Communication and Marketing Department
Isebe loThungelwano neNtengiso
Kommunikasie en Bemarkingsdepartement

Private Bag X3, Rondebosch 7701, South Africa
Welgelegen House, Chapel Road Extension, Rosebank, Cape Town
Tel: +27 (0) 21 650 5427/5428/5674 Fax: +27 (0) 21 650 5628

www.uct.ac.za

30 March 2023

Groundbreaking PhD study shows normal breathing may be major contributor to TB spread

It has long been assumed that tuberculosis (TB) is spread through coughing, but new findings have shown that it may also be spread through normal breathing.

Given a large number of normal breaths every individual takes in a day, new evidence suggests that breathing alone is estimated to contribute more than 90% of the daily *M. tuberculosis* bioaerosol output among patients with active TB disease.

Titled "Catching a glimpse: the visualization of mycobacterium tuberculosis from TB patient bioaerosols", the study was conducted by University of Cape Town's PhD graduand Ryan Dinkele.

The study was conducted in two parts, with the central aim of advancing the understanding of how *M. tuberculosis* is aerosolised.

The first objective was to develop a novel method for the microscopic detection of *M. tuberculosis* bacilli in bioaerosol samples. Once this was developed, Dinkele collected bioaerosol samples from 30 TB patients using the Respiratory Aerosol Sampling Chamber (RASC). This is a custom-made personal clean room built to catch bioaerosols - the droplets and particulate matter that become aerosolised during respiration.

"I found that the sensitivity of this method was high (~90%), which was striking as the participants were sampled for 60 minutes without any requirement for forced coughing," said Dinkele. This observation led to the second component of this work: testing the long-standing assumption that coughing is the primary driver of *M. tuberculosis* transmission. For this question, he altered the RASC to allow for the direct comparison of breathing, deep breathing, and coughing.

The *M. tuberculosis* detection methodology was then applied to independently examine the bioaerosols from each of the samples. "This work forces us to challenge long-standing assumptions that are currently accepted in TB research," he said.

"Prior to the COVID-19 pandemic, TB was the leading cause of death owing to a signal infectious agent, globally. It claimed 1.5 million lives in 2020. Unlike COVID-19, however, TB remains out of the global spotlight, predominantly impacts young adults, and

disproportionately affects the poor. The inability of antibiotics and the TB vaccine (Bacille Calmette-Guérin) to eradicate the TB epidemic necessitates further research into how, when, and by whom, *Mycobacterium tuberculosis* is spread."

Dinkele will graduate on Thursday, 30 March with a PhD in Medical Microbiology.

Ryan Dinkele Photo: Elizabeth Dinkele

Download photo

ENDS

Issued by: UCT Communication and Marketing Department

Ridovhona Mbulaheni
Media Liaison Assistant
Communication and Marketing Department
University of Cape Town
Rondebosch
Tel: (021) 650 2333
Cell: (064) 905 3807
Email: ridovhona.mbulaheni@uct.ac.za
Website: www.uct.ac.za