X-ray abnormal cases estimated here may not be bacillary cases and most of them may not become active cases in the future. Studies done by NTI<sup>3</sup> and Hong Kong<sup>4</sup> show that about 30% of X-ray abnormal cases are likely to break down to bacillary cases. Thus, 0.39 crore (1.29 crore  $\times$  30%) of the X-ray abnormal cases that break down to bacillary cases was alone considered to be abacillary pulmonary cases. The number of extrapulmonary cases was estimated to be 0.08 crore of the 0.39 crore bacillary

**Table 1.** Estimated burden of tuberculosis in India for the year 2000

Type of case	Number (in crore)
Bacillary	0.38
Abacillary	0.39
Extrapulmonary	0.08
Total	0.85

cases (20% of 0.38 crore). Thus, the burden of TB projected in the country for the year 2000 was 0.85 crore (0.38 + 0.39 + 0.08 crore). This estimate did not consider the possible association of HIV and multidrug resistant (MDR) TB from different parts of India.

## References

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