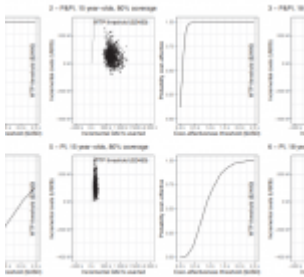


# A new TB vaccine – is it cost-effective and efficient?



A new vaccine against tuberculosis may prove to be a cost-effective and efficient preventative management strategy for a pandemic that has been overshadowed by the dawn of COVID-19.

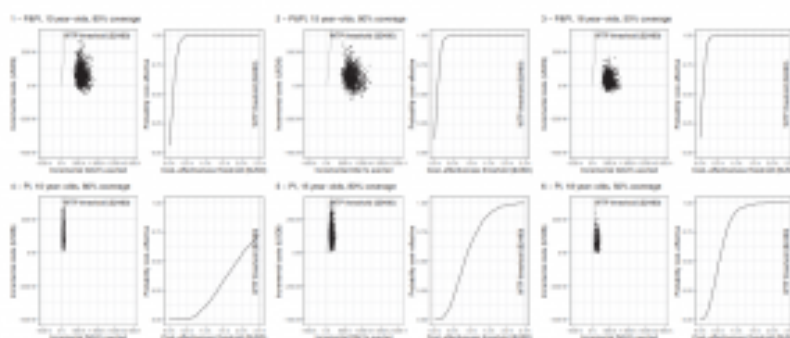
The COVID-19 pandemic has drawn, justifiably, much needed research attention away from other disease areas including tuberculosis (TB) research. *Mycobacterium tuberculosis* has taken advantage of the shortage of attention from respiratory clinicians and scientists. Increasing deaths from TB in 2021 followed by a negatively impacted treatment and diagnosis platforms are some of the main areas of concern exacerbated by the lockdowns and overburdened healthcare systems. In addition, the increase in poverty, malnutrition and resultant lung damage from COVID-19 will only aid to the burden of TB due to increase vulnerability.

It is still a global priority, despite our ongoing battle with COVID-19, to achieve our Sustainable Development Goal targets for 2030 i.e. reduce TB deaths by 90%, cut new cases by 80%, and to ensure nobody faces catastrophic expenses due to TB. Vaccines may be the best hope for achieving this goal.

Currently the only licensed vaccine available against TB is the Bacille Calmette–Guérin (BCG). However, BCG protecting does not last and does not protect adults from TB in adulthood, therefore a vaccine which to prevent TB disease after childhood is needed.

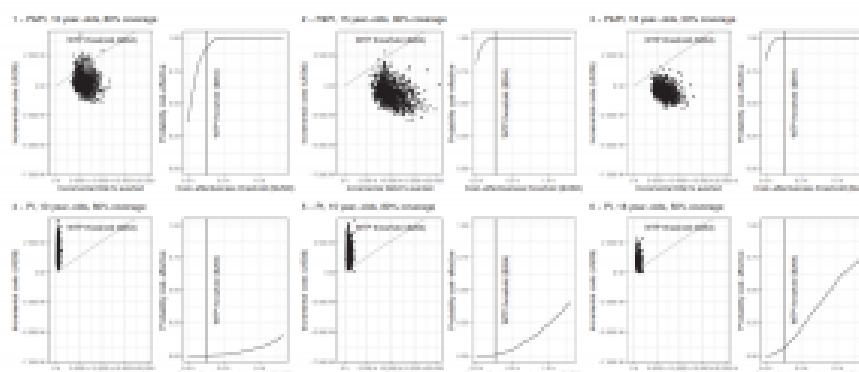
A new M72/AS01E vaccine was developed in 2019 and caused a stir within the TB field showing that it was 50% efficacious in preventing TB disease in sub-Saharan Africa. The efficacy and cost-effectiveness of this vaccine needs to be proven in a bigger trial.

In a new study, Harris, et al., investigated the potential *health impact and cost-effectiveness of the M72/AS01E vaccine in two high burden TB countries: India and South Africa* (Figure 1 and Figure 2). They reported that the M72/AS01E would be a great potential investment for vaccine developers and health systems, particularly if shown to induce protection among TB-uninfected people.



**Figure 1: Cost effectiveness planes and cost-effectiveness acceptability curves for vaccination scenarios in South Africa.** Top row (panels 1–3) shows costeffectiveness planes (scatter plot) and cost-effectiveness acceptability curves (line graph) for three scenarios with pre- and post-infection vaccine efficacy. Bottom row (panels 4–6) shows cost-effectiveness planes and cost-effectiveness acceptability curves for three scenarios of post-infection-only vaccine efficacy. P&PI denotes vaccine with pre- and post-infection. PI denotes vaccine with post-infection efficacy

only. DALY disability-adjusted life year, USD United States Dollars, WTP willingness to pay (Harries, et al., 2022).



**Figure 2: Cost effectiveness planes showing incremental cost-effectiveness ratios for vaccine introduction scenarios in India.** Top row (panels 1–3) shows cost-effectiveness planes (scatter plot) and cost-effectiveness acceptability curves (line graph) for three scenarios with pre- and post-infection vaccine efficacy. Bottom row (panels 4–6) shows cost-effectiveness planes and cost-effectiveness acceptability curves for three scenarios of post-infection-only vaccine efficacy. P&PI denotes vaccine with pre- and post-infection. PI denotes vaccine with post-infection efficacy only. DALY disability-adjusted life year, USD United States Dollars, WTP willingness to pay (Harris, et al., 2022).

How does this vaccine work? In this present study they modelled two vaccine scenarios. They found that routine vaccination of teenagers could have the greatest health impact

and be most cost-effective in reducing TB deaths and disease. This would be key in protecting those at the age where TB infection is most common.

Currently the only results for the M72/AS01E vaccine show that it is effective for people previously infected with TB bacteria. One would hope that it is effective in people who have not yet been infected with TB, providing some protection. More time is needed to investigate this.

Learning from COVID-19 vaccinations, the success and failures, is imperative going forward. Vaccine education is key as well as engaging with communities, especially in lower-income countries. Prevention is the best method to reach our goals of eradicating TB. Vaccines like M72/AS01E, and other candidates, may be the solution in our battle to defeat TB.

**Journal article: Harris, R, et al., 2022. [Cost-effectiveness of routine adolescent vaccination with an M72/AS01<sub>E</sub>-like tuberculosis vaccine in South Africa and India.](#) *Nature Communications*.**

*Summary by Stefan Botha*