TB Centre
Biennial Report
2017–18

Research to end TB
Reducing the global burden of TB through research and education

Tuberculosis is a slow-motion disaster which has become the leading cause of infectious death worldwide. The TB disaster threatens the UK and Europe as the emergence and transmission of multi drug-resistant forms of tuberculosis render our traditional control measures ineffective.

Our School has for many years been at the forefront of tuberculosis research, diagnosis and treatment, working in collaboration with government agencies, universities and civil society partners across more than 70 projects in around 40 countries worldwide.

In recent years, the TB Centre at LSHTM has become established as a collaborative hub to further develop and co-ordinate this work. Thanks to the leadership of Katherine Fielding, the Centre is growing to encompass all aspects of research including pathogen biology, epidemiology, social science and evaluation of new control strategies.

This report highlights some of the projects, partnerships and areas in which the Centre is engaged. There is much to do, and as always the biggest challenge is to persuade governments and funders to work together and act strategically to build effective health systems and services. TB has throughout history been closely linked with poverty, and its control will come through sustained public health and socio-economic interventions that improve people’s quality of life.

I hope you will be inspired by what you read here to support the work of the TB Centre and join us in the common goal to understand, control, and ultimately eliminate this disease.

About the TB Centre at the London School of Hygiene & Tropical Medicine (LSHTM)

The TB Centre at the London School of Hygiene & Tropical Medicine brings together over 120 laboratory scientists, clinicians, epidemiologists, statisticians, public health specialists and policy-makers.

Our shared purpose is to conduct high quality research across a range of relevant disciplines to reduce the global burden of tuberculosis (TB) disease. We will strive to achieve this vision through research, education and influencing policy.

Research
Through research grants meetings, seminars and journal clubs, we disseminate our work and generate new ideas. Members of the TB Centre are global leaders in areas including:

- clinical trial design
- epidemiology
- tracing of TB transmission using molecular tools
- host-pathogen interactions
- development and implementation of new diagnostics
- mathematical modelling
- health economics
- health systems research

Mathematical modelling
Consultancy and contract activity

Influencing policy
We work with organisations such as Results-UK and the TB Global Caucus to maximize the impact of our research and influence policy.

Our shared purpose is to conduct high quality research across a range of relevant disciplines to reduce the global burden of tuberculosis (TB) disease. We will strive to achieve this vision through research, education and influencing policy.

Mission:
Reducing the global burden of TB through research and education

Vision:
To be a world leading TB research community through innovative research and global partnerships

Values:
Performing high quality interdisciplinary research to inform, educate, set research priorities and influence policy

Main funders of TB research at LSHTM:
Bill & Melinda Gates Foundation, British Infection Association, DFID, ECDC, Economic and Social Research Council, European Commission FP7 and Horizon 2020, Medical Research Council (South Africa), Medical Research Council (UK), Newton Fund USAID, Wellcome Trust.

Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreword</td>
<td>2</td>
</tr>
<tr>
<td>About the TB Centre at LSHTM</td>
<td>3</td>
</tr>
<tr>
<td>Global footprint of LSHTM</td>
<td>4-6</td>
</tr>
<tr>
<td>TB Centre</td>
<td>7</td>
</tr>
<tr>
<td>Diagnostics research</td>
<td>8</td>
</tr>
<tr>
<td>Multidrug-resistant (MDR) TB</td>
<td>9</td>
</tr>
<tr>
<td>Immunology and vaccines</td>
<td>10</td>
</tr>
<tr>
<td>Social determinants, policy, adherence</td>
<td>11-11</td>
</tr>
<tr>
<td>Mathematical modelling</td>
<td>13</td>
</tr>
<tr>
<td>Consultancy and contract activity</td>
<td>13</td>
</tr>
<tr>
<td>Education</td>
<td>14-15</td>
</tr>
</tbody>
</table>

Acknowledgements

Huge thanks to Jeremy Hill and Maddy Baird who gathered the content for this brochure through endless pursuit of interviews with principal investigators. Lisa Stockdale, Helen Fletcher and Rein Houben contributed to the planning and structure and Dave Moore parsimoniously squeezed the content into the deliberately limited text space.

