ANNUAL REPORT

2025

The Mueller Health Foundation

“Our hope is to live in a world where every person has access to effective treatment options for infectious diseases and more and more infectious diseases ultimately become eradicated.”

The Mueller Health Foundation Vision

A LETTER FROM THE PRESIDENT

Dear Members of the TB Community,

As we look toward 2026, I find myself both encouraged by the progress our community continues to drive and sobered by the realities that confront us. On behalf of The Mueller Health Foundation, I extend our heartfelt gratitude to all our partners, collaborators, and champions for TB elimination. Your commitment in the face of a constantly evolving landscape remains a source of inspiration.

TB once again stands as the leading infectious disease killer globally, taking more than a million lives each year. This stark reminder comes at a time when global health funding is under increasing pressure. Across continents, we have witnessed severe budget cuts that weaken health systems, disrupt essential TB services, and threaten hard-won gains. We know all too well that germs know no borders. When funding falters, preventable deaths rise, and communities, especially those already shouldering the greatest burdens, pay the highest price.

Nonetheless, even with these challenges, 2025 has shown that progress is possible. Scale-up of community-based models, expansion of rapid diagnostics, country-led screening initiatives, and national commitments to treatment access have demonstrated what can be achieved when vision is paired with political will. At the same time, the TB pipeline has never been more promising: shorter regimens, novel compounds, improved point-of-care technologies, and a growing portfolio of vaccine candidates offer a view of a future where diagnosis is faster, treatment is safer, and prevention is truly within reach.

But innovation alone is not enough. The path ahead demands that we bridge widening funding gaps through new models of collaboration, cross-sector partnerships, and creative investment mechanisms. Now more than ever, we must unite academia, governments, civil society, the private sector, philanthropy, and affected communities to sustain and accelerate progress. The cost of inaction, measured in lives lost, families fractured, and futures foregone, is too great.

In 2025, our shared work reinforced the importance of listening to those most affected by TB. Whether advancing drug-resistant community care models in India, developing a community care model for those affected by TB and diabetes, or developing culturally responsive TB education tools in New York City, we have seen that equitable, person-centered solutions are not only possible but essential.

In 2026, we must channel these lessons into even more vigorous advocacy and action. We must demand that TB stays at the forefront of global health priorities, that lifesaving tools reach every person who needs them, and that the structural determinants fueling this epidemic, such as poverty, marginalization, stigma, and interrupted access to care, are confronted head-on.

Thank you for your unwavering dedication to ending TB. Together, through shared purpose and steadfast partnership, we can ensure that 2026 will be remembered not for the barriers we faced, but for the progress we forged and the lives we helped protect.

With gratitude and solidarity,

Prof. Dr. Peter Mueller
Founder and President
The Mueller Health Foundation

MHF 2025 HIGHLIGHTS IN NUMBERS

From lab to community, MHF's 2025 investments spanned across the TB field, including advancing basic science, novel drug development, technology, research infrastructure, and life-saving programs worldwide.

Even amid significant global funding cuts in 2025, the Mueller Health Foundation continues to stand firmly behind tuberculosis drug research and development by investing in innovation, sustaining scientific momentum, and reinforcing our shared belief that progress toward ending TB must not slow when it is needed most.

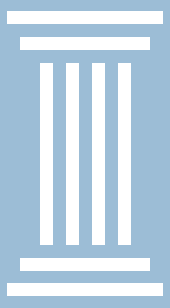
MHF Investments Made

$714,307 USD
Distributed in New Grant Funds in 2025

$4,828,060 USD
Distributed in Grant Funds since 2015

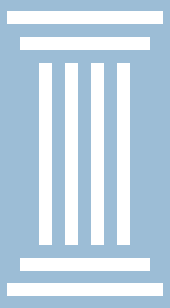
Grant Funds Spent by Strategic Pillar in 2025

$456,355 USD



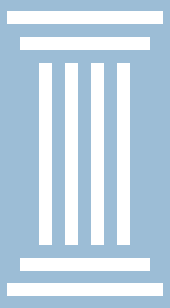
I. Clinical Research and Science

$5,000 USD



II. Data and Technology

$252,952 USD



III. Education and Community-Based Care

Creating Awareness and Telling Stories

We at The Mueller Health Foundation strongly believe in giving a voice to those affected by tuberculosis. Throughout 2025, thanks to a great repository of stories collected by the Centers for Disease Control (CDC) and APOPO HeroRats, we have made great efforts to amplify patient voices by including these stories in our monthly newsletter as well as posting weekly videos and inspirational lessons learned on our social media channels from those directly affected by TB.

In 2025, we have shared **64** unique stories of TB patients and survivors through weekly social media posts and in our monthly newsletter.

Picture Credit: CDC TB Personal Stories, APOPO HeroRats

Fun Fact: In 2025, our best-performing social media posts, with the highest engagement rates among our online community, have been patient story posts!

Our Hero Rats

For the past four years, the Mueller Health Foundation has proudly supported the HeroRats trained by the APOPO non-profit organization, whose innovative work plays a vital role in tuberculosis detection in high-burden settings. Carolina was a valued member of this program from the beginning, contributing to TB detection efforts in Tanzania alongside teams also operating in Mozambique and Ethiopia.

Since late 2024, Carolina has been enjoying a well-earned retirement at APOPO's Morogoro facility in Tanzania and she celebrated her 9th birthday in October 2025. We are pleased to continue supporting APOPO's life-saving work through our HeroRat Tamasha, who has stepped into Carolina's role and, together with the next generation of HeroRats, is carrying this important mission forward.

RETIRED

NAME: CAROLINA

GENDER: FEMALE

SCIENTIFIC NAME: CRICETOMYS ANSROGEI

DATE OF BIRTH: SEPTEMBER 5, 2016

OCCUPATION: TUBERCULOSIS DETECTION RAT

LOCATION: TANZANIA

FAVORITE FOOD: PEANUTS

FAVORITE PASTIME: GROOMING

MEASUREMENT: 64 CM

WEIGHT: 4.9 POUNDS

PERSONALITY: CUTE AND HARDWORKING

Carolina's Impact Over Her 6.8 Year Career

3,126
New TB-positive cases Carolina identified that had initially been missed by health clinics

208,235
Total samples screened by Carolina

86.3%
The overall detection accuracy rate Carolina achieved over her career.

Carolina's 9th Birthday Party

Picture and Impact Credit: APOPO HeroRats

Our Hero Rat: Tamasha

Last year, we were thrilled to welcome Tamasha to our team. Tamasha is an inspiring HeroRat with an exceptional dedication to her work. She proudly stepped into the role of our adopted HeroRat, succeeding her remarkable colleague, Carolina. Just as skilled in detecting tuberculosis, Tamasha is a wonder to watch as she moves effortlessly from plate to plate, diligently searching for signs of TB in the samples.

Every morning, this little expert starts her day with enthusiasm. In a focused 20-minute session, Tamasha uses her incredible sense of smell to examine 100 heat-inactivated sputum samples for TB. When she detects TB, she signals her find by holding her nose over the hole above the sputum sample plate for three seconds, earning herself a well-deserved treat.

Together with her HeroRat colleagues, Tamasha is making a meaningful impact on TB diagnosis, ensuring that patients receive accurate and timely results. Take a look at the details of her incredible work below!

