

# India's syndemic of tuberculosis and COVID-19

Rukmini Shrinivasan,<sup>1</sup> Saurabh Rane,<sup>2</sup> Madhukar Pai <sup>3</sup>

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Before COVID-19 became a global pandemic, India was dealing with another, much older epidemic—tuberculosis (TB)—which affected 2.64 million Indians in 2019 and killed nearly 450 000 people in the country.<sup>1</sup> That is over 1000 TB deaths every single day, well before COVID-19 entered the picture. In fact, no country has a higher TB burden than India, which accounts for a quarter of the 10 million global TB cases and 1.4 million TB deaths each year.<sup>1</sup>

Even before the pandemic, the cascade of TB care in India has been leaky,<sup>2</sup> with long diagnostic delays,<sup>3</sup> complex care pathways,<sup>4</sup> poor quality of TB care in public as well as private health sectors<sup>2 5</sup> and high TB case fatality.<sup>6 7</sup>

While the COVID-19 pandemic did not escalate in India until May 2020, by early November, India has reported over 8 million cases of COVID-19, with over 125 000 deaths. As the pandemic continues to escalate, the healthcare system is falling apart under the stress. India's economy (GDP) contracted by 24% in the April–June period in 2020.<sup>8</sup>

While the public health system is collapsing under the stress of the growing COVID-19 caseload, the private healthcare system is becoming expensive and challenging to access.<sup>9</sup> In both sectors, non-Covid-19 conditions are getting little attention.<sup>10 11</sup>

When India went into a stringent lockdown on March 25, anecdotal evidence suggested that citizens were having difficulty accessing routine health services.<sup>10</sup> A large part of the health administrative machinery had to be diverted in identifying and containing COVID-19 cases, many hospitals were designated as 'COVID-19 only' and others restricted routine services for fear of an infected patient causing an outbreak.

Additionally, the complete closure of public and most private transport made travel to health facilities difficult, and horror stories of patients with chronic conditions dying before they could make it to a doctor emerged in the

media. Hundreds of thousands of migrants were forced to walk hundreds of miles back to their homes, and they received little by way of medical care. Tests, medicine refills and medical consultations are essential activities for patients but were severely disrupted due to lack of transportation, lockdown measures and an overwhelmed health system.<sup>10</sup>

## LARGE-SCALE DISRUPTION OF TB AND GENERAL HEALTH SERVICES

Official data on the extent of health service disruptions have been harder to come by. The National Health Mission's Health Management Information System (NHM-HMIS),<sup>12</sup> an administrative database, aims to collect and publish updated data from over 250 000 health facilities across the country nearly daily. The majority of the NHM-HMIS reporting facilities are in rural areas and are government-run, and their services range from immunisations and the distribution of contraceptives to the treatment of cancer, including all age groups, and both communicable and non-communicable disease treatment.

After the data for March 2020, summarised in an Indian newspaper in late April,<sup>10</sup> the NHM-HMIS reported no new data for the next 3 months. In late August, data for April, May and June finally became available, and it laid bare a worrying disruption of all health services.<sup>11</sup> In particular, the data show serious disruption in access to the prevention, monitoring and treatment of TB, India's biggest infectious disease killer.

In March 2020, over 260 000 fewer children received the BCG vaccine that provides protection against childhood TB than in January 2020 (figure 1). The decline in April was even sharper—just half as many children received the BCG vaccine in April 2020 as in January 2020. These declines were also evident when the numbers are compared with the same months of the previous year. In May, there was some evidence of an improvement, but the numbers for both May and June were



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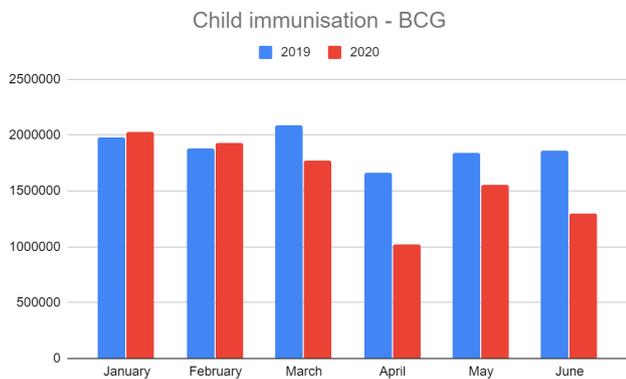
<sup>1</sup>Independent Data Journalist, Chennai, India