Cover image, top: TB lab culture using MGIT 960, in Lusaka, Zambia. Credit to Zambart Photo File.

Cover image, bottom: A Red Cross worker in India speaks with a tuberculosis (TB) patient. © 2011 Benoit Matsha-Carpenter/FRC. Courtesy of Photoshare. Image is shown for illustrative purposes only.
Global footprint of LSHTM TB Centre

TB Centre collaboration with the Africa Health Research Institute (AHRI)

This strategic partnership with AHRI in KwaZulu-Natal brings together AHRI expertise in conducting rural demographic surveillance and excellence in laboratory science. The collaboration will build a portfolio of TB research focusing on interrupting TB transmission and containing drug-resistant TB.

TB Centre members:
Alison Grant, Indira Govender, Themba Mzembe

Implementation science to improve contact tracing in South Africa

This collaboration with the University of Pretoria, the Aurum Institute, AHRI and Johns Hopkins University aims to improve contact tracing in Gauteng, KwaZulu-Natal and Eastern Cape provinces.

TB Centre members:
Katherine Fielding, Alison Grant, Indira Govender

Examining health system performance for indigenous people in the Peruvian Amazon through the lens of tuberculosis control

Exploration of the lived experience of government healthcare provision for indigenous Amazonian groups is facilitated by determining the performance of the National TB Control programme in remote jungle regions. This project also entails video development for advocacy purposes.

TB Centre members:
Cesar Ugarte-Gil, Dave Moore

Changing the agenda of TB control: impact of social protection on TB care

This project assesses the impact of Bolsa família, a government conditional cash transfer programme, on TB epidemiology and control in Brazil. Key project collaborators include the Brazilian National TB Programme, Universidade de Brasília and the Universidade Federal do Espírito Santo.

TB centre members:
Delia Boccia

ZAMBART

Zambart is based at the University of Zambia Medical School campus in Lusaka, Zambia. In addition to the PopART and TREATS trials, Zambart is one of the M72/AS01 TB vaccine efficacy trial sites and is participating in a demonstration project with FIND for the new Xpert Omni instrument. Zambart has been contracted by the MOH of Zambia to conduct the third national TB drug resistance survey.

TB Centre members:
Helen Ayles, Barry Kosloff, Ab Schaap, Virginia Bond

TB Cambodia Research Programme

The TB Cambodia Research Programme, a collaboration between LSHTM TB Centre, the National University of Singapore, the University of Health Science in Cambodia and the National Tuberculosis Programme (CENAT), aims to inform TB Policymakers in Cambodia where to focus limited resources for maximum impact on TB control over the next 15 years.

TB Centre members:
Mishal Khan, Richard Coker

MERM trials in China

The Medication Event Reminder Monitor (MERM) is a pill box incorporating audio and visual alerts that remind the patient to open the box and take their medication, along with a system for recording when the box has been opened which can later be viewed by the patient and their healthcare provider. MERM is now the subject of a second cluster randomised trial looking at whether using the MERM box (vs standard of care) improves treatment outcomes.

TB Centre members:
Katherine Fielding, Anna Vassall, James Lewis, Sedona Sweeney

The Malawi Epidemiology and Intervention Research Unit, Karonga, northern Malawi

Open source TB database making TB isolate data and clinical information available for use by other researchers. Whole genome sequencing of >3000 strains collected in Karonga district since 1996.

TB Centre members:
Mia Crampin, Judith Glynn, Taane Clark
Diagnostics research

From development of diagnostic tests (MODS), through evaluation of diagnostic accuracy (LAM) to implementation science and policy (Xpert MTB/RIF), LSHTM researchers are immersed in diagnostics research at every level.

CRyPTIC

The ultimate goal of the CRyPTIC consortium led by the University of Oxford is to create an open-access, cloud-based tool for immediate automated decoding and reporting of complete M. tuberculosis drug susceptibility from uploaded whole genome sequence data. The constantly evolving WGS database will start with 100,000 genomes from across the globe, enabling the important characterisation of low as well as high frequency mutations associated with phenotypic resistance and clinical treatment failure. As a founder partner of this growing global consortium LSHTM is contributing >5000 phenotypically well-characterised strains with detailed metadata from our well-established collaboration with Universidad Peruana Cayetano Heredia and the NTP in Peru.