ACTIVE

NAME: TAMASHA

GENDER: FEMALE

SCIENTIFIC NAME: CRICETOMYS ANSROGEI

DATE OF BIRTH: DECEMBER 19, 2022

OCCUPATION: TUBERCULOSIS DETECTION RAT

LOCATION: TANZANIA

FAVORITE FOOD: AVOCADO, PEANUTS

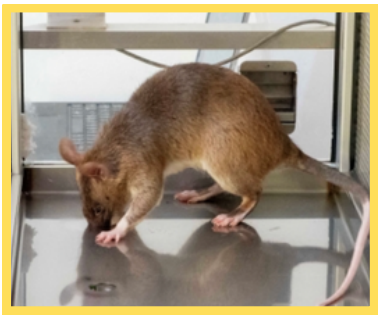
FAVORITE PASTIME: JUMPING, CLIMBING

MEASUREMENT: 60.2 CM

WEIGHT: 4.8 POUNDS

PERSONALITY: PLAYFUL AND ENTHUSIASTIC

Tamasha and her trainer Priscus



Tamasha sniffing TB samples

Tamasha's Impact in 2025

292
Additional TB cases found since she started her career in November 2024

~7 minutes
to evaluate each sample

82.29%
Accuracy rate for detecting TB samples

~ 1,186
tuberculosis sample evaluated per month

Picture and Impact Credit: APOPO HeroRats

Hero Rat: Success Story

In Morogoro, Tanzania, eight-year-old twins Zainab and Omary began experiencing persistent coughing and nighttime fevers, the early warning signs of tuberculosis. Although their initial clinic tests were negative, health workers took an extra step and sent their samples to APOPO for reconfirmation. There, APOPO's trained HeroRATs flagged both samples for TB, a finding later confirmed by laboratory testing. Because of this rapid second screening, the twins were able to begin treatment without delay.

Zainab and Omary completed a six-month course of daily medication, supported by regular follow-ups from health staff. Their grandmother, Salma, watched as their health steadily improved, and post-treatment evaluations confirmed that both children had fully recovered.

Today, Zainab and Omary are healthy, back in school, and thriving. Salma now shares their story widely, encouraging families to seek early testing and to advocate for follow-up screening when symptoms persist, turning one family's experience into a powerful message of hope and early action.

Picture and Impact Credit: APOPO HeroRats

Community Building: Social Media

At MHF, we are always eager to showcase our work and the work of our grantees and partners across a variety of different outlets. We have worked hard this year to expand our followers and to create an engaged online community across the globe to help us increase awareness for TB and infectious diseases.

FOLLOWERS

>1,200 is the number of new followers that we have gained in 2025 across our social media channels.

Across our four platforms, this expands our total number of followers to more than **>3,800**

NEWS AND TOPICS

NEWS

Throughout the year, we provided our followers with a summary of all the latest TB news in our monthly newsletter **The Monthly Dose**.

Knowledge Sharing Across Six Different Topic Areas

- Monthly TB Statistics
- Bi-Monthly Fun Fact About Tuberculosis
- Monthly Update on Our TB-Sniffing Rat Carolina
- Weekly Patient Stories
- Scientific Publication of the Month
- Bi-Monthly Inspirational Quotes for Patients

POSTS

503 Unique posts were created by MHF throughout 2025 across our social media accounts.

>25,000 is the number of impressions on social media that were made by our MHF post throughout 2025.

On average, our posts on social media throughout the year have a **35.7% higher engagement rate** than the current non-profit industry average. MHF is ranked consistently in the top performing organizations on social media based on posting frequency, follower engagement, and increase in followers. (2)

(2) Analysis and ranking is based on Hootsuite's Social Score and Annual Analytics Report for 2025

Community Building: Educational Materials

At The Mueller Health Foundation, our mission is deeply rooted in creating and supporting communities, especially among vulnerable populations. We are proud to continue to work alongside the TB-Free NYC Coalition, fostering partnerships, collaboration, and the development of impactful resources to raise awareness about tuberculosis in New York City. Through this collaboration, we aim to ensure that resources and initiatives are inclusive, empowering, and accessible to those who need them most.

OVERVIEW

COALITION FOR A TB-FREE NEW YORK

In 2025, our Executive Director continued to proudly serve as the co-lead for the TB-Free NYC Coalition Education Group, a dynamic team of 20+ members representing diverse sectors, including physicians, public health professionals, TB survivors, and community organizations. Over the past year, this collaborative group met every two weeks and worked tirelessly to develop educational materials tailored specifically for persons affected by tuberculosis.

The goal was clear: to create materials that are simple, visually engaging, and grounded in messages of hope, dignity, and reassurance for individuals navigating a new TB diagnosis. The result of this collective effort is a comprehensive and patient-centered booklet, *"Managing Your Tuberculosis (TB) Care: What to Expect During and After Your Treatment"*, designed to guide patients through every stage of their treatment journey.

This booklet exemplifies the power of collaboration and person-centered design. By combining clinical accuracy with compassion and practical tools, the TB-Free NYC Coalition Education Group has created a resource that not only informs but reassures and empowers. Together, we are building a stronger, more informed community in the fight against tuberculosis in New York City.

A summary of the booklet is provided on the next page.

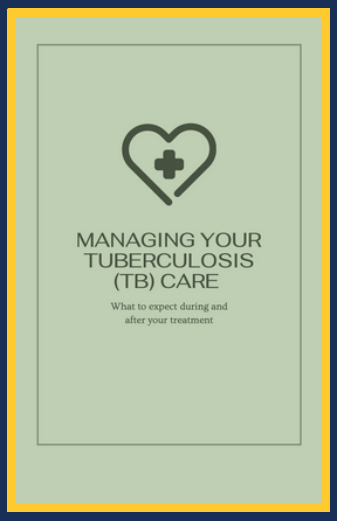
The TB Patient Booklet: An Overview

The booklet opens by emphasizing three foundational messages: that TB is a medical condition and not a personal failing, that completing the full course of treatment is essential for cure, and that transmission risk rapidly decreases after treatment begins. These messages are aimed at helping to reduce stigma and fear from the outset. The booklet then provides practical guidance on managing isolation at home and away, offering clear, compassionate instructions on how to protect loved ones while maintaining social connections and emotional well-being.

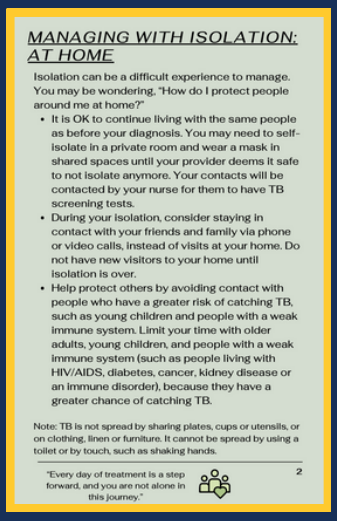
Recognizing the emotional toll of isolation, the booklet includes a dedicated chapter on coping strategies, encouraging patients to seek social support, counseling, and peer groups to reduce loneliness and stigma. A major section is devoted to managing side effects of TB treatment, with detailed, easy-to-follow tips for addressing nausea, dizziness, neuropathy, brain fog, depression, and anxiety with the aim of empowering patients to recognize symptoms early and communicate effectively with their care team.

The booklet also provides guidance on nutrition during treatment, highlighting key nutrients to support immune recovery, and outlines what to avoid to promote healing. Practical chapters help patients stay on their medication routine, explain Directly Observed Therapy (DOT), and offer tools for sharing concerns with providers through shared decision-making and clear communication.

Finally, the booklet includes special sections addressing TB among children and older adults, recognizing the unique clinical, social, and caregiving needs of these populations and reinforcing the importance of coordinated care with families, schools, and public health departments.


