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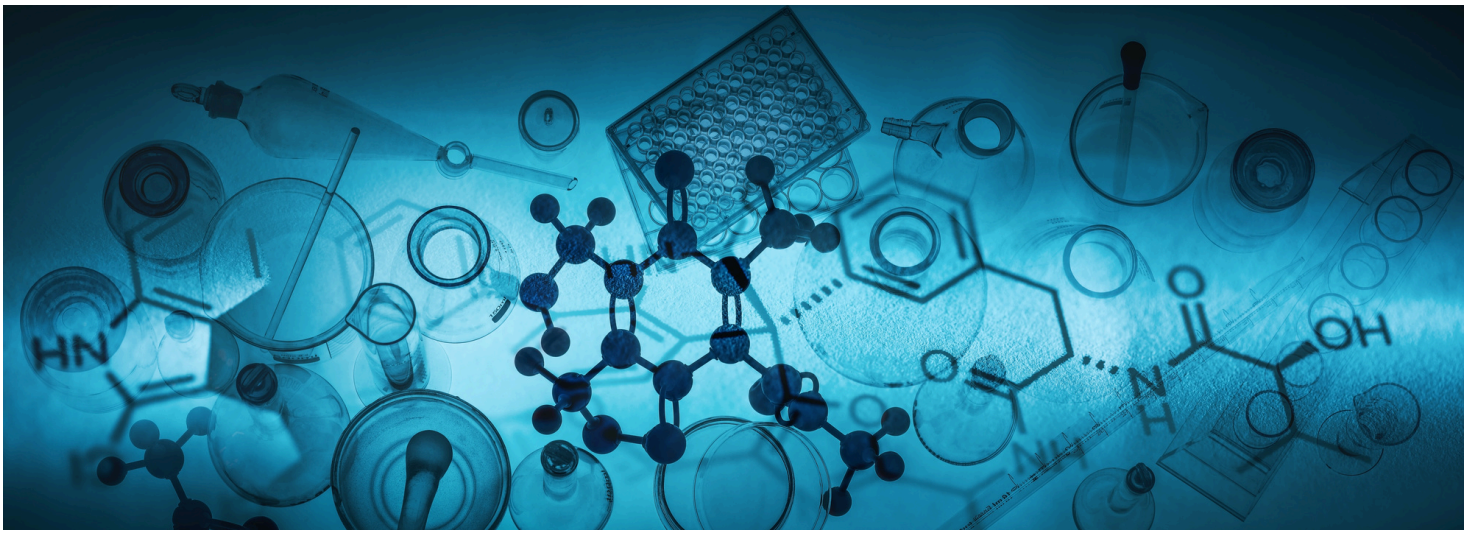
THE MONTHLY DOSE

Official Newsletter of The Mueller Health Foundation



WHAT'S NEW AT THE MUELLER HEALTH FOUNDATION:

We are excited to share an update from the field from our tiniest collaborator, Tamasha the HeroRat, who is trained by APOPO to sniff out TB samples with remarkable accuracy. Over her 7-month career, Tamasha sniffed a total of 8,928 samples and helped identify 115 potential TB patients, who might otherwise have gone undiagnosed. She also took on a new challenge by switching from her usual automated system to the traditional manual line cage and did not miss a beat, maintaining her quick daily session time of just 10 minutes. We are incredibly thankful for Tamasha's dedication and the vital role she plays in accelerating TB detection.

Picture Credit: APOPO HeroRats

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 new HeroRat Tamasha, 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 Rahima's story:

Rahima, a 35-year-old mother of five, lives in a rented home in Kolfe Keranyo, Addis Ababa, where she balances the challenges of poverty, illness, and raising young children. Originally from Wolqite in Ethiopia's Gurage Zone, her life has been marked by perseverance, particularly after falling ill during her last pregnancy. Initially misdiagnosed with gastritis despite undergoing medical tests at a private hospital, Rahima's symptoms worsened until she was finally diagnosed with tuberculosis (TB) a year after giving birth. The diagnosis came as a shock, but starting TB treatment brought rapid improvement to her health. Concerned for her children's well-being, she took precautions at home, such as wearing a mask and ensuring her youngest received TB preventive therapy. Throughout her illness, Rahima continued working as a petty trader, though her ability to earn was limited by her condition and unpredictable weather. Her husband, having lost his shop when she fell sick, now does irregular labor jobs, and the family receives some help from a relative to cover school expenses. Despite the stigma surrounding TB and its common association with HIV, Rahima encourages others in Addis Ababa to get tested and complete treatment. Now healthy, Rahima's focus is on her children's future and sharing her story to inspire others to prioritize their health. To read her full story, please follow the link here: https://apopo.org/tb-detection-ethiopia-rahima/