TB Centre members:
Dave Moore

Treat and test - transcriptomics (T3)

The majority of individuals with immunological sensitivity to mycobacterial antigens, manifest as a positive skin test or interferon gamma release assay (IGRA), never go on to develop TB disease. Our hypothesis is that this state, designated as latent tuberculosis infection (LTBI), actually includes some people with antigen persistence but no viable mycobacteria, in whom there is no risk of future reactivation TB disease. We are using a transcriptomic approach to identify these people according to their response to preventive therapy (PT). Identification of a transcriptomic signature of effective PT could (a) facilitate future trials of PT for drug-susceptible and MDR-TB and (b) ultimately lead to a point-of-care test for a stop/continue treatment decision.

TB Centre members:
Claire Broderick, Jackie Cliff, Dave Moore

STAMP

The Screening for Tuberculosis to reduce AIDS-related Mortality in hospitalized Patients in Africa trial (STAMP) is based on the work and vision of the late Professor Steve Lawn and is being conducted in Zomba Central Hospital (Malawi) and Edendale Hospital (South Africa). In this large trial hospitalised patients (with minimal exclusion criteria) are randomised to receive either the standard of care in TB diagnostics, or to have, in addition, urine tested for TB by LAM and Xpert MTB/RIF. As well as the primary outcome of mortality, secondary outcomes of interest include time to TB treatment and ART initiation. Collaborations with Harvard (economic modelling) and University of Cape Town (urine processing) expand the outputs of this research programme.

TB Centre members:
Dave Moore

Technology supported systems for rapid impact on TB control

In this Newton Fund supported collaboration between the TB Centre, the International Diagnostics Centre at LSHTM and the South African NHLS, the power of connectivity of diagnostic systems is being leveraged to develop and evaluate national level service improvement interventions.

TB Centre members:
Dave Moore, Rosanna Peeling

TB-PRACTICAL

This MSF-sponsored trial in Uzbekistan, Belarus and South Africa is comparing three novel, exclusively oral, six-month regimens for the treatment of pulmonary MDR-TB with the current standard of care, which currently entails between nine and 24 months of treatment, including four–six months of injections.

TB Centre members:
Bern-Thomas Nyang'wa, Dave Moore, Katherine Fielding, Elizabeth Allen, Joanna Sturgess

E-registry for MDR-exposed contacts

The diagnosis of MDR-TB is the start of a journey not only for the patient but also for their exposed household contacts. An electronic tool has been developed for registration and data collation to facilitate contact tracing and surveillance, and simultaneously build a multi-national observational cohort and generate a line-list of contacts potentially eligible for PT. Peru, Mongolia, Bhutan and Somaliland will be the first early adopter countries, with further iterative development and process evaluation.

TB Centre members:
Kate Gaskell, Dave Moore

Umoya Omuhle ("good air"): infection prevention and control for drug-resistant tuberculosis in South Africa in the era of decentralised care: a whole systems approach

The transmission of drug-resistant TB (DR-TB) in health centres in South Africa is well documented, but it is not clear how much clinic transmission contributes overall. Working in Western Cape and KwaZulu-Natal provinces this project will estimate the contribution of transmission in health care facilities to overall DR-TB transmission; and explore organisational, structural and social factors contributing to transmission. These data will inform development of an intervention package. We will estimate the impact this intervention package could have on DR-TB incidence in South Africa, and the economic benefits for both patients and the South African health system.

TB Centre members:
Alison Grant, Anna Vassall, Richard White, Rein Houben, Nicky McCreesh

Optimising health systems to improve delivery of decentralised care for patients with drug-resistant tuberculosis

This project in Western Cape, Eastern Cape and KwaZulu-Natal seeks to evaluate implementation of decentralised care for drug-resistant TB in South Africa, and identify interventions to optimise this approach. It explores policy and health systems processes involved in decentralisation of TB treatment, and will identify related features associated with positive outcomes for patients, health systems constraints and enablers.