MANAGING YOUR TUBERCULOSIS (TB) CARE

What to expect during and after your treatment


MANAGING WITH ISOLATION: AT HOME

Isolation can be a difficult experience to manage. You may be wondering, "How do I protect people around me at home?"

- It is OK to continue living with the same people as before your diagnosis. You may need to self-isolate in a private room and wear a mask in shared spaces until your provider deems it safe to not isolate anymore. Your contacts will be contacted by your nurse for them to have TB screening tests.
- During your isolation, consider staying in contact with your friends and family via phone or video calls, instead of visits at your home. Do not have new visitors to your home until isolation is over.
- Help protect others by avoiding contact with people who have a greater risk of catching TB, such as young children and people with a weak immune system. Limit your time with older adults, young children, and people with a weak immune system (such as people living with HIV/AIDS, diabetes, cancer, kidney disease or an immune disorder), because they have a greater chance of catching TB.

Note: TB is not spread by sharing plates, cups or utensils, or on clothing, linen or furniture. It cannot be spread by using a toilet or by touch, such as shaking hands.

"Every day of treatment is a step forward, and you are not alone in this journey." 2


MANAGING SIDE EFFECTS OF TB TREATMENT

To help with:

- Heartburn - elevate your head at night with pillows, avoid eating spicy foods, coffee and chocolate
- Peripheral Neuropathy - if you are taking Isoniazid, ensure you are taking vitamin B6 as a supplement, You can also wear compression stockings.
- Brain Fog - improve sleep habits to get enough rest, eat healthy and nutritious meals, and when possible, try to exercise for 30 minutes each day. Reduce screen time and opt for printed media to help with eyestrain. Simple puzzle books may help with focus.
- Depression and Anxiety - seek help through therapy and social support and try to exercise for 30 minutes each day to allow the release of endorphins and muscle tension. Practice mindfulness and meditation techniques, such as the 4-7-8 Breathing Technique.

4-7-8 Breathing Technique

1. Inhale through your nose for four counts.
2. Hold your breath for seven counts.
3. Exhale through your mouth for eight counts.

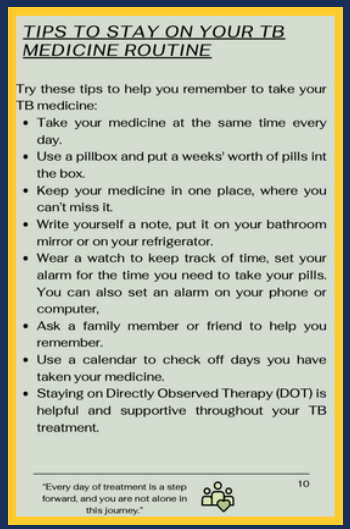
"Every day of treatment is a step forward, and you are not alone in this journey." 6


WHAT TO AVOID DURING TB TREATMENT

Speak to your provider to understand what lifestyle changes may be helpful during your treatment process. Make sure you consult your provider before stopping any other medications that you may be taking. Generally, patients are recommended to:

Stop smoking tobacco (including e-cigarettes and vaping)
Avoid drinking alcohol
Avoid eating processed foods
Avoid eating fried foods
Avoid high-sugar foods and drinks
Avoid eating foods with excess salt

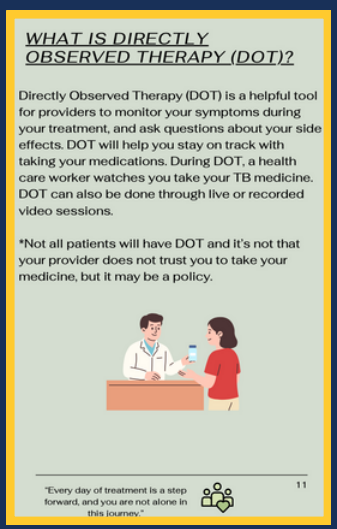
"Every day of treatment is a step forward, and you are not alone in this journey." 8


TIPS TO STAY ON YOUR TB MEDICINE ROUTINE

Try these tips to help you remember to take your TB medicine:

- Take your medicine at the same time every day.
- Use a pillbox and put a weeks' worth of pills int the box.
- Keep your medicine in one place, where you can't miss it.
- Write yourself a note, put it on your bathroom mirror or on your refrigerator.
- Wear a watch to keep track of time, set your alarm for the time you need to take your pills. You can also set an alarm on your phone or computer,
- Ask a family member or friend to help you remember.
- Use a calendar to check off days you have taken your medicine.
- Staying on Directly Observed Therapy (DOT) is helpful and supportive throughout your TB treatment.

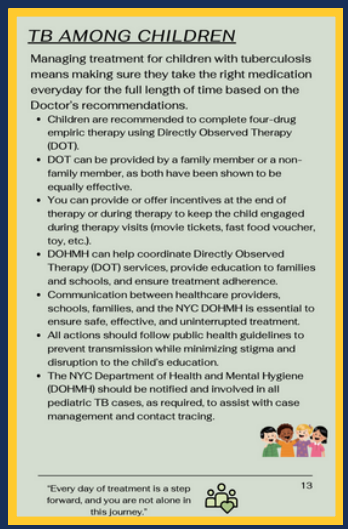
"Every day of treatment is a step forward, and you are not alone in this journey." 10


WHAT IS DIRECTLY OBSERVED THERAPY (DOT)?

Directly Observed Therapy (DOT) is a helpful tool for providers to monitor your symptoms during your treatment, and ask questions about your side effects. DOT will help you stay on track with taking your medications. During DOT, a health care worker watches you take your TB medicine. DOT can also be done through live or recorded video sessions.

*Not all patients will have DOT and it's not that your provider does not trust you to take your medicine, but it may be a policy.

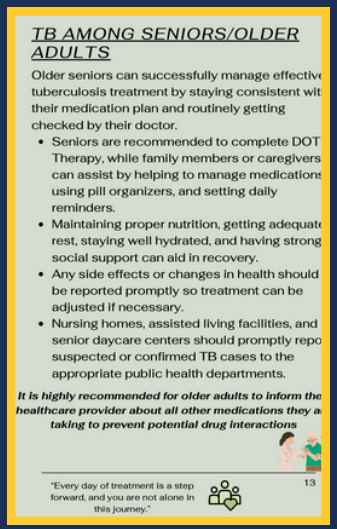
"Every day of treatment is a step forward, and you are not alone in this journey." 11


TB AMONG CHILDREN

Managing treatment for children with tuberculosis means making sure they take the right medication everyday for the full length of time based on the Doctor's recommendations.

- Children are recommended to complete four-drug empiric therapy using Directly Observed Therapy (DOT).
- DOT can be provided by a family member or a non-family member, as both have been shown to be equally effective.
- You can provide or offer incentives at the end of therapy or during therapy to keep the child engaged during therapy visits (movie tickets, fast food voucher, toy, etc.).
- DOHMH can help coordinate Directly Observed Therapy (DOT) services, provide education to families and schools, and ensure treatment adherence.
- Communication between healthcare providers, schools, families, and the NYC DOHMH is essential to ensure safe, effective, and uninterrupted treatment.
- All actions should follow public health guidelines to prevent transmission while minimizing stigma and disruption to the child's education.
- The NYC Department of Health and Mental Hygiene (DOHMH) should be notified and involved in all pediatric TB cases, as required, to assist with case management and contact tracing.

"Every day of treatment is a step forward, and you are not alone in this journey." 13


TB AMONG SENIORS/OLDER ADULTS

Older seniors can successfully manage effectiv tuberculosis treatment by staying consistent wit their medication plan and routinely getting checked by their doctor.

