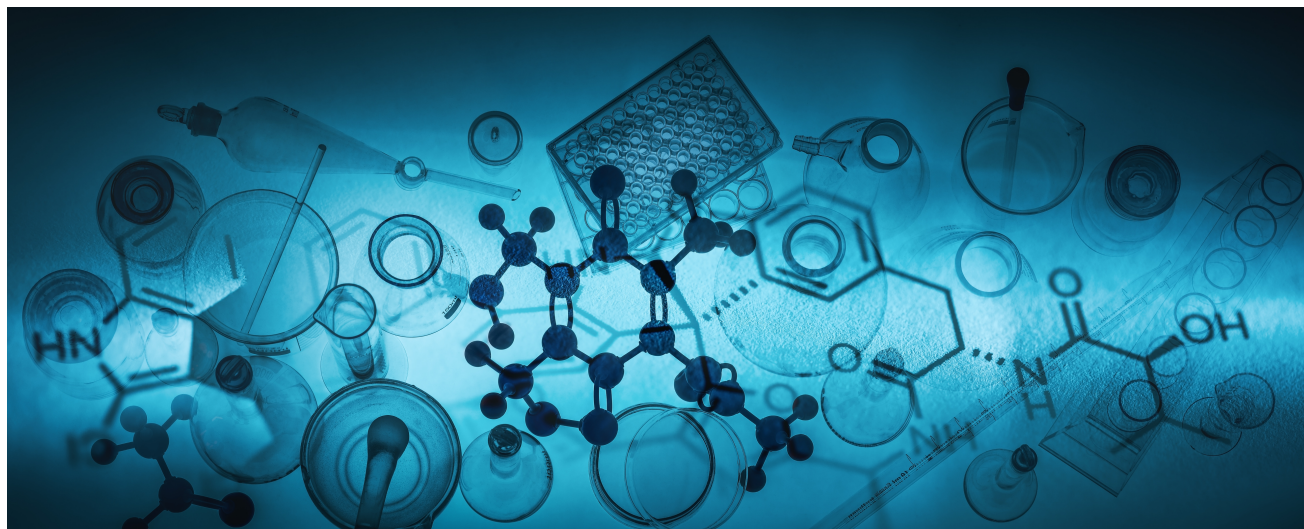


THE MONTHLY DOSE

Official Newsletter of The Mueller Health Foundation



WHAT'S NEW AT THE MUELLER HEALTH FOUNDATION:

We at The Mueller Health Foundation have been engaging in projects aimed at finding bottom-up approaches to solving problems that communities with a high-TB burden often face. We recently came across a great toolkit created by the Virginia Department of Health, which provides a structured framework on better engaging communities in public health interventions.

The toolkit and training course is intended for public health departments with a goal to share a process and model of community engagement that local public health departments can follow to more effectively reach their identified TB populations. To learn more, take a look at the toolkit here:

<https://www.vdh.virginia.gov/tuberculosis/community-engagement/>

Stay tuned for more updates!

LATEST NEWS: STORY FROM A TB SURVIVOR

As part of our mission for 2022, the Mueller Health Foundation cares deeply about sharing the stories of those affected by tuberculosis (TB) around the world and to learn from their experiences. This month, we came across a great collection of stories on the Center for Disease Control's (CDC) website and wanted to showcase Khayr's journey of battling both latent and active tuberculosis.

Khayr was tested for TB as part of the college application process in the United States. His doctor told him he had latent TB infection. Khayr was prescribed treatment for latent TB infection to prevent the development of active TB disease but did not complete the full treatment. A few years later, he began experiencing symptoms of active TB disease. Khayr's symptoms continued to worsen. Eventually he was diagnosed with active TB disease and began treatment. But even after starting treatment, he did not feel any better. After some additional tests and another chest x-ray, his doctor had some disappointing news as he was diagnosed with drug-resistant TB. Treatment for drug-resistant TB takes much longer and instead of the 6-9 months of treatment for drug-susceptible TB, Khayr's treatment would take 18 to 24 months. He also needed to isolate himself until he was no longer infectious.

Reflecting on the challenges of such a long time on medications and in isolation, Khayr hopes his story can encourage people with latent TB infection to complete treatment and to prevent the development of active TB disease. He says: "If there's one thing I could change about my treatment personally it would be to go back in time to when I was 19 and I was diagnosed with latent TB...it would have saved me a lot of grief in the future. It would have saved me, you know, 7 months in isolation. So, I think stopping TB at that initial stage, when it's latent and when you're not infectious, I think is something that we need to educate more people about."