TB Centre members:
Alison Grant

Combating drug resistant TB in Myanmar and Yunnan Province, China

In collaboration with the National TB Control programmes of Myanmar and China we conducted: a situational assessment of TB control and the health system in Yunnan and Myanmar; an epidemiological investigation of patient and health-system level risk factors for the development of drug-resistant TB in Myanmar; and a qualitative investigation of financial barriers in accessing care of drug-resistant TB in Yunnan.

TB Centre members:
Richard Coker, Mishal Khan, Coll Hutchison
TB vaccine development

In three major work packages of the TBVAC2020 project, laboratory studies are focused on: (1) safety screening of candidate TB vaccines in the SCID mouse; (2) immune correlates of risk for TB disease in humans; (3) infant immune responses to BCG vaccination; (4) development of mouse models of human TB disease risk for testing of TB vaccine candidates.

ZAMBART in Zambia is one of the 11 sites testing the efficacy of the GSK candidate TB vaccine M72/AS01.

TB Centre members:
Helen Fletcher, Hazel Dockrell, Greg Bancroft, Andrea Zelmer, Steven Smith, Alison Elliott, Helen Ayles

Mathematical modelling of vaccine response and impact of new vaccines

In an example of interdisciplinary collaboration, experimental data are being used to better inform models of vaccine immune response.

Further, modelling has been used to inform preferred product characteristics developed by partners Aeras, the Bill and Melinda Gates Foundation, TBVI and the WHO to accelerate promising TB vaccines through the pipeline and make sure the target population is ready. Mathematical modelling, produced by the TB Centre in partnership with Aeras Asia, has led to a targeted change in vaccine policy, in line with WHO goals for TB control, to ensure that TB vaccines will be as effective as possible for those who need them most.

TB Centre members:
Helen Fletcher, Sophie Rhodes, Richard White, Rebecca Harris

TANDEM

With 11 collaborating institutions and field sites in Peru, South Africa, Romania and Indonesia, TANDEM explores the heterogeneous interface between TB and type II diabetes. Transcriptomic studies are characterising the different immunological phenotypes seen amongst TB patients with and without co-morbid diabetes at the time of diagnosis, in response to effective therapy and at the end of treatment.

TB Centre members:
Jackie Cliff, Hazel Dockrell, Claire Eckold, Dave Moore

The immunology of TB in adults and infants in Uganda

Immunology research in Uganda, in collaboration with the MRC and the Uganda Virus Research Institute, is investigating the B cell response to BCG and the role of innate immunity in protection against TB, and looking to address the question “how does maternal latent TB infection affect infant responses to BCG?”. Nested within this project is a study of the influence of epigenetics on the BCG response.

TB Centre members:
Alison Elliott, Stephen Cose, Hazel Dockrell, Steven Smith, Mateusz Hasso-Agopsowicz, Emily Webb

EURIPRED

EURIPRED is a multi-centre EU consortium aimed at improving access of vaccine developers to knowledge and expertise within the European vaccine community. LSHTM is focused on developing and harmonising vaccine research methods with other groups.

TB Centre members:
Hazel Dockrell, Steven Smith
Social determinants, policy, adherence

Social protection, economic evaluation and policy

LSHTM has one of the world’s largest groups of health economists working in economic evaluation and priority setting in developing countries, including a team of six economists working on TB. Collaborating with partners, and linking an economic approach with the world leading expertise of LSHTM in TB clinical disciplines and epidemiology, the group aims to inform investment in TB globally and within high burden countries.

Priority setting for TB

LSHTM is working to promote the use of economic analysis in priority setting for TB globally and at the country level. The work of the group includes several projects.

**Economic evaluation of new TB technologies**

LSHTM is uniquely positioned to deliver economic evaluation alongside clinical trials, often in collaboration with mathematical modellers, with interdisciplinary collaboration occurring within the one globally-focused institution. The diverse range of recent and current interventions evaluated include work on the XTEND (Xpert for TB: Evaluating a New Diagnostic) trial; economic evaluation of TB vaccines and target products; supporting Georgia introduce results-based financing for TB services; examining shortened treatment regimens for both DS and MDR-TB in collaboration with the TB Alliance and MSF; working with the Aurum Institute in South Africa, Mozambique and Ethiopia on a trial of 3HP (three months of weekly isoniazid/ rifampentine) for LTBI; and with Chinese CDC on evaluation of an automated device for dispensing daily treatment.