- Seniors are recommended to complete DOT Therapy, while family members or caregivers can assist by helping to manage medications using pill organizers, and setting daily reminders.
- Maintaining proper nutrition, getting adequat rest, staying well hydrated, and having strong social support can aid in recovery.
- Any side effects or changes in health should be reported promptly so treatment can be adjusted if necessary.
- Nursing homes, assisted living facilities, and senior daycare centers should promptly repo suspected or confirmed TB cases to the appropriate public health departments.

It is highly recommended for older adults to inform the healthcare provider about all other medications they a taking to prevent potential drug interactions

"Every day of treatment is a step forward, and you are not alone in this journey." 13

TBConnect Blockchain Application

The Mueller Health Foundation is proud of its Ethereum blockchain application TBConnect, which aims to create a global network of key stakeholders in the field of tuberculosis to allow for improved information exchange and collaboration. TBConnect is designed from the ground up to foster an open environment where ideas can flow freely between all stakeholders. This is achieved by onboarding all parties on a unified platform, including but not limited to scientists and researchers, practitioners and healthcare workers, non-profits and government bodies, lateral partners and organizations, and the wider public. The portal empowers all parties with an open platform where they can freely voice their opinions, network with a diverse group of stakeholders, and disseminate their ideas and share information far and wide.

Key Updates

Together with our partners the MHF team continues to build out the body of knowledge on the TBConnect Blockchain Application. TBConnect currently hosts more than 240 documents.

Compared to 2024, the team at MHF has increased the number of documents housed in the TBConnect Blockchain Application by more than 40%.

The TBConnect Application hosts documents across the following categories:

In addition to expanding its document library, TBConnect continues to grow as a global knowledge hub for the TB community. In 2025, the platform engaged stakeholders across multiple countries, including researchers, clinicians, and program implementers. By centralizing trusted TB resources on a secure, open-access platform, TBConnect is helping reduce information silos and accelerate collaboration across the global TB response.

HIGHLIGHTS FROM OUR GRANTEES

REACH

The Mueller Health Foundation continues its partnership with the Resource Group for Education and Advocacy for Community Health (REACH) on the creation and implementation of two major projects focused on providing a community care model for people with drug-resistant tuberculosis (DRTB), as well as a CARE Connect community care model that focuses on TB patients with diabetes. India currently has the highest number of people with TB and DRTB in the world, comprising almost a quarter of the total global burden. We at the Mueller Health Foundation believe in a bottom-up approach that incorporates community needs at its core. When effectively implemented, community-based care has been shown to improve adherence and treatment success rates, reduce loss to follow-up, and minimize delays. Community care models and a more holistic and person-centered approach can also help to address limitations of facility-based interventions, such as limited mobility of patients and high costs associated with attending regular visits. Community care models also have broader applicability, not only in India but in the rest of the world, and MHF has been in active dialogue with public health agencies across the United States to share findings and lessons learned from this project.

REACH - Overview of Key Projects

DRTB Community Care Model

The key objective of the two-year project was to provide comprehensive, equitable, stigma-free, quality care, treatment, and support services for DRTB patients through integrated approaches that combine government, private sector, and community engagement. The specific objectives of the project were:

- **To design and demonstrate a community care model for people with DRTB in Tamil Nadu, India by adopting an evidence-based participatory approach.**
- **To develop a package of person-centered services that can improve the physical, mental, social, and economic well-being of people with DR TB.**

The project has been extended beyond the initial two-year implementation and will be expanded to address the needs of DRTB patients post-treatment completion to facilitate reintegration into the workforce and daily life.

CARE Connect Community Care Model for TB Patients with Diabetes

The CARE Connect project aims to redefine the co-management of TB and diabetes over a four-year period in the Chennai metropolitan area, with the goal of improving TB treatment outcomes and delivering comprehensive integrated healthcare solutions. The specific objectives of the CARE Connect project are:

- **To develop the CARE Connect model by comprehensively assessing the clinical, social, economic, and psychosocial determinants impacting individuals with TB and diabetes. (Phase-1 launched in July 2024).**
- **To implement the CARE Connect model aimed at addressing the clinical management of TB and diabetes and improving TB treatment outcomes and diabetes treatment adherence. (Phase-2 - launched in June 2025).**
- **To integrate socio-behavioral dimensions within the CARE Connect model and enhance interventions for people with TB and diabetes (Phase-3).**
- **To facilitate knowledge transfer of best practices from the CARE Connect model by establishing knowledge satellites in select districts and states in the country (Phase-3).**

REACH - DRTB Community Care Model

The Mueller Health Foundation, in partnership with REACH, is dedicated to placing the needs of patients at the heart of its efforts. Through the DRTB Community Care model, MHF emphasizes a comprehensive, patient-centered approach, delivering holistic services that support both patients and their families. As one of the few global funders consistently implementing such programs, MHF demonstrates an unwavering commitment to a person-first philosophy, ensuring compassionate and effective care.

Patient-Centered Care Support Services

A person-centric approach is considered to be the key to delivering high-quality healthcare. TB programs are now increasingly adopting newer strategies by engaging with the local communities to strengthen person-centric approaches. Care and support services need to be individualized for each person with TB in health care settings, prioritizing needs according to their socio-economic status. While diagnosis and treatment are vital factors for a person with DRTB, assessing the individual, family, and social environment becomes critical to ensure a continuum of care during the treatment period. Integrated care and support can improve patient experience and treatment outcomes, ensuring better outcomes and reducing spread in the community. REACH provides comprehensive care services through the following approaches:

REACH - DRTB Community Care Model Highlights in Numbers

From July 2024 through 2025, the DRTB Community Care Model in Tamil Nadu continued to demonstrate strong results and sustained impact. The program will continue through 2028, and we are excited to build on this momentum by exploring the expansion of the existing model to include post-DR-TB treatment support by extending care beyond cure and strengthening long-term recovery.

KEY HIGHLIGHTS

1,855
people with TB supported, out of which 939 were bacteriologically positive

586
Line Probe Assays conducted (61% coverage)

962
microbiological positive

SERVICES PROVIDED

NUMBER OF SERVICES PROVIDED BETWEEN Q3 OF 2024 AND 2025

Counselling	101
Travel support	56
Monthly Nutritional Kit	23
Food Support During Admission	53
Health Care Kit	77

TREATMENT OUTCOMES OF FIRST COHORT

TREATMENT STATUS OF PWDR TB (N=119)

Outcome	INH resistant TB	MDR/RR TB	Total
Treatment completed	67	34	**101 (85)**
Died	4	5	**9 (8)**
Lost to follow up	0	2	**2 (1)**
Treatment Failure	0	4	**4 (3)**
On treatment	0	3	**3 (3)**
Total	**71**	**48**	**119**

SUPPORT GROUPS

Support group meetings provided a platform for patients with DRTB and their families. The sessions included education on DRTB, sharing personal experiences, clarifying treatment-related doubts, addressing concerns about adverse drug reactions, sharing coping mechanisms, and offering emotional support and motivation.

More than 12 Support Group meetings were held

REACH - DRTB Community Care Model Success Story

We are proud to share an inspiring success story from the DRTB Community Care Model project: Sandeep, a 19-year-old DRTB survivor from Tamil Nadu, is now entering his final month of treatment.

SUCCESS STORY

"When I was in my second year of engineering, I started feeling sick, with a persistent cough, fever, and stomach pain. Eventually, I was diagnosed with drug-resistant TB in my abdomen. At first, I thought, "A few medicines and I'll be fine." But the treatment journey was anything but easy.

