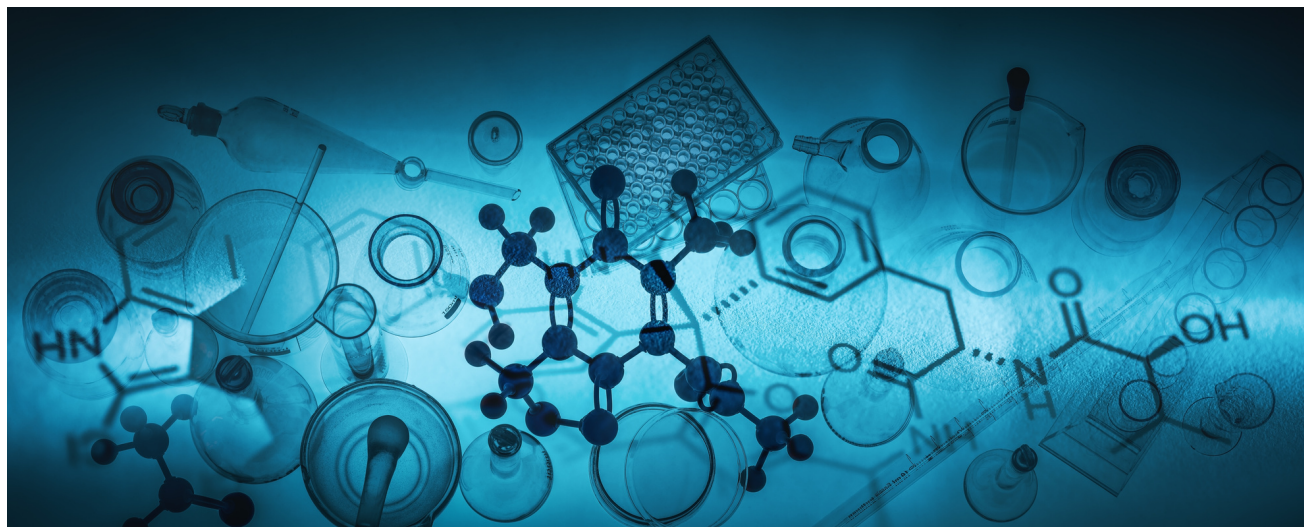


THE MONTHLY DOSE

Official Newsletter of The Mueller Health Foundation



WHAT'S NEW AT THE MUELLER HEALTH FOUNDATION:

We at The Mueller Health Foundation are very proud of the great work that our partners and collaborators do to help those affected by tuberculosis.

This month, we want to congratulate our newest partner, the Resource Group for Education and Advocacy for Community Health (REACH), who was honored by the Chief Minister M. K. Stalin of Tamil Nadu, India. During an official ceremony, Dr. Nalini Krishnan, founder-director of REACH, received a certificate commending REACH's community support for TB patients in the form of additional nutrition supplementation.

If you would like to learn more about the impactful work that REACH is doing in India, please follow the link below:

<https://reachindia.org.in>

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. The Center for Disease Control and Prevention (CDC) has put together a wonderful collection of stories and this month we would like to highlight Karen's story. Karen is an American woman who was diagnosed with TB shortly after giving birth. Here is her story:

Karen started to feel sick after giving birth to her fourth child. She had a fever, night sweats, and lost her appetite. Worst of all, it was very hard for her to breathe. She was sent for an x-ray screening of her lungs. Unfortunately, Karen was misdiagnosed with pneumonia and treated for about a week and a half in the hospital. Soon after she got home from the hospital, the fevers and night sweats returned. Karen was soon back in the hospital where she got another chest x-ray and was diagnosed with tuberculosis (TB) disease. However, not long after, her lung collapsed and she had to be intubated. While Karen started treatment for TB in the hospital, her newborn son was also diagnosed with active TB disease. Luckily both Karen and her newborn son received treatment and Karen really appreciated the support of directly observed therapy (DOT) during her TB disease treatment. Directly observed therapy is a way of helping patients take their medicine for TB and as part of this approach Karen met with a health care worker to take her TB medicine while the health care worker watched. Karen was inspired by the support she received from her health care worker and wanted to give back to her community. After completing her TB treatment she trained to become a DOT technician and was hired by her local public health department.

Now that Karen and her son have fully recovered, Karen wants to continue to inspire other patients with her story. She says: "I used to go out to the field and visit patients who couldn't make it to the health department to take their medicine every day. And I just kind of, I could relate to them. I kind of try to give them hope that it's, I mean it's curable, they can get better and I just like to share my story with them." To read Karen's full story please follow the link to the CDC website: <https://www.cdc.gov/tb/topic/basics/Karenstory.htm>

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 around the prevention and treatment of tuberculosis around the world.

