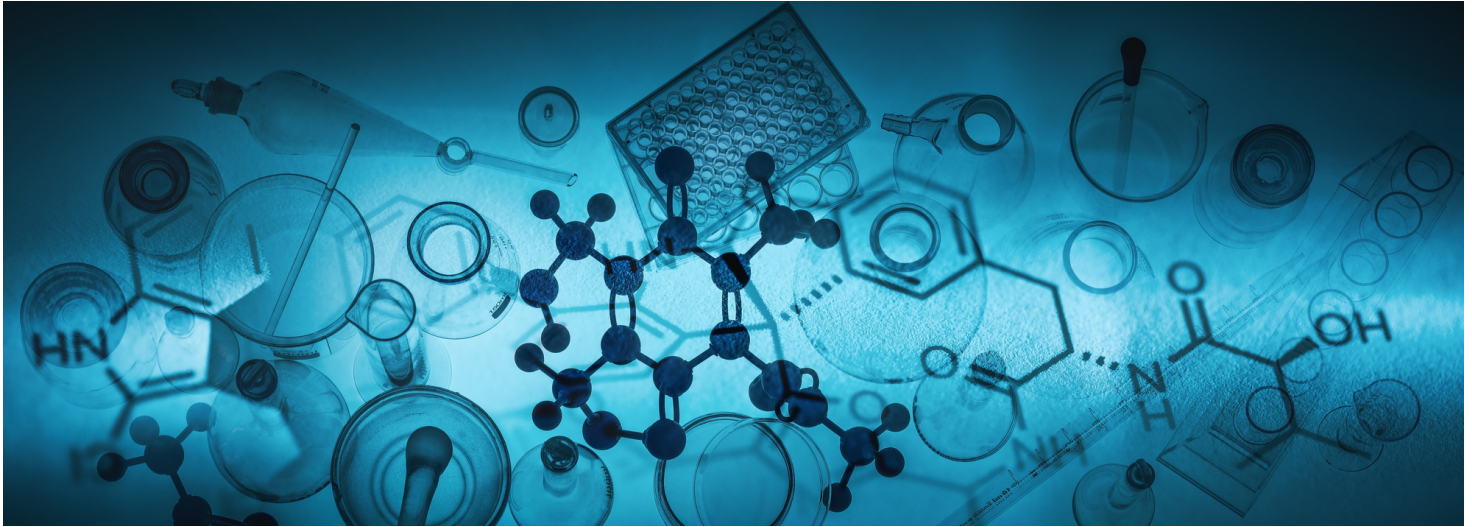


THE MONTHLY DOSE

Official Newsletter of The Mueller Health Foundation



WHAT'S NEW AT THE MUELLER HEALTH FOUNDATION:

We at the Mueller Health Foundation are thrilled to announce the continuation of our collaboration with our grantee, REACH, in India.

Building on the success of our previous project, which focused on creating and implementing a community care model for patients diagnosed with drug-resistant TB, we are now embarking on a new four-year initiative.

This project aims to develop and implement the "Care Connect" model, which will redefine the co-management of TB and diabetes. Our goal is to improve TB treatment outcomes and provide comprehensive, integrated healthcare solutions to patients.

Stay tuned for more updates!

LATEST NEWS: SHOWCASING STORIES OF TB SURVIVORS

We at The Mueller Health Foundation continue to be deeply committed to sharing personal stories and giving a voice to TB patients, TB survivors, TB practitioners, and all the friends and family members of the people who have been affected by the disease. We are also proud to continue our support of our HeroRat Carolina who has been trained by APOPO, a charity focused on training rats to detect TB in sputum samples across Africa. APOPO has put together a wonderful collection of success stories from TB survivors and this month we would like to highlight Omary's story, who works on a farm in Tanzania:

Omary is currently in the hospital receiving treatment for tuberculosis, which he recently contracted. While he's now feeling much better, he and his family experienced a frightening ordeal as he became gravely ill, and the clinics and doctors initially couldn't diagnose the cause. Despite being sick for only a few weeks, his illness was severe. His first two TB tests came back negative, but his condition continued to deteriorate rapidly. Omary works on a farm outside the city, and his health declined quickly from a minor cough to being bedridden. This was a significant issue because he and his fellow workers had crops to harvest and plant. Unable to work, his family had to hire additional laborers, and his youngest children had to leave school to help in the fields. Fortunately, Omary's clinic collaborates closely with APOPO, who retested his sputum sample using rats trained to detect TB by smell, followed by laboratory confirmation. Omary was initially surprised by the use of rats in his diagnosis, but they ultimately saved his life, allowing him to continue supporting his family. Omary's small community, where everyone knows each other, also rallied around him. Reflecting on his experience, Omary said, "We have to be open; otherwise, we are not a strong community. Tuberculosis and other diseases like HIV are openly discussed here, and when someone falls ill, we don't avoid them—we help them. This happened to me. My neighbors supported us by providing food and supplies, and I am very thankful to them." To read his full story please follow the link here: <https://apopo.org/what-we-do/detecting-tuberculosis/success-stories/omary/>

For more news, please also take a look at our top 3 picks for **June** in this newsletter, where we highlight novel research findings and news around the prevention and treatment of tuberculosis around the world.