With help from the DRTB Coordinator at REACH, I got admitted to Tambaram Hospital and started the free treatment. The side effects were hard, skin darkening, nausea, mood swings, and the comments about my appearance really got to me. The doctors and coordinator kept reminding me, "Health is more important than looks."

The nutrition kits and regular check-ins helped my family and kept me on track. Over time, I started taking my health more seriously and even encouraged friends to do the same: "We only value our health when we lose it."

Now, after almost 17 months, I'm close to finishing treatment. My skin is returning to normal, and I'm hopeful about the future. Looking back, I know I couldn't have done this alone. I believe everyone with DRTB deserves this level of care - counselling, support, nutrition, and someone to call when things get tough."

VOICES FROM THE FIELD

"At first, I was hesitant and unsure about seeking treatment through the government system. But the unwavering reassurance of the DRTB coordinators helped me take that step. Even after admission, I felt anxious and afraid, yet their continuous phone calls and visits strengthened me and helped me feel supported. I could never have done this on my own. Thank you, from the bottom of my heart, for prioritising my wellbeing and standing by me."

Person with DRTB

"When I first met him, he was bedridden, aged, and receiving private treatment from a chest physician. Through the MHF initiative, we were able to support him with counselling, adherence guidance, and nutritional aid. A few months later, when I visited his home, I was delighted to see him walking around independently, without needing anyone's help. His recovery was so remarkable that even the private doctor was truly surprised by the transformation."

DRTB Coordinator

REACH - CARE Connect Community Care Model

The CARE Connect Project, a four-year collaboration between MHF and REACH, aims to revolutionize TB and diabetes co-management using the Triple-A approach: Access to early diagnosis, access to quality treatment, and access to health education. Launched in July 2024, Phase 1 focused on developing the CARE Connect model through a comprehensive assessment of the clinical, social, economic, and psychosocial factors impacting individuals with TB and diabetes. The first phase has now been successfully completed and included a landscape review of community-based care models and a 360-degree analysis to identify gaps and challenges, laying the foundation for impactful, patient-centered healthcare interventions.

KEY ACTIVITIES - PHASE 1

KEY ACCOMPLISHMENTS FOR PHASE 1:

1. Rapid Assessment of Tuberculosis and Diabetes Landscape in India
There has not been a systematic assessment of community care models for people with tuberculosis and diabetes, in public and private settings in India. The objective of this rapid assessment was two-fold:

- ✓ To identify, map, and consolidate existing approaches to tuberculosis and diabetes in India.
- ✓ To understand and document the experience of tuberculosis and diabetes care services in India.

2.Comprehensive 360-degree Assessment
A detailed protocol has been developed for this assessment in order to comprehensively understand the interplay between these disease conditions and optimize their management. Through a multidimensional approach, the assessment determined various facets including clinical, economic, behavioral, and psychosocial factors affecting tuberculosis and diabetes groups. Utilizing qualitative and quantitative methodologies, data has been collected from a range of stakeholders to capture a holistic view of the challenges faced by people with both diseases.

3. Constitution of Technical Advisory Group
A Technical Advisory Group (TAG) of experts has been created to obtain insights, guidance, and expert opinions at every phase of the project roll-out. The TAG includes TB Experts, Diabetologists, People with TB and Diabetes, and Public Health Specialists. This group reviews the findings of the assessment conducted among people with TB and diabetes and private practitioners. Discussions are held quarterly to identify potential solutions to be included in the CARE Connect Model. Based on previous experience, the TAG can play a key role in creating champions and advocates for TB-DM comprehensive care.

4. Development of Standard Operating Procedures (SOP)
An SOP (Standard Operating Procedure) has been developed in accordance with the findings from the assessment. This helps to ensure standardized guidelines for the diagnosis, treatment, and management of people with TB and diabetes. The SOP provides detailed information on interventions including support for drug adherence, regular glucose monitoring, reminders for follow-up consultations, counseling on proper nutrition, regular exercise, tracking lifestyle modifications, and counseling on substance use.

5. Development of Module on Caregivers Training
The findings from the assessment were used to help in the development of a caregiver's module. This module focuses on how caregivers can support and guide a person with tuberculosis and diabetes to adhere to the treatment regimens. This training covers a range of topics, including signs and symptoms of diabetes and other risk factors such as hypertension, malnutrition, and substance use. The training also emphasizes the importance of patient support, promoting adherence to medication, dietary/ lifestyle changes, and addressing the psychosocial needs of people with diabetes and tuberculosis.

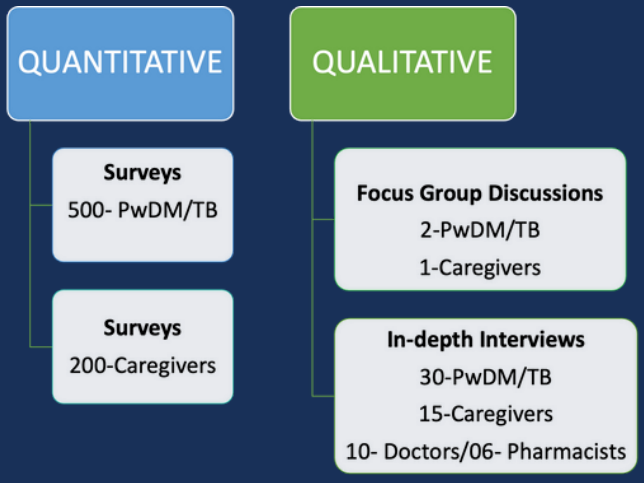
REACH - CARE Connect Community Care Model Needs Assessment Mixed Methods Study

As part of 360-degree assessement for the CARE Connect Project, a mixed-methods study is used to delve into the lived experiences of people managing both TB and diabetes, uncovering the barriers and challenges they face. By exploring the critical role of caregivers and understanding the unique needs of those affected, this study aims to inform person-centric interventions that not only address these challenges but also improve the quality of life for patients and their families. Insights gained will shape innovative solutions to bridge gaps in care and provide holistic support.

The Key Objectives of the Mixed Methods Study

- Comprehensive Assessment of People with TB and Diabetes (DM)
- Understand the Lived Experiences of People with TB and DM
- Identify Barriers and Challenges in TB and DM
- Role of Caregivers in the Management of TB and DM
- Disease Management Practices in Health System

STUDY STRUCTURE



STUDY ELEMENTS

Questionnaires

- FGD Guide-Caregivers
- FGD Guide-PwDM/TB
- IDI Guide- Caregivers
- IDI Guide- PwDM/TB
- IDI Guide-Health Care Providers
- IDI Guide- Pharmacists
- Survey- PwDM/TB
- Survey- Caregivers

Consent Forms

- ❑ Participant Consent form-FGD-Caregivers
- ❑ Participant Consent form-FGD- PwDM/TB
- ❑ Participant Consent form-IDI-Caregivers
- ❑ Participant Consent form- IDI- PwDM/TB
- ❑ Participant Consent form-IDI- Health Care Providers
- ❑ Participant Consent form-IDI-Pharmacists
- ❑ Participant Consent form-Survey-PwDM/TB
- ❑ Participant Consent form-Survey-Caregivers

*PWDM/TB: PEOPLE WITH DIABETES AND TUBERCULOSIS

Key Findings of the Survey Component focused on Understanding the Lived Experience of PwTB and Diabetes

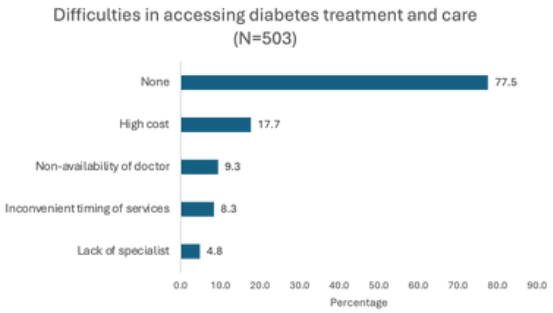
The following findings present initial results from the component of the survey focused on people with tuberculosis (PwTB) and TB–diabetes comorbidity, aimed at identifying key individual-level barriers and challenges that impede effective diabetes management. The analysis includes data from 503 adults aged 18 years and older diagnosed with both diabetes and TB, including individuals newly diagnosed, currently on treatment, or who have recently completed TB treatment. Data were collected using a structured questionnaire capturing socio-demographic characteristics, DM and TB clinical history, self-management practices, and health literacy.

