

RESEARCH

The CBTBR and SACEMA produce the first 2 collaborative papers between two Centres of Excellence

The first paper is entitled "Tuberculosis: the Effect of Diagnostic Delays on the Total Delay to Diagnosis of Tuberculosis" and is available online at <http://www.plosone.org/doi/pone.0001933>

During 2007, Dr Pieter Uys, and Mr Stephen Millen, an MSc student from Southampton University, investigated the critical factors leading to delay in the diagnosis and treatment of tuberculosis. The consequences of this delay were analyzed and the existence of a threshold delay value was demonstrated. It was shown that unless a sufficient number of cases are detected before this threshold, the epidemic will escalate. Intervention strategies to increase the threshold value relative to the time to diagnosis and which thereby decrease disease incidence became evident from a mathematical analysis of this threshold delay. In a significant number of instances an episode of TB disease can be attributed to a re-infection event. It has also been shown that the rate of re-infection of people who have recovered from a previous TB disease episode is higher than the rate of first-time infection. From a purely theoretical investigation it was shown that a simple relationship can be expected between incidence and the proportion of cases due to re-infection after a prior episode of TB. This relationship is approximately logarithmic and is sustained by a rate of re-infection that is higher than the rate of first-time infection. This latter consideration underscores the importance of monitoring recovered TB cases for repeat disease episodes, especially in regions where TB incidence is high.

The second paper is entitled "Tuberculosis reinfection rate as a proportion of total infection rate correlates with the logarithm of the incidence rate – a mathematical model" and has been accepted for publication in *Journal of the Royal Society Interface*.