<sup>2</sup>Survivors Against Tuberculosis, Mumbai, India

<sup>3</sup>Department of Epidemiology and Biostatistics & McGill International TB Centre, McGill University, Montreal, Québec, Canada

### Correspondence to

Dr Madhukar Pai; madhukar.pai@mcgill.ca



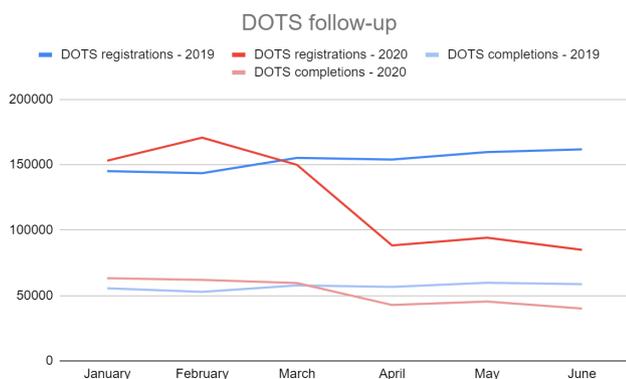
**Figure 1** Routine BCG immunisation data from India’s National Health Mission’s Health Management Information System (NHM-HMIS) for the January to June 2020 period, in comparison to similar data for 2019. Source: National Health Mission’s Health Management Information System (NHM-HMIS).<sup>12</sup>

a long way from those earlier in the year or in previous years.

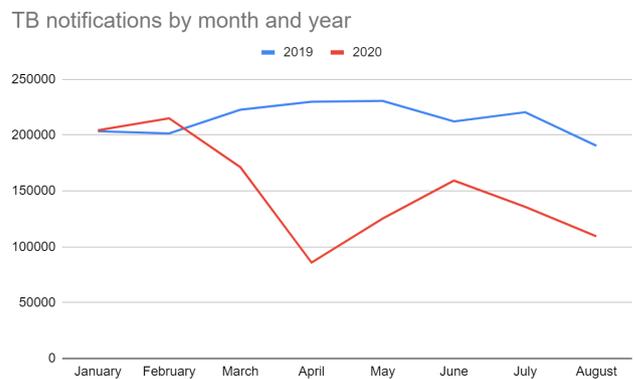
The number of patients with TB registered as being on treatment (captured in the NHM data as ‘DOTS patients’) in April 2020 fell to just half the February levels (figure 2). By June 2020, over 23 000 fewer patients had completed the TB therapy successfully than in January 2020 (figure 2).

Across the country, the number of persons admitted for inpatient treatment fell for many diseases including malaria, dengue and TB.<sup>11</sup> In June 2020, the number of people admitted for inpatient TB treatment in these facilities fell to less than a third of the number in June 2019.

Given the scale of administrative disruption, data quality is always a concern, as shown by the reports of the underestimation of COVID-19 deaths in the country.<sup>13</sup> While the NHM-HMIS typically includes updated data



**Figure 2** Number of patients with TB registered on DOTS and completed treatment, in India’s National Health Mission’s Health Management Information System (NHM-HMIS) for the January to June 2020 period, in comparison to similar data for 2019. Source: National Health Mission’s Health Management Information System (NHM-HMIS).<sup>12</sup> TB, tuberculosis.