Healthcare Access and Financial Barriers

The Cost Barrier: High treatment cost was the most frequent barrier to accessing care.

Gender Inequity: Women face greater financial hurdles, with 77.7% depending on others to pay for treatment (vs. 30.2% of men).

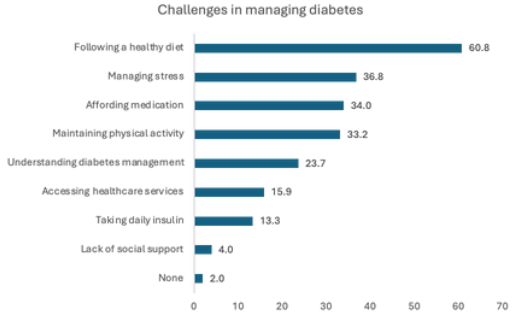
Women also significantly expressed more difficulty in accessing healthcare services (28% vs 19.5%) whereas adherence was similar.

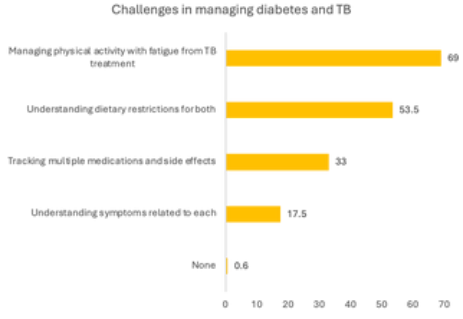


Challenges of Dual Disease Management

The Impact of Fatigue: While diet is the primary challenge for managing diabetes alone, fatigue from TB treatment becomes the predominant barrier when both conditions are present.

Physical Strain: TB-related tiredness and weakness make it difficult for patients to maintain dietary discipline, exercise, and daily diabetes routines.

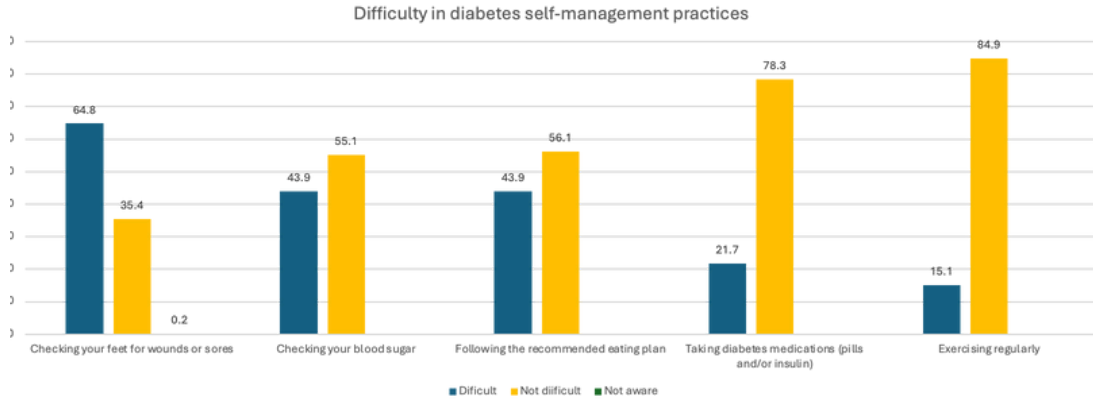




*PWDM/TB: PEOPLE WITH DIABETES AND TUBERCULOSIS

Continuation of Key Findings of the Survey Component focused on Understanding the Lived Experience of PwTB and Diabetes

Challenges in Diabetes Self-Management



Health Literacy and Counseling Gap

Comprehension Gap: While 90.5% received information on managing their conditions, **45% required help understanding** that information.

Uneven Awareness: Knowledge is high for medications (95.8%) and diet (94.8%) but **notably lower for preventive care** like eye checks (68.2%) and foot care (58.1%).

Counselling Inconsistencies: Healthcare providers focus heavily on diet (90.5%) and medication (88.7%) but frequently neglect **foot care**, with **37% of patients receiving no counselling** on this topic.

Patients often know what to do but lack the comprehension of how or why, leading to inconsistent self-care.

*PWDM/TB: PEOPLE WITH DIABETES AND TUBERCULOSIS

REACH - CARE Connect Community Care Model Indicator Target Review from June to December 2025

We are excited to share Phase 2 progress achieved during the first six months of implementation (June–December 2025), measured against 12-month targets across TB care, TB–diabetes integration, and community engagement. These mid-year results show strong momentum, with most indicators on track or exceeding expectations, particularly in TB diagnosis, treatment initiation, TB–DM screening, and linkage to diabetes care, highlighting effective implementation and sustained impact at the halfway point of the reporting period.

Indicator	12 Months Target	6 Month Activity June-December 2025	% Achieved
Referrals from all sources	5000	2720	**55%**
People diagnosed with TB	1500	1054	**70%**
No. of People with TB initiated on Treatment	1470	1054	**72%**
No. of PwTB eligible for DM/HT screening	1350	991	**74%**
No. of PwTB underwent DM screening	1215	907	**75%**
No. of PwTB diagnosed with DM	365	341	**94%**
No. of PwTB with DM linked to DM care	328	284	**87%**
Standard Patient Education	328	127	**39%**
Foot Care	328	184	**56%**
No. of PwTB with DM underwent follow-up test	328	106	**32%**
No. of Caregiver trainings	6	3	**50%**
No. of Participants in Care givertraining	180	91	**50%**
No. of Community Awareness Programs	120	63	**52%**
No. of Participants in community programs	3600	2147	**60%**
No. of Social media campaigns	1	2	**>100%**

*PWDM/TB: PEOPLE WITH DIABETES AND TUBERCULOSIS

REACH - CARE Connect Community Care Model Technical Advisory Group

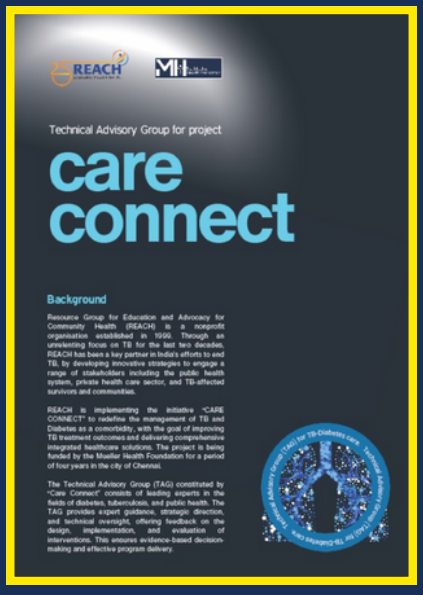
The CARE Connect Project is guided by a Technical Advisory Group (TAG) comprising 11 leading experts, including diabetes specialists, nutritionists, community representatives, and officials from the District TB Office and WHO. This diverse team provides invaluable insights to ensure the project's interventions are impactful, patient-centered, and address the needs of all stakeholders involved.

