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New tests could slash SA's TB deaths by two-thirds, UCT study finds

A new study led by University of Cape Town's (UCT) Associate Professor Leigh Johnson suggests that new tests, which can be performed in clinics on either tongue swab or sputum specimens, could reduce TB incidence by as much as 49% and TB mortality by as much as 67%, over the next 15 years.

Published in the journal *Global Health Action*, the study assessed which factors are most critical to reducing future TB incidence and mortality in South Africa.

The study employed a mathematical model of TB and HIV developed for South Africa, Thembisa. By varying different model parameters between their plausible lower and upper bounds, the study investigators were able to identify which parameters have the most influence on future TB trends.

This study is important because TB is still one of the leading causes of death in South Africa, causing roughly 50 000 deaths per annum (including TB deaths in people living with HIV). Although the End TB targets published by the World Health Organization (WHO) aim for an 80% reduction in TB incidence over the period 2015-2030, South Africa has so far (over 2015-2024) achieved only a 22% reduction in TB incidence.

Associate Professor Johnson, an epidemiologist and actuary based in UCT's Centre for Integrated Data and Epidemiological Research, noted that one of the biggest obstacles to controlling TB in South Africa is that the vast majority of people coming to clinics because of TB symptoms don't get microbiologically tested.

"The current testing protocols require that patients produce sputum specimens, which is difficult for some patients, and those sputum specimens have to be sent to laboratories to be analysed, and then patients have to return to get test results. The process is laborious and expensive, and health workers facing high patient volumes often skip it due to time pressure," he said.

In this context, Johnson argues, the new test is a potential game-changer: it can be performed on either tongue swabs (easier to collect) or sputum, it can be performed quickly in clinics (without specimens being sent to laboratories) and it is considerably cheaper than the existing laboratory-based testing.

"Its accuracy is similar to that of current sputum laboratory-based tests in people with TB symptoms, and the World Health Organization has recently endorsed the use of the test in people with TB symptoms," he said.

However, Johnson emphasised that addressing the problem of low rates of microbiological testing in symptomatic patients needs to go beyond just introducing the new test. He added that there is also a need for better monitoring of the proportion of symptomatic patients who are tested, and for more healthcare workers dedicated to supporting the TB testing process.

Johnson and his team also evaluated the potential impact of expanding TB testing into community settings, for example, through mobile testing vans or door-to-door testing campaigns. Their results showed that this could reduce TB incidence and mortality by up to 38% and 49% respectively.

"We need to be cautious, though, because the WHO has not yet endorsed the use of the new tests in community settings, due to concerns that they are less accurate in people who are asymptomatic (not experiencing TB symptoms). Also, it is much more expensive to do testing campaigns in communities, and further health economic analyses are required to assess whether the health gains justify the additional costs," he said.

The study also found that uncertainty in future rates of social contact and facial mask use was also important in predicting future trends. Although social contact rates dropped to low levels during the COVID-19 pandemic, there has been no data on changes in social contact rates in the post-COVID period.

According to Johnson, future rates of antiretroviral therapy (ART) initiation are also important in determining TB mortality in the South African context. "This is an area of particular concern given recent disruptions to US funding. In a worst case scenario, the model estimates that TB mortality could increase by 17% as a result of reductions in ART initiation rates," he said.

The study also highlighted the importance of expanding new forms of TB preventive therapy (TPT) to vulnerable groups (most significantly, people recently diagnosed with HIV and household contacts of people with TB). Johnson said newer forms of TPT can be taken for shorter periods and are potentially more effective against TB infection.

Overall, the study suggests South Africa is unlikely to achieve the End TB target of an 80% reduction in TB incidence by 2030. However, it is possible to get close to an 80% reduction with the right mix of interventions. "We need to strike a balance between fixing the existing gaps in the TB programme and pursuing new technologies, if we are to control TB in South Africa," Johnson said.

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