TB Centre members:

Anna Vassall, Gabriela Gomez, Sedona Sweeney, Yoko Laurence, Fiammetta Bozzani, Mariana Siapka

**Global Health Costing Consortium (GHCC)**

LSHTM is working with others to provide a comprehensive dataset of TB costing information for global and national use. This work includes development of new standards and methodologies for collecting, aggregating and estimating the cost of TB to health services and to patients, and is conducted with partners at the University of Washington, University of California and San Francisco, University of Cape Town, Instituto Nacional de Salud Pública in Mexico and Avenir Health.

VALUE-TB

This project provides directed, in-country primary data on the cost of delivering TB services in a range of settings and health systems. This includes projects in India, the Philippines, China, Ethiopia and Kenya, and is delivered in collaboration with NTPs, WHO and the University of Cape Town’s Health Economics Unit.

A third component of the group’s work in priority setting for TB involves interdisciplinary collaboration with the field-leading mathematical modelling group, TB-MAC. This collaboration will deliver a set of resources for policy makers and funders to help set priorities within TB: combining models of TB epidemiology, and the best possible estimates of TB resource use and cost at the country level. This work includes advising the Think Tank in South Africa that has supported the National Department of Health produce its National Tuberculosis plan.

TB Centre members:

Gabriela Gomez, Fiammetta Bozzani, Sedona Sweeney, Mariana Siapka, Richard White, Yoko Laurence, Anna Vassall

**The Social Protection Action Research and Knowledge Sharing (SPARKS) Network**

The SPARKS network was launched in 2016 in collaboration with the Karolinska Institute in Sweden and the World Health Organization. SPARKS aims to bring together multi-disciplinary researchers to maximise the design, implementation and evaluation of social protection interventions in public health. The network seeks to improve partnerships for programmes working in social protection and access to equitable care to mitigate the financial consequences of diseases of poverty. SPARKS works in three key areas: (1) generation of evidence; (2) strengthening of existing research platforms; (3) dissemination of research and policymaking. SPARKS currently involves partners in Brazil, Vietnam, Kenya, Moldova and India and engages with various organizations such as the World Bank and UNICEF.

TB Centre members:

Delia Boccia

**S-PROTECT modelling consortium**

This consortium brings together mathematical modellers, policymakers and social epidemiologists to assess the impact of TB social protection programmes on health. The consortium is currently developing a methodology to evaluate the impact of the achievement of the Sustainable Development Goals (SDG) on health. S-PROTECT particularly aims to assess the impact of increased social protection programme coverage on the achievement of SDG 1: elimination of poverty. The modelling consortium seeks to shift the discussion for TB to be recognised as a development issue.

TB Centre members:

Delia Boccia, Rein Houben

Understanding the economic impact of TB

The economic evaluation group are key partners to the WHO-GTB and others in their research into a broader understanding of the economic impact of TB. This work has an emphasis on the economic consequences of TB disease to patients, and the contribution of this economic impact at a societal level. One area of the group’s work is to describe the catastrophic costs attributable to TB among affected households; with active participation on the WHO Task Force on catastrophic costs measurement for TB. The group is examining the long-term economic consequences of TB, collaborating on a cohort study of costs affecting MDR-TB patients treated through AHR in KwaZulu-Natal. It is also examining methods to pool data from patient costing studies, where national surveys are not available and is currently conducting a systematic literature review on societal costs of TB.

TB Centre members:

Sedona Sweeney, Gabriela Gomez, Mariana Siapka, Debora Pedrazzoli, Allison Grant, Anna Vassall

Image above: CXR and shrine in Dili, Timor Leste. Credit to Anthea Katelaris, TB Centre photo competition winner.
HIV-TB

Globally 11% of TB occurs in people with HIV-associated immunosuppression, predominantly in sub-Saharan Africa and south and south-east Asia. The TB Centre is at the forefront of research into both these colliding syndemics.