TAG GROUP MEMBERS

Technical Advisory Group Members

1. **Dr. J.Lavanya ,** District TB Officer, NTEP
2. **Dr. Hemanth Shewade ,** Scientist-E, National Institute of Epidemiology (NIE)
3. **Dr. Vinod Kumar,** Member of the NITI Aayog, Director of Health and Nutrition vertical.
4. **Dr. R.M. Anjana,** Managing Director, Dr.Mohan's Diabetes Speciality Centre
5. **Dr. M.K.Mohan,** Director, MK Nursing Home
6. **Dr. Suma.S,** WHO consultant, NTEP
7. **Dr.Usha Sriram,** Diabetologist, HOD, VHS
8. **Dr. Rama Subramanian,** Infectious Disease Specialist, Apollo Hospital
9. **Mr. Vimal Fernandez,** Community Representative
10. **Dr. Janani Sankar,** Paediatrician, KKTCH
11. **Prof.Dr. R.Sridhar,** Vice Chancellor, Chettinad Academy of Research & Education

TERMS OF REFERENCE



REACH - Community Screening and Outreach

In addition to the two projects, REACH, in partnership with the Mueller Health Foundation, also conducted community-based outreach, screening, and sensitization for TB, diabetes, and hypertension with the overarching goal to screen 15,000 people by March 2026. The screening efforts have been ongoing since mid-June 2025, and below is a snapshot of initial results for 2025.

COMMUNITY SCREENING

Initial Results of the Community Screening and Outreach Initiative (June - November 2025)

13,136
people screened in total

Diabetes

1	Total Number of People Screened	**13,136**
A	Total People with Diabetes	2,110 (16%)
1.1	Among (1): No. of People with High RBS Value	311 (2%)
1.2	Among (1.1): Reached Health Facility	199 (64%)
1.3	Among (1.2): Newly Diagnosed DM	54 (27%)
1.4	Among (1.3): Diabetes Treatment Initiated	50 (93%)
1.5	Among (1.3): Advised Lifestyle Modification	4 (7%)
1.6	Among (1): No. of People with Known Diabetes	2,056 (16%)
1.7	Among (1.6): Regular Treatment	1,923 (94%)
1.8	Among (1.6): People with RBS ≥ 200	1,068 (52%)
1.9	Among (1.8): Regular Treatment	1,006 (94%)

Hypertension

1	Total Number of People Screened	**13,136**
B	Total People with Hypertension	1,967 (15%)
2.1	Among (1): No. of People with High BP Recording	106 (1%)
2.2	Among (2.1): Reached Health Facility	100 (94%)
2.3	Among (2.2): Newly Diagnosed Hypertension	19 (19%)
2.4	Among (2.3): Hypertension Treatment Initiated	17 (89%)
2.5	Among (2.3): Advised Lifestyle Modification	2 (11%)
2.6	Among (1): No. of People with Known Hypertension	1,948 (15%)
2.7	Among (2.6): Regular Treatment	1,823 (94%)
2.8	Among (2.6): People with BP > 140/90	1,140 (59%)
2.9	Among (2.8): Regular Treatment	1,078 (95%)

REACH - Additional Activities

WORLD DIABETES DAY ACTIVITIES 2025

On World Diabetes Day 2025, REACH marked the occasion across India with a series of impactful activities aimed at raising awareness about diabetes and its critical connection to tuberculosis. The day featured information sessions and interactive learning activities at hospitals, public health centers, and partner NGOs, alongside patient counseling and community education initiatives.

Special outreach efforts engaged workers across multiple industries, including construction, shipping, and scrap metal, while community-based activities reached shelter homes, women's shelters, sanitation workers, auto drivers, and participants at Nakshatra Centers. Together, these activities underscored the importance of holistic health, early detection, and integrated care in the prevention and management of both diabetes and TB.

Campaign Banner

Food Plate Sticker

Nakshatra Center

Scrap Metal Workers

Women's Shelter

Sanitation Workers

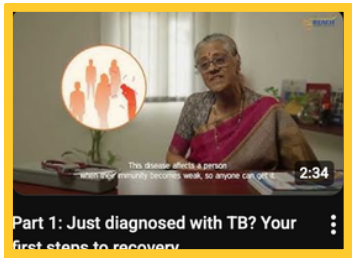
REACH - Additional Activities

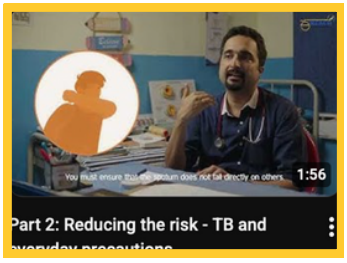
WORLD TB DAY 2025

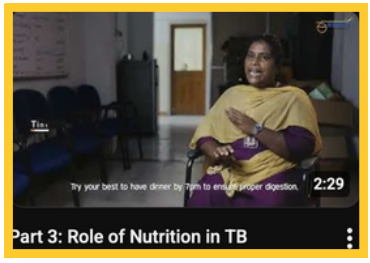
In Chennai, Hon. Health Minister Thiru. Ma. Subramaniam launched citywide awareness drives with the theme “Yes! We Can End TB: Commit, Invest, Deliver.” Activities included awareness sessions, screening camps for sanitary workers, distribution of wristbands, stickers, and pamphlets, along with community pledges to support those affected by TB.

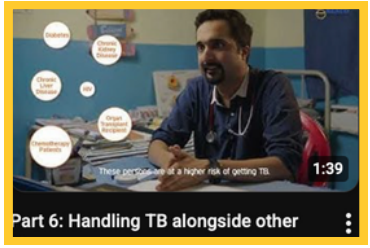
MINI-MOVIE SERIES

To better support individuals newly diagnosed with tuberculosis, MHF worked with REACH to develop a six-part mini-movie series to help patients understand and prepare for their TB treatment journey. The short films address common questions, concerns, and practical challenges faced during diagnosis and treatment, offering clear, compassionate guidance at a critical moment of care. The series is available publicly on YouTube and is also shared directly with newly diagnosed patients via WhatsApp as part of patients’ treatment counseling sessions. By combining accessible storytelling with digital delivery, this innovative approach ensures that patients receive timely, engaging, and culturally appropriate information to strengthen understanding, adherence, and confidence throughout their TB journey.









David Russell's Lab at Cornell University

The Russell Lab at Cornell University, in collaboration with The Mueller Health Foundation, has developed an innovative single-cell platform to examine how individual host immune cells shape the response of *Mycobacterium tuberculosis* (Mtb) to treatment during active infection. Using in vivo single-cell profiling, this multi-year project maps how distinct host cell environments influence the susceptibility of different bacterial subpopulations to current and emerging TB drugs.

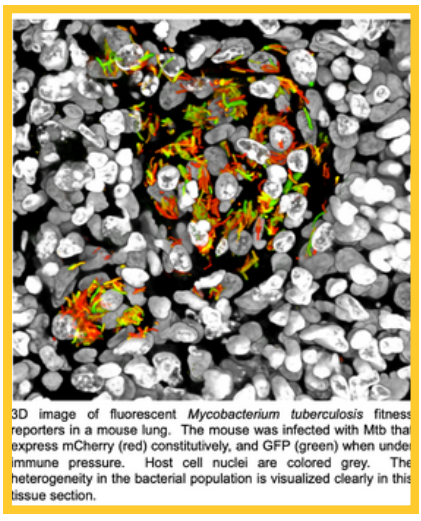
By creating a drug-response "road map" that links host immune cell states with drug-susceptible and drug-tolerant bacteria, and by integrating epigenetic reprogramming as a strategic focus, this work provides a high-resolution framework to inform the rational design of more effective, host-informed TB treatment regimens.