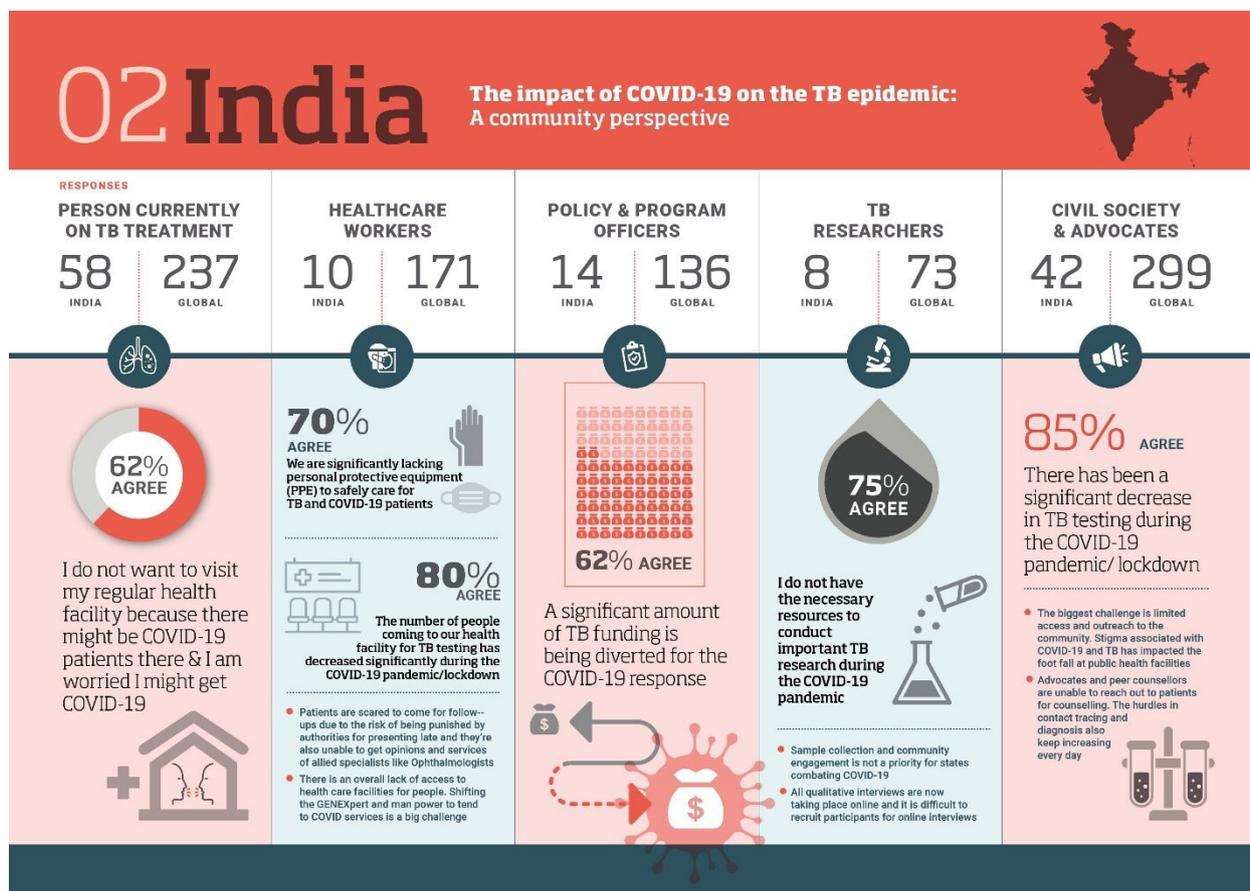
**Figure 3** Data from Nikshay TB notification system by India’s National TB Elimination Programme on TB for the April to August 2020 period, in comparison to similar data for 2019. Source: Nikshay, Central TB Division, National TB Elimination Programme.<sup>14</sup> TB, tuberculosis.

on the number of facilities reporting this information, the government has not released this data since April onwards, making it difficult to estimate the scale of missed data, if any. However, data from March suggest that unreported data cannot fully explain these numbers—there were in fact more health facilities reporting data in March 2020 than there were in March 2019. Given that the data for April 2020 only confirmed the trend established in March, it is unlikely that the trends in figure 1 can be fully explained by missing data.

Other official data confirm the NHM trends for TB. Data from the Nikshay database,<sup>14 15</sup> India’s national TB case notification system, show that notifications fell most sharply in April, and then revived somewhat in the months after. Figure 3 shows the Nikshay TB case notification data for the April to August 2020 period, in comparison to similar data for 2019. In August 2020, case notifications were down by nearly 50% compared with the same month in 2019. TB notifications declined in both the public and private sectors; at the beginning of the lockdown, the decline was even more severe in the private sector.