MHF TOP PICKS FOR JUNE

Every month, we at the Mueller Health Foundation like to showcase interesting news and updates in the field of tuberculosis (TB). Below are our top 3 picks for **June**:

1. Study Shows that Age and Sex May be Important to Consider in Assessing Tuberculosis Risk

The researchers at Harvard T.H. Chan School of Public Health investigated antibody responses to *Mycobacterium tuberculosis* (Mtb), the bacteria that can cause TB, in 140 individuals in South Africa, who had been exposed to TB but not yet diagnosed with the disease. The researchers identified differences in antibody response between those who later progressed to TB disease and those who remained healthy. The study identified an antibody score, representing the presence of TB-related antibodies, that could identify people at risk of progression to TB disease. The study also found that antibody scoring was most accurate if it considered people's sex and age. This study therefore supports the push towards moving from a one-size-fits-all diagnostic approach to a more personalized diagnostic approach that takes into account more of a patient's identity, which may allow health systems to treat patients more effectively. To learn more, you can access the full article at: <https://www.nature.com/articles/s41564-024-01678-x>

2. Study Looks at Harnessing Post-translational Modifications for a Tuberculosis Booster Vaccine

In developing tuberculosis vaccines, scientists have studied proteins from *M. tuberculosis* that trigger the protective immunity against tuberculosis. Especially IFN-gamma produced by T cells is known to be critical for protection against tuberculosis. Furthermore, Mycobacterial DNA-binding protein 1 (MDP1) is a major protein of both the BCG vaccine and the bacterium *M. tuberculosis*. Recent studies show that IFN-gamma responses to MDP1 are higher in individuals who suppress tuberculosis progression compared to tuberculosis patients, making MDP1 a new vaccine candidate. To evaluate MDP1 for a tuberculosis booster vaccine, the researchers produced recombinant MDP1 and tested its ability to induce IFN-gamma using blood from BCG-vaccinated adults. In this study, the researchers demonstrated that the combination of mMDP1 and G9.1, a novel type of CpG-DNA, elicits a significant level of IFN-gamma from peripheral blood of BCG-vaccinated adults. The results of this study suggest that combining mMDP1, which displays post-translational modifications, with G9.1 can reinvigorate the waning effect of BCG for people over the age of five, indicating its potential as a booster vaccine for older vaccine recipients. To learn more, you can read about the research here: <https://www.nature.com/articles/s41598-024-58836-8>

3. Tuberculosis Treatment Outcomes and Associated Factors among Tuberculosis Patients Treated at Healthcare Facilities of Motta Town, Northwest Ethiopia: A Five-Year Retrospective Study

Assessing the current treatment outcome and its associated factors is essential for improving patient care and reducing the spread of TB. The study aimed to assess TB treatment outcomes and their associated factors among TB patients who received treatment at public healthcare facilities in Motta Town, Northwest Ethiopia. A facility-based retrospective cross-sectional study design was employed in two TB treatment centers in Motta town from January 2017 to December 2021. The 362 study participants were all patients diagnosed with TB, who received treatment. In the study, nine out of ten study participants had successful TB treatment outcome rates. The study confirmed that male gender, normal nutritional status, non-presumed drug resistance to TB, and HIV-negative status were significantly associated with successful TB treatment outcomes. By taking risk factors associated with poor treatment outcomes like those found in this study into account, patient management and treatment can be optimized. You can read the full paper here: <https://www.nature.com/articles/s41598-024-58080-0>

DID YOU KNOW?

In response to the recent tuberculosis outbreak in Long Beach, California, which led to 14 active TB cases and one fatality, we would like to share some key data to provide an overview of tuberculosis occurrences across the state of California:

- Since 2020, TB cases in California have been increasing each year for a total increase of 24% over the last four years, returning to case numbers not seen since before the COVID-19 pandemic.
- In 2023, 2,113 new TB cases were reported, a substantial increase (15%) compared with 1,842 in 2022.
- The vast majority of TB cases (85%) in 2023 were attributable to progression of latent TB to active TB, while an estimated 5% of cases were in persons who arrived in California from outside the United States with active TB disease, and another 10% resulted from recent transmission.
- In 2023, there were 8 new TB outbreaks and 13 ongoing outbreaks in 14 jurisdictions, each involving at least 4 persons.
- More than 2 million Californians (6% of the population) have latent tuberculosis. Without treatment latent TB can progress to active TB.
- In 2023, there were 24 (1.1%) MDR TB cases in California, an increase from 18 cases (1.0%) during 2022. During 2019-2023, three XDR cases were reported.
- Medical and societal costs of TB reached \$265 million in California in 2023.
- The percentage of people with TB who die has been increasing. In 2010, 8.4% of people with TB died. In 2020 this percentage reached a peak of 13%. In 2021, 217 (12% of TB cases) people with TB died; of those, 61 (28%) died before receiving treatment for TB.