Key Advancements of the Project

As the world emerges from the COVID-19 pandemic, tuberculosis has once again reclaimed its position as the leading cause of death from a single infectious agent worldwide. Despite decades of biomedical advances, TB treatment remains long, complex, and fragile, requiring multiple antibiotics over eight to nine months, with treatment failure and relapse still distressingly common. Research led by Dr. David Russell and his laboratory is challenging the conventional paradigm of TB drug development by asking a fundamentally different question: What if improving TB treatment requires changing the host environment as much as targeting the bacterium itself?

The Overlooked Role of Drug Tolerance

Drug resistance in TB is often framed as a genetic problem within *Mycobacterium tuberculosis* (Mtb). However, Dr. Russell's work has focused on a less visible but equally powerful phenomenon: drug tolerance. Within an infected individual, only a subset of bacteria is fully susceptible to antibiotics at any given time. The host's immune response, while essential for controlling infection, can paradoxically stress Mtb in ways that reduce antibiotic effectiveness.



3D image of fluorescent *Mycobacterium tuberculosis* fitness reporters in a mouse lung. The mouse was infected with Mtb that express mCherry (red) constitutively, and GFP (green) when under immune pressure. Host cell nuclei are colored grey. The heterogeneity in the bacterial population is visualized clearly in this tissue section.

This insight led the lab to provocative questions:

1. Is it possible to maintain immune control of TB while preventing, or even reversing, the induction of drug tolerance?

2. More ambitiously, could the host immune environment be modulated to enhance the efficacy of existing TB drugs?

Building New Tools to See TB Differently

When this research program began, there were no established models for pursuing this approach, and many of the experimental tools required were still hypothetical. Over several years, Dr. Russell's lab systematically built the scientific foundation needed to address this challenge. The team developed fluorescent Mtb "fitness reporter" strains that provide real-time insight into how bacteria respond to immune pressure within living hosts. Using advanced imaging, single-cell RNA sequencing, and both mouse and human infection models, the lab demonstrated that immune control, particularly within distinct macrophage populations, can directly reduce antibiotic susceptibility. These findings reframed the macrophage not simply as a battlefield, but as a therapeutic lever.

David Russell's Lab at Cornell University

Key Advancements of the Project Continued

A Host-Centered Drug Discovery Platform

To translate these insights into actionable therapeutics, the lab developed an intracellular infection screening platform using macrophages, the primary host cell for Mtb. By engineering Mtb to express luciferase, the team created a live, real-time readout of bacterial fitness inside host cells, allowing compounds to be evaluated under conditions that closely mimic human infection. Using this platform, the lab screened a curated library of host-directed therapeutics (HDTs) enriched for FDA-approved drugs and compounds targeting cellular regulatory and epigenetic pathways. The goal was not to replace TB antibiotics, but to strengthen them by modifying host cell biology.

The results were striking. The primary screen identified dozens of biologically active compounds, with some enhancing bacterial control, and others inadvertently promoting growth, highlighting both the plasticity of macrophages and the importance of careful target selection. Promising candidates were prioritized based on potency, safety, clinical relevance, and compatibility with next-generation TB drugs such as bedaquiline.

Two Promising Breakthroughs

Among several compelling findings, two pathways emerged as particularly promising:

Polycomb Repressive Complex 2 (PRC2)

Multiple inhibitors targeting different subunits of PRC2 independently restricted intracellular Mtb replication. These compounds, many already under development for cancer treatment, act through transcriptional regulation by modifying histones. Gene-editing experiments confirmed on-target activity, producing the same restrictive phenotype as the drugs. Importantly, PRC2 inhibitors demonstrated efficacy in combination with TB drugs in both macrophage and mouse infection models.

Apabetalone (BET inhibition)

Apabetalone, a bromodomain inhibitor currently in clinical trials for inflammatory and metabolic diseases, also showed strong activity against intracellular Mtb. It synergized effectively with both first-line TB drugs (such as isoniazid) and newer agents (including bedaquiline), in both cell-based and animal models, making it an especially attractive candidate for translational development.

Why This Work Matters

This research represents a paradigm shift in TB therapeutics. By targeting host macrophage biology, rather than the bacterium alone, this approach aims to reduce the induction of drug tolerance and slow the emergence of drug resistance; two of the most persistent barriers to TB elimination.

While ambitious for a single laboratory, the data generated to date strongly support continued investment in host-directed combination therapy. Dr. Russell's work suggests that integrating host-active compounds with existing TB drugs could shorten treatment, improve outcomes, and future-proof TB care against resistance. This project has been instrumental in advancing this innovative and high-risk, high-reward research and is helping to push the boundaries of TB science toward solutions that are both scientifically transformative and globally impactful.

David Russell's Lab at Cornell University

A brief overview of key milestones that have been achieved from the first year to the fourth year of the project is provided below:

Summary of Milestones from Year 1 through Year 4

Year 1:

- **Completed scRNA-seq road maps assessing differential drug susceptibility for Mtb in the mouse lung for frontline drugs (INH, RIF, EMB, and PZA).**
- **Developed a pipeline for onboarding new compounds, focusing on host-active compounds that influence Mtb sensitivity to frontline drugs.**

Year 2:

- **Completed scRNA-seq road maps for newer frontline drugs (Linezolid, Pretomanid, and Bedaquiline). Developed an in vitro platform for functional profiling of compounds, enhancing drug combination design by assessing independent, antagonistic, and synergistic effects with the host environment.**
- **Conducted preliminary assessments of inhibitors of epigenetic modification for modulating macrophage behavior and bacterial survival. Established an in vitro screening platform to prioritize compounds before in vivo testing.**
- **Completed initial drug/drug assessment studies on host-active compounds from Year 1 in combination with anti-TB drugs.**

Year 3:

- **Designed and tested anti-TB drug regimens based on the scRNA-seq road map, optimizing bacterial population coverage and focusing on in vitro platforms for initial assessment.**
- **Developed and tested anti-TB and host-active drug combinations using an Optimized Informer Deck and macrophage screening platforms.**
- **Identified and preliminarily characterized bacterial sub-populations least susceptible to anti-TB drugs in vivo. Conducted pilot studies combining anti-TB drugs with epigenetic inhibitors.**
- **Defined combinatorial drug regimens for effective treatment of Mtb infection in vivo.**
- **Identified host environments and cells responsible for maintaining tolerant and persistent bacilli, improving understanding of macrophage populations' response to therapies.**

Year 4:

- **Established robust in vitro models for reduced drug susceptibility, now used to screen additional compound collections.**
- **Assessed the efficacy of combinatorial drug treatment involving different host-active compounds together with anti-TB drugs against intracellular Mtb using a panel of six drug-resistant clinical strains.**

Our Global Reach

We are very proud to see our grantees making a truly needed impact across four different continents including Africa, Asia, Europe, and North America.

Thank You

We would like to express our deepest gratitude to our supporters, grantees, partners, and collaborators, for their time, insight, wisdom and contributions. Our work would not be possible without the many individuals from academic institutions, scientific and medical experts, biotech- and high-tech companies, multilateral agencies, non-governmental organizations and global networks, who willingly gave their time, experience and contributions to make a difference in the fight against TB and infectious diseases!


The Mueller
Health Foundation