You can learn more details about his journey here:

<https://www.cdc.gov/tb/topic/basics/Khayrstory.htm>

For more news, please also take a look at our top 3 picks for May 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 MAY

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 May:

1. Monitoring Medication Adherence for TB Treatment in Africa using AI

A new pilot study led by researchers at the University of Georgia has focused on determining the technical feasibility of applying Artificial Intelligence (AI) to analyze a raw dataset of videos from TB patients in Africa taking medications. This study was conducted by a multidisciplinary team led by a public health physician specializing in TB medication adherence and three computer scientists specializing in deep learning models. In this study, researchers used a secondary dataset containing 861 self-recorded medication intake videos of 50 TB patients. Researchers tested several deep learning models and with one model called 3D ResNet, they observed a diagnostic accuracy ranging from 72.5% to 77.3%, which is comparable to or higher than the expert clinical accuracy of doctors. To learn more, you can access the full article at: <https://www.news-medical.net/news/20220411/Monitoring-medication-adherence-for-TB-treatment-in-Africa-using-AI.aspx>

2. The Relationship Between Previous Pulmonary Tuberculosis and Risk of Lung Cancer in the Future

Researchers at the Nantong University in China have conducted research to support the views that tuberculosis is an important risk factor for lung cancer occurrence. Through this research, it is becoming clearer that *Mycobacterium tuberculosis* (M.tb) in TB patients meticulously schemes multiple mechanisms to induce tumor formation and is indispensable to participate in the occurrence of lung cancer. In addition, some additional factors such as age, sex and smoking, accelerate the development of lung cancer after M.tb infection. The clarification of these insights is fostering new diagnoses and therapeutic approaches to prevent the development of lung cancer in TB patients. A key take-away is that clinicians should use relevant assessments on whether tuberculosis patients are likely to develop lung cancer, provide personalized medicine for improved disease management, and begin to shift focus to early intervention measures. To learn more, you can read the full article here: <https://infectagentscancer.biomedcentral.com/articles/10.1186/s13027-022-00434-2>

3. Distribution of Common and Rare Genetic Markers of Second-Line-Injectable-Drug Resistance in *Mycobacterium tuberculosis* Revealed by a Genome-Wide Association Study

Researchers at San Diego State University have identified rare genetic markers in *M. tuberculosis* that could improve early detection of drug-resistant strains of the disease, thereby helping to prevent their spread. The researchers obtained samples of *M. tuberculosis* from seven different countries where antibiotic resistance is common. Culturing the samples revealed that some were indeed drug-resistant, even though molecular diagnostics had failed to catch them. The researchers identified one set of rare genetic mutations that may help block the common TB drug kanamycin from interfering with the pathogen's ability to synthesize the proteins it needs, rendering it harmless to the pathogen. Given the evolution of antibiotic resistance coupled with the findings of this research, molecular diagnostics will need to be updated frequently and be tailored to different regions of the world where antibiotic resistance in TB is common. To learn more, you can access the full article here: <https://journals.asm.org/doi/10.1128/aac.02075-21>

DID YOU KNOW?

In recent news, Washington State in the US is currently facing its largest TB outbreak in decades. Of the 70 confirmed tuberculosis cases in Washington State over the last four months, 17 of them have been linked to Washington state prisons. In light of this finding, we wanted to highlight a few trends in relation to TB and incarceration facilities in the US over the last three decades:

- In 2020, approximately 3% of TB cases (179 TB cases) reported in the United States occurred among people who were current residents of correctional facilities and were 15 years of age or older.
- Between 1993 and 2017, on average, approximately 49% of all TB cases reported among residents of correctional facilities were from local jails. About 8% resided in federal prisons, 28% resided in state prisons, about 12% resided in other facilities (e.g. ICE), less than 1% were in facilities housing juveniles and 2% had missing data on type of facility.
- From 2010 to 2017, the largest number of cases reported among residents in a correctional facility at the time of TB diagnosis were among Hispanics (1710), followed by Blacks (729), Whites (326), Asians (155) and persons of other race/ethnicities or unknown race (57). Among correctional facility residents with TB, the highest proportion of non-U.S.-born persons were among Asians (94%) followed by Hispanics (83%).
- From 1993 to 2017, over 90% of TB cases among persons reported to reside in a correctional facility were male. In the same timespan, the number of males ranged from 1,011 in 1994 to 249 in 2017.
- Since 1993, most TB cases among persons in correctional facilities completed treatment for TB (71%) either during their stay in the correctional facility or after they were released. Most TB patients completed treatment within a year, but for some, treatment can take years.
- Between 2010 and 2017, for TB cases among persons in correctional facilities, 71% reported not having a history of excess alcohol use in the year prior to their TB diagnosis in comparison to 88% among persons not in a correctional facility.

Information Source:

<https://seattlemedium.com/washingtons-largest-tuberculosis-outbreak-in-decades/>
<https://www.cdc.gov/tb/publications/slidesets/correctionalfacilities/default.htm>
<https://www.cdc.gov/tb/topic/populations/correctional/default.htm>