TB Fast Track

Cluster-randomised trial in 24 primary care clinics in South Africa to evaluate simple diagnostic algorithms and targeted empirical TB treatment for people with advanced HIV. Provision of empirical TB treatment alone was insufficient to reduce mortality and early ART initiation is likely to be the most important intervention.

TB Centre members:
Alison Grant, Katherine Fielding, Aaron Karat, Anna Vassall

PopART and TREATS

Since 2011, Zambart has been conducting the HPTN071 (PopART) trial of the impact of a community-based combination HIV prevention package, including universal HIV testing and treatment, on HIV incidence. This trial, led by LSHTM, is being conducted in 21 communities in Zambia and the Western Cape province of South Africa. The PopART intervention has included TB screening for the whole population (approximately 700,000 individuals) as well as a package of HIV prevention that should have a major impact on TB prevalence and transmission in these communities.

Recent award of a four-year grant from ECDC: "TB Reduction through expanded Anti-retroviral Treatment and TB Screening” (TREATS) will enable measurement of the impact of the PopART intervention on the prevalence of TB disease and the incidence of TB infection and disease.

TB Centre members:
Helen Ayles, Barry Kosloff, Ab Schaap, Virginia Bond, Sian Floyd, Lily Telsinghe, Richard Hayes

HIV-TB in Malawi: case-finding, diagnosis, treatment

A vibrant group of scientists affiliated to the TB Centre is leading research and innovations in HIV-TB care in Blantyre, Malawi. The HIV-TB research group is based at the University of Malawi, College of Medicine and the Malawi-Liverpool-Wellcome Trust Clinical Research Programme, with close links to the Malawi National TB control Programme.

The research programme in the next two–three years includes: (1) intervention trials of early diagnosis of HIV and TB at community and primary care levels (SCALE, PROSPECT and XACT-TB Trials); (2) TB diagnostics and clinical management – evaluation of new diagnostics in adults and children (TB RaPaed TB study), early mortality on TB treatment, and HIV clinical epidemiology; (3) Phase three therapeutic trials including investigation of surrogate markers of TB treatment, drug interactions, pharmacometrics and genomics (PanACEA II); and (4) social determinants of health seeking for chronic cough and TB, masculinity, individual and societal consequences following self-testing for HIV. In addition to the Postgraduate Research Methods Short Courses (PRMs), new courses focusing on clinical trials will be introduced in 2018. National TB networking meetings are also planned to provide a forum for researchers to showcase their work.

TB Centre members:
Rebecca Harris, Titus Divala, Marriott Nilwassa, Daniel Grint, Ankur Gupta-Wright, Liz Corbett

Mathematical modelling

LSHTM hosts the multinational TB modelling and analysis consortium (TB-MAC) bringing together leading TB modelers, economists, epidemiologists, and country and global policy makers to work together in a coherent and harmonised strategic approach. TB-MAC has recently taken on responsibility for the WHO Global Task Force on TB Impact Measurement’s new strategic work area on burden and impact projection.

TB Centre members:
Richard White, Christine Albertson, Finn McQuaid, Rein Houben, Anna Vassall

TB Impact and Model Estimates (TIME)

TIME is a modelling tool created in 2013 and designed for local TB programme planners in resource-constrained settings. Implementation has four key goals: (1) enable NTPs to investigate different policy options and support efficient resource allocation; (2) equip NTPs with the technical skills to use modelling for decision-making; (3) promote the use of locally-generated evidence for strategic planning; (4) provide a platform for data collation and promote operational research to strengthen country data. TIME is being used by NTPs and technical agencies in > 10 high-burden countries including Indonesia, Vietnam and Nigeria.

TB Centre members:
Rein Houben, Marek Lali, Kristian Godfrey, Debora Pedrazzoli, Hassan Bassam, Fiammetta Bozzani, Gabriella Gomez, Richard White

Consultancy and contract activity

Though the majority of TB Centre work is supported by competitive research grant funding there is also capacity for consultancy and research contract work where it fits with the interests, vision and mission of LSHTM and the TB Centre. Examples include systematic reviews on MDR-TB and TB infection control commissioned by WHO, the impact of changing the age of BCG vaccination, contract work for ECDC on adherence to treatment in hard-to-reach groups in Latvia. The TB Centre is also well placed to assist countries with operational research as exemplified by recent collaborations in Peru, Pakistan and Bhutan.