Taking the NHM and Nikshay trends together, there is little doubt that TB services are seriously disrupted in India, and the disruptions extend over several months, rather than just weeks. The pandemic stress, coupled with the pre-existing stigma around TB, has made matters worse for patients. This has severely affected the treatment adherence in some patients, increasing the risk of drug-resistant disease and mortality.

Disruptions to TB services extend well beyond India.<sup>16</sup> On 15 September 2020, more than 10 civil society groups and global networks released the results of a large survey done, to document the impact of the COVID-19 pandemic on TB services and stakeholders. The results show that COVID-19 has had an enormous impact on the number of people seeking and receiving healthcare for TB.<sup>17</sup> Figure 4 is a summary of the key results for India, from this civil society-led survey.



**Figure 4** Key results for India from a large civil society-led survey on the impact of COVID-19 on the TB epidemic. Source: report on ‘The impact of COVID-19 on the TB epidemic: A community perspective’.<sup>17</sup>

Now that India is dealing with a large-scale syndemic of TB and COVID-19, we need to anticipate and prevent poor outcomes among TB-affected persons as well as the possibility of increased spread of infection within households and close contacts because social distancing and masking are unlikely to be feasible within families and overcrowded, impoverished communities.

The stigma around TB is well recognised. Stigma around COVID-19 is also emerging as a concern now. People are hesitant to get tested for the fear of being tagged or quarantined. And because TB and COVID-19 have similar symptoms (cough and fever), stigma could delay the diagnosis of both conditions. Underdiagnosis and undernotification of both infections are the norms, not the exception.

Delayed TB diagnosis and treatment might substantially increase TB mortality in the future. A modelling analysis by the Stop TB Partnership and partners suggests that each month of lockdown in India could cause an additional 40 000 deaths over the next 5 years.<sup>18</sup> Another model estimate suggests that a 59% reduction in TB case detection between the end March and May 2020 may result in an estimated additional 87 711 TB deaths in 2020.<sup>19</sup>

#### HOW CAN INDIA TACKLE THE SYNDEMIC OF TB AND COVID-19?

A lot depends on how long service disruptions will continue in India and how quickly essential health services

can be ramped up.<sup>20</sup> We hope the Indian government will find a way to restart and ramp up all essential health services, especially routine immunisation, TB diagnosis and treatment.<sup>20</sup> Some states in India have done better than others in preserving routine health services,<sup>21</sup> and other states must learn from their experience.

In September 2020, the National TB Elimination Programme (NTEP) announced a Rapid Response Plan to mitigate the impact of COVID-19 Pandemic on TB Epidemic and NTEP activities.<sup>15</sup> The plan includes bi-directional TB-Covid-19 screening, intensified case finding, replacement of sputum smears with rapid molecular testing, home-based sample collection and delivery of TB medicines, and modification of the DOTS approach to include digital adherence technologies, call centres and family members to provide treatment support.

We applaud this rapid response plan and call for its full and rapid implementation. But we are yet to see data on whether NTEP has been allocated sufficient funds by the Indian government to fully implement the rapid response plan. With the Indian economy shrinking and with the ongoing diversion of funds to COVID-19 response, we worry that TB funding will decrease, rather than increase.<sup>16</sup>

The first pressing priority is to catch-up on all the missed patients—actively find over half a million persons with TB who were missed during the past 6 months and offer

them TB treatment. Precision public health approaches for TB have shown that employed men who problem-drink and smoke are a prime target for interventions in urban India.<sup>22</sup> Reducing delays in care seeking in this group of ‘missing men’<sup>23</sup> is critical for catching up on TB case notifications.

There are several innovative apps now available for COVID-19, and some of them could be repurposed to also nudge people with TB symptoms to seek care, for increasing TB notifications and for contact tracing for both TB and COVID-19. This might also help with real-time data dashboards and geospatial trackers on TB, just as we have several dashboards and trackers for COVID-19.