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

The Mueller Health Foundation

MHF TOP PICKS FOR JULY

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 **July:**

1. New Study Confirms HeroRATs Boost TB Detection, Outperforming Even Advanced Diagnostics

Researchers evaluated the added value of African giant pouched rats, trained by APOPO, for tuberculosis detection in Tanzania by re-screening sputum samples that were initially negative by smear microscopy or Xpert at health facilities. Across 34,565 presumptive TB patients and 43,153 samples collected in 2023, the rats identified 2,176 additional TB-positive cases, representing a 48% increase over cases detected by routine diagnostics. The incremental yield was higher at smear-based sites (59%) compared to Xpert sites (44%), and the rats were 47% more likely to detect TB in samples with low bacillary loads that were missed by Xpert. The study also found that detection performance was consistent across children and adults, as well as across varying bacillary loads. Overall, trained rats provided a significant boost to TB case detection, particularly in settings relying on less sensitive diagnostic methods, thereby highlighting their role as a valuable second-line screening tool in resource-limited environments. To learn more, you can access the study at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0321866

2. Beetle-Inspired Credit Card-Sized TB Test Improves Detection in People with HIV

Tulane University researchers have developed a handheld, electricity-free tuberculosis diagnostic device, inspired by the chemical defense mechanism of the bombardier beetle. Known as ASTRA (Antigen-Specific T-cell Response Assay), this credit-card-sized test uses a drop of blood and a beetle-inspired chemical propellant to deliver results in about four hours, versus the Interferon-Gamma Release Assay (IGRA)'s 24–48 hours, without need for electricity, lab facilities, or specialized staff. In clinical trials, ASTRA demonstrated 87% specificity in detecting TB among HIV-positive individuals, outperforming standard IGRA testing (60%), and identified novel T-cell biomarkers that remain effective even in immunocompromised patients. This rapid, portable assay holds promise for enhancing TB detection and treatment in high-burden, low-resource settings, particularly among populations most at risk. To learn more, you can read about the research here: https://www.nature.com/articles/s41551-025-01441-5

3. New Discovery Sheds Light on TB Drug Resistance to Bedaquiline

Researchers at the University of Alabama at Birmingham and the University of Zurich have identified the detailed structure of a key protein in M*ycobacterium tuberculosis* that contributes to resistance against the frontline drug bedaquiline. This protein, part of an "efflux pump" system, enables the bacteria to expel both the drug and iron-binding molecules essential for its survival. Using high-resolution cryo-electron microscopy, the team revealed the binding site shared by both bedaquiline and the iron-carrying molecules. This structural insight provides a clearer understanding of how TB bacteria evade treatment and opens the door to developing targeted inhibitors that could block the pump's function, potentially restoring the effectiveness of drugs and weakening the pathogen's ability to thrive. You can read the article here: https://www.nature.com/articles/s41467-025-56888-6

DID YOU KNOW?

The United States continues to grapple with a resurgence of tuberculosis. In 2024, the CDC reported 10,347 provisional TB cases, reflecting an 8% increase from the previous year and marking the highest case count since 2011, with an incidence rate of 3.0 per 100,000 persons. This uptick spans 34 states and D.C., with key drivers including increased international travel, post-pandemic migration, and the reactivation of latent infections due to weakened immunity. Of these cases, California leads the nation, accounting for approximately 22% of all U.S. TB cases, followed by Texas, New York, and Florida.

Florida has recently made the headlines after confirming a case at Dillard High School in Fort Lauderdale and another at a federal detention center in Miami, signaling growing concern among health officials. In Florida, TB cases climbed by 9%, totaling 681 reported cases (2.9 per 100,000) in 2024. The highest concentration was observed in Miami-Dade and Broward counties, with the majority of cases occurring among non–U.S.–born individuals, particularly those from Latin America and the Caribbean.

Meanwhile, Kansas is continuing to deal with one of the most significant TB outbreaks in recent memory. The Kansas Department of Health and Environment identified 67 active cases and approximately 79 latent infections in Wyandotte and Johnson counties in early 2025, a surge from 51 active cases the year prior.

These recent outbreaks underscore the importance of robust contact tracing, widespread testing, and adherence to CDC-recommended control measures. Furthermore, these stark developments highlight urgent needs: expanded latent TB screening among high-risk and immigrant populations, enhanced post-treatment monitoring, and strengthened community-based public health infrastructure. Without proactive strategies like targeted screening, treatment support, and education, the recent upward trend may undermine decades of progress in TB control.

Information Source:
CDC TB State Data: https://www.cdc.gov/tb-data/2024-provisional/

US TB Increase: https://apnews.com/article/tuberculosis-tb-infection-cdc-d1165566b838bd8a838975e4e5e13b79

Kansas Outbreak: https://www.theguardian.com/us-news/2025/jan/28/kansas-tuberculosis-outbreak