TB Centre technical expertise for Global Observatory on Health Research & Development, World Health Organization (WHO)

Members of the TB Centre were commissioned by the WHO to provide evidence to inform setting up of the Global Observatory on Health Research & Development (R&D). The first phase of the research included identifying existing R&D prioritisation processes and summarising key features. Phase two included analysing stakeholders’ views on how to enhance R&D prioritisation processes. The research indicated that the criteria for comparing R&D options should be clearly defined at the outset of the process and that a wider range of experts (including country level experts) should be included when assessing R&D priorities.

TB Centre members:
Mishal Khan, Helen Fletcher, Hannah Painter
## Education

<table>
<thead>
<tr>
<th>PhD Student</th>
<th>PhD Title</th>
<th>Supervisor</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palwasha Khan</td>
<td>Assessing TB transmission dynamics in northern Malawi</td>
<td>Judith Glynn</td>
<td>Malawi</td>
</tr>
<tr>
<td>Lisa Stockdale</td>
<td>Antibodies and immune activation in TB</td>
<td>Helen Glynn</td>
<td>Malawi</td>
</tr>
<tr>
<td>Ivanice Freire</td>
<td>TB treatment drug-induced liver injury and diabetes</td>
<td>Dave Moore</td>
<td>Brazil</td>
</tr>
<tr>
<td>Bern-Thomas Nyang'wa</td>
<td>Pharmacokinetic, pharmacodynamic and toxicity drivers of MDR-TB treatment regimen success</td>
<td>Dave Moore</td>
<td>Uzbekistan</td>
</tr>
<tr>
<td>William Rudgard</td>
<td>Insuring Against the Financial Impact of TB in Brazil: The Role of the National Conditional Cash Transfer Programme, Bolsa Familia</td>
<td>Laura Rodrigues, Delia Boccia</td>
<td>Brazil</td>
</tr>
<tr>
<td>Sean Cavany</td>
<td>Optimising contact tracing for TB control in England</td>
<td>Emilia Vynnycky, Tom Sumner</td>
<td>UK</td>
</tr>
<tr>
<td>Rebecca Harris</td>
<td>Estimating the impact of potential TB vaccines</td>
<td>Emilia Vynnycky, Tom Sumner</td>
<td>UK and Malawi</td>
</tr>
<tr>
<td>Marek Laili</td>
<td>Country-level modelling to inform tuberculosis policy: addressing gaps in model design, data and implementation for evidence-informed policymaking</td>
<td>Rein Houben, Richard Coker, Helena Legido-Quigley</td>
<td>UK</td>
</tr>
<tr>
<td>Sophie Rhodes</td>
<td>Modelling the impact of potential TB vaccines</td>
<td>Richard White, Helen Fletcher</td>
<td>UK</td>
</tr>
<tr>
<td>Debora Pedrazzoli</td>
<td>TB economic burden and social protection</td>
<td>Rein Houben, Delia Boccia, Jo Borghi</td>
<td>UK</td>
</tr>
<tr>
<td>Anera Khan</td>
<td>Determining the feasibility and acceptability of implementing a latent tuberculosis infection testing and treatment programme at overseas panel sites for US-bound immigrants</td>
<td>Richard Coker, Lucy Platt</td>
<td>Vietnam USA</td>
</tr>
<tr>
<td>Noemila Teixeira-Filha</td>
<td>The treatment of HIV/AIDS in Brazil: economic evaluation of strategies for screening and diagnosis of tuberculosis in people living with HIV/AIDS and the use of antiretroviral therapies as a way to reduce morbidity and mortality of tuberculosis</td>
<td>Andreia Santos, Rosa Legood</td>
<td>Brazil</td>
</tr>
<tr>
<td>Kai Young</td>
<td>Integrating tuberculosis services into primary care: impact on health system and tuberculosis control in Lao People's Democratic Republic.</td>
<td>Sandra Mourier-Jack, John Porter</td>
<td>Lao</td>
</tr>
<tr>
<td>Yasmeen Hanifