University of St Andrews School of Medicine
Division of Infection and Global Health

The St Andrews Tuberculosis Research Group is a multidisciplinary team address important questions in TB diagnosis and treatment. It includes clinicians (Prof Gillespie, Dr Sloan), biomedical scientists (Dr Baron, Dr Hammond and Dr Sabiiti) and mathematical modellers (Dr Bowness)

Developing new treatments
The St Andrews group is very active in developing and trialling new treatments for tuberculosis (TB). **Gillespie** was the coordinating investigator for the TB Alliance REMoxTB and STAND clinical trials. He was one of the three principal investigators who, with 12 African centres established the PanACEA TB clinical trials consortium. This group has recently completed trials to optimise the dose of rifampicin and of new agents. Supported by EDCTP in 2008, the St Andrews group, with **Sloan** and **Sabiiti** has been an essential contributor to the success of the PanACEA consortium receiving a further €16m for a second series of studies using innovative trials methodology.

Sloan is engaged in a range of projects examining the challenges of delivering effective antibiotic therapy to patients across the world. In Malawi and Vietnam, he has been involved in pharmacology studies which investigate the anti-TB drug concentrations obtained in the blood and lungs of TB patients after administration of oral medications. He has also studied the relationship between variable antibiotic concentrations in samples obtained from TB patients and the likelihood that treatment will be successfulIn Uganda he is involved in a work to explore whether changing the dose of the first-line TB drug, rifampicin, might interact with and reduce the effectiveness of HIV treatment.

Developing new diagnostics and biomarkers
One of our main innovations has been development of a molecular test which can rapidly quantitate the number of **viable** *M. tuberculosis* organisms in clinical samples, and may be able to replace culture as the primary method of establishing whether bacteria are being eliminated when exposed to antibiotics. The test has been evaluated through the EDCTP funded PANBIOME consortium, which links the St Andrews group (**Gillespie, Sloan, Sabiiti, Bowness**) with colleagues in Malawi, Mozambique and Tanzania. This molecular bacterial load assay (MBLA) is now being developed for CE marking and introduction onto the market for clinical use. The group already make the test reagents available globally to researchers on a not-for-profit basis. The group is also developing novel methods to detect sub-populations of "dormant" TB cells that are thought to be responsible for disease relapse after treatment. Utilising a range of photonic and microscopic techniques the group (**Gillespie, Sloan, Hammond, Baron**) can now enumerate these critical cell types in a range of samples including sputum and lung tissue.

Implementing new knowledge
Sabiiti is leading the advancement of implementation science by taking new diagnostic and treatment tools from bench to clinical practice. Innovation is not complete until it is accessible and usable by the target users. Our recently completed EDCTP funded TWENDE study in East Africa explored ways to unlock barriers and accelerate uptake of health research innovations into policy and practice. Many lessons were learned that will be useful to policymakers and technology developers.

Mathematical modelling
Bowness, focuses on developing an individual-based mathematical model for TB disease in the lung, which will allow us to understand some of the complexities involved in TB disease and why current treatment can often lead to patients relapsing. She has developed an innovative agent-based model that can mimic relapse and treatment that, through simulations, will help to direct future drug development efforts.

Find out more: http://med.st-andrews.ac.uk/infection/
Twitter: @Infection_StAnd