

The urgent need for new TB vaccines

The G20 nations are home to over half of the world's TB burden and many of the world's leading research institutions and funding bodies. The G20 has a critical role to play in developing the new TB vaccines and other tools required to End TB.

New TB vaccines are possible — and urgently needed

No infectious disease has ever been eradicated in the absence of an effective vaccine — TB will be no exception. TB remains the leading cause of death from an infectious disease behind COVID-19, and pandemic disruptions to TB programs mean TB is poised to overtake COVID-19 once the acute phase of the COVID-19 pandemic ends. Existing tools for preventing TB are woefully inadequate. In contrast to the unprecedented collaboration in the development of COVID-19 vaccines, there is only one available TB vaccine — the century old Bacille Calmette Guérin (BCG). While BCG offers important but incomplete protection against the most severe forms of TB, such as TB meningitis, in infants and young children, it is mostly ineffective in adolescents and adults, who are most at risk of developing and spreading TB. **New TB vaccines that work across all age groups, particularly among adults and adolescents, will be critical to eliminate TB by 2030 and meet the WHO End TB targets.** Vaccines also offer the best chance to contain the spread of drug-resistant TB, which is a leading cause of death due to antimicrobial resistance (AMR).

The time to invest in new TB vaccines is now

The urgency of the need is matched by the promise of the science: **new TB vaccines are truly within reach but only with the right investments.** The pipeline of candidate vaccines has never been stronger, with at least five vaccines in phase III trials and work underway to develop next-generation vaccines based on mRNA and other promising platforms. Unlocking this potential requires fulfilling commitments to fund TB vaccine R&D. At the United Nations High-Level Meeting to End TB in 2018, world leaders pledged to deliver at least US\$2 billion annually for TB R&D, including \$550 million for vaccines. Despite these commitments, funding for TB vaccines has never exceeded \$120 million per year, further increasing the annual need. **We need to make up for lost time. World leaders must fulfill their commitments to end TB by 2030 by ensuring an annual investment of at least \$1.4 billion to deliver a fully funded and resourced TB vaccine pipeline by 2023, so that new TB vaccines are possible as early as 2025.**

New TB vaccines are key to tackling antimicrobial resistance and drug-resistant TB

Multidrug-resistant TB (MDR-TB) and extensively drug-resistant TB are both on the rise. Of the half a million people estimated to fall sick with drug-resistant TB each year, only 157,000 were diagnosed in 2020. Treating drug-resistant TB is also many times more expensive than treating drug-susceptible TB. **Globally, MDR-TB accounts for one-third of all AMR-related deaths and drug-resistant TB deaths could cost the global economy US\$16.7 trillion by 2030.** Yet, TB has been left out of many AMR initiatives — a missed opportunity to address the heart of the challenge.

New TB vaccines would address AMR in several ways:

- Likely to be **equally effective against drug-resistant and drug-sensitive TB**, since the mechanisms by which vaccines would afford protection against TB would be different from those that confer drug resistance.
- By preventing TB disease, new TB vaccines would **reduce the need for antibiotics.**
- Therapeutic vaccines, in combination with drugs, could **reduce treatment duration and reduce the risk of disease recurrence.**

Investing in TB vaccine R&D is an investment in pandemic preparedness

Preventing future pandemics requires tackling the most serious of pandemic threats today. TB stands alongside HIV/AIDS, malaria, viral hepatitis, and antimicrobial resistance as deserving concerted attention within any new pandemic preparedness initiative or international instrument. **The world needs flexible, adaptable, and sustainable global health R&D funding, capacity, and infrastructure to successfully address future pandemics.** Investing in TB R&D can build local and global research capacities across the breadth of the research continuum, driving efficiency-optimized practices in every stage of the product development process, while addressing the burden of TB and ensuring the world has the infrastructure in place to address future threats.

Existing multilateral funding mechanisms exclude TB vaccine R&D

We won't end TB by 2030 without transforming the TB R&D funding landscape. Existing multilateral and global health funding mechanisms for TB and for vaccines overlook TB vaccine R&D. The Global Fund is the largest international donor to TB activities, but supports implementation of existing tools, not R&D to develop new tools, such as vaccines. Similarly, GAVI leads global efforts to scale-up immunization programs in low- and lower-middle-income countries but does not invest in product development. Conversely, mechanisms like CEPI that focus on vaccine R&D do not prioritize TB. CEPI's 2022–2026 strategy, in line with their investments to date, remains directed toward viral pathogens, but not yet TB.

We need innovative funding mechanisms for TB vaccine R&D, **ones based on a partnership of funders** that bring together different governments and other interested parties in support of an accelerated agenda for TB vaccine R&D. The COVID-19 response, underpinned by unparalleled multilateral and multi-stakeholder collaboration, offers a blueprint to meet the funding and resourcing needs to achieve the End TB targets. **This response must include the diversification of funding streams, innovative and custom funding mechanisms, and the incentivization of industry partners, such as through de-risking investments.**

The cost of inaction wildly surpasses the cost of action — in lives, livelihoods, and economies

Ending TB is a sound economic investment. Across a range of valuations, **TB vaccines have been shown to be overwhelmingly cost-effective, particularly when targeted to adolescents and adults.** Most recently, Silva et. al. conducted the first ever full-income analysis of the actual and projected losses due to TB in 120 countries, which drastically bolsters these arguments. Based on current projections, an estimated 31.8 million TB deaths will occur between 2020 and 2050, corresponding to an economic loss of US\$17.5 trillion (roughly equivalent to the nominal GDP of the European Union in 2021). **Conversely, we can save up to 23.8 million lives and avert \$13.1 trillion in economic losses if governments meet the WHO End TB targets by 2030.** For each year that the target is missed, the loss of lives and money compounds. As stated by the authors, understanding the full costs of TB in lives and economies "strengthens the case for advanced trials and licensure of a tuberculosis vaccine."

SOURCES

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