Even as existing molecular platforms such as GeneXpert and TrueNAT are being repurposed for COVID-19 testing, it is critical to not stop TB testing. In particular, the TB programme must continue running the Xpert MTB/RIF TB test because this test is critical for early detection of drug-resistant TB.<sup>24</sup>

There are now digital X-rays with artificial-intelligence solutions that can rapidly screen for both TB and COVID-19. In urban India, X-rays are widely available and could be used to triage people with respiratory symptoms.

Novel sample collection methods should be tried out for both COVID-19 and TB, including drive-by sample collection sites, at-home collection, collection via community health workers and engagement of neighbourhood private laboratories. The national TB helpline should be strengthened, and patients should have a choice of texting, calling, emailing or engaging through social media—whatever is convenient to them.

In fact, India has announced a plan for bi-directional screening, with COVID-19 screening of all diagnosed patients with TB and TB screening for all Covid-19-positive patients.<sup>15</sup> This plan, however, will require substantially higher capacity for molecular testing and serious financial investment, given the massive numbers of TB and COVID-19 cases in the country. If approximately 200 000 notified patients with TB need COVID-19 testing every month and if approximately 100 000 new patients with COVID-19 are being reported every day, the numbers add up to millions of TB and COVID-19 molecular tests each month. Because COVID-19 testing is much harder to access than TB testing, it is critical to make sure that COVID-19 testing does not become a bottleneck for accessing TB testing services.

There is tremendous innovation ongoing to develop and deploy rapid antigen tests for COVID-19 as molecular testing capacity is scarce in many settings.<sup>25</sup> If rapid tests can be developed and rolled out so quickly for COVID-19, there is no reason to think it cannot be done for TB.

Where possible, treatment support could be done remotely using telemedicine and digital adherence technologies such as 99DOTS, smart pillboxes and video DOT.<sup>26</sup> Medicine vending machines and e-pharmacies that can deliver medicines to homes of patients are other approaches worth trying. Community-based groups, including TB survivors, are closer to patients

than government staff and could be engaged to provide patient support via WhatsApp, FaceBook and mobile phones.

Because injectable TB drugs are very challenging during this crisis, it is important to adopt the WHO-recommended all-oral, shorter drug regimens for drug-resistant TB. To avert a big increase in paediatric TB, it is important to increase BCG vaccination coverage and catch up on all the missed BCG and other vaccinations in the past 6 months.

Infection control has received tremendous attention during this pandemic, including widespread use of personal protection equipment, use of face masks, safe disposal of sputum and physical distancing. Greater use of such infection control measures can help reduce TB transmission.

Malnutrition is a huge driver of the TB epidemic in India, and India’s economic collapse during COVID-19 is pushing millions into extreme poverty and worsening malnutrition. Addressing these key social determinants of TB will be critical for ending TB in India.<sup>27</sup> Experts have suggested enhanced food rations through India’s public distribution system, as well as direct cash transfers to the poor as a way of dealing with this immediate crisis.<sup>19</sup> The pandemic has demonstrated the critical importance of sick pay as a safety net. All patients with TB in India deserve sick pay to help them get through the long and difficult treatment period.

In the longer term, we endorse the suggestions of Bhargava and colleagues<sup>27</sup> who argue that TB elimination in India will need ‘a pro-poor model of patient-centred care inclusive of nutritional, psychosocial and financial support, universal health coverage and social protection; and convergence with multisectoral efforts to address poverty, undernutrition, unsafe housing and indoor pollution’.

Lastly, the pandemic has clearly exposed major fragility in India’s underfunded public health system and an unregulated, potentially exploitative private health system. India cannot achieve its true potential by spending just 1.5% of its Gross Domestic Product (GDP) on health. India needs to strengthen the public health system while simultaneously regulating and engaging with the private health sector to deliver quality, affordable care.<sup>28</sup> In particular, engagement of the private health sector is critical for TB as nearly half of India’s TB cases are managed by private providers.<sup>29 30</sup> Without leveraging both sectors, India cannot meet the surging health needs of over 1.3 billion people.

**Twitter** Madhukar Pai @paimadhu

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#### ORCID ID

Madhukar Pai <http://orcid.org/0000-0003-3667-4536>

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