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. Below are our top 3 picks for July:

1. Machine Learning Model Predicts Infection With Treatment-Resistant Tuberculosis

A critical class of antibiotics for the treatment of drug-resistant TB are fluoroquinolones, which form the backbone of most drug-resistant TB regimens. However, strains of TB have evolved to become resistant to fluoroquinolones, undermining the efficacy of treatment regimens that include that class of antibiotic. In this study, researchers have been working on models to predict the resistance to fluoroquinolones, which could speed up the process of delivering optimal care. Working with national TB data collected in the Republic of Moldova, the team assessed whether demographic and clinical factors could be utilized as predictors of TB resistance to fluoroquinolones. They found that information such as age, geographic location, and whether the TB illness was new or a relapse served as reliable predictors of resistance. From this, they then created a model via machine learning to estimate the probability that the patient is infected with a TB strain that is resistant to fluoroquinolone. The new model had a statistically higher net benefit in designating the appropriate treatment for patients with drug-resistant TB. To learn more about the research, you can access the full article at: <https://journals.plos.org/digitalhealth/article?id=10.1371/journal.pdig.0000059>

2. Study Finds that TB-Causing Bacteria Can Evolve Rapidly in Response to New Environments

As with other species of bacteria, *Mycobacterium tuberculosis* (M. tuberculosis) is able to form complex structures called biofilms which allow bacterial cells to resist stressors such as antibiotics and immune cells. For this study, the research team evolved populations of M. tuberculosis in the lab and found that it could form thick biofilms due to mutations in genetic regions that cause multiple changes to happen at once. These findings could inform the development of antibiotics targeted at biofilm growth. The team found evidence suggesting that the genetic background of the parent strain of M. tuberculosis had an impact on the enhanced growth of the biofilms. This means that interactions between genetic factors could play an important role in the adaptation of the M. tuberculosis to changing environments.

To learn more about this study, you can read the full paper here: <https://elifesciences.org/articles/78454>

3. Positive Treatment Outcomes Among Pregnant Patients With Multidrug-Resistant Tuberculosis: A Systematic Review and Meta-analysis

The study examined the experiences of 275 pregnant women with multidrug-resistant tuberculosis living in South Africa, Peru, Brazil, Iran and Uganda. The study found that Linezolid, a medication used to treat multidrug-resistant tuberculosis, was associated with favorable pregnancy outcomes and high treatment success: As many as 73.2 percent of pregnant women with multidrug-resistant tuberculosis gave birth to healthy babies and the treatment had worked for 72.5 percent of the women. The researchers also found that a high rate of treatment success and favorable pregnancy outcomes can be achieved when pregnant patients with MDR-TB are treated with effective regimens very early in the pregnancy. However, further research on the use of Linezolid in pregnancy is needed because long-term use may increase the risk of gastrointestinal disorders, ototoxicity, and psychiatric disorders. To learn more about the research, you can access the full article here:

<https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2793223>

DID YOU KNOW?

On July 4th, 2022, the STOP TB Partnership launched The Global Plan to End TB, 2023–2030 (Global Plan), which is a detailed plan for ending tuberculosis (TB) as a public health challenge by 2030. The Global Plan emphasizes the need for a rights-based, people-centred approach to ending TB. It increases the focus on prevention as a public health priority alongside universal access to TB care and support, an accelerated approach to TB research and development (R&D), and the introduction and scale-up of new TB tools. We have highlighted a few key take-aways from the Global Plan below:

- The Global Plan projects that between 2023 and 2030, US\$ 249.98 billion will need to be mobilized to tackle tuberculosis from all sources—governments, philanthropy, the private sector, and innovative sources of financing.
- The breakdown of the financial needs proposed by the Global Plan includes US\$ 157.2 billion for TB prevention and care, averaging US\$ 19.65 billion per year, plus US\$ 52.6 billion for vaccination once new TB vaccines are available. US\$ 40.18 billion is needed to accelerate the development of new TB medicines and treatment regimens, diagnostics, and vaccines, which includes US\$ 800 million annually to support basic science research.
- The total amount of funding needed to support the Global Plan's ambitions is the equivalent of every person in the world donating US\$4 per year for the next eight years.
- The economic return on this investment in fighting TB would amount to US\$40 for every US\$1 invested—and as much as US\$59 for every US\$1 invested in low- and middle-income countries.
- Models project that the following targets and objectives could be reached by 2030 if the funding goals are met:
 - At least 95% of people with TB will receive a diagnosis.
 - All high-risk and key and vulnerable populations will be able to access periodic screening.
 - 50 million people will access appropriate TB treatment, including 4.7 million children and 3.32 million people with drug-resistant (DR-) TB.
 - 35 million people will access TB preventive treatment (TPT).
- Delaying or failing to implement the Global Plan would result in immense human and economic loss. If the status quo were to continue from 2023 through 2030, an additional 43 million people would develop TB, leading to 6.6 million additional TB deaths and a global economic cost of US\$ 1 trillion.

Information Source:
<https://omnibook.com/view/dc664b3a-14b4-4cc0-8042-ea8f27e902a6/en#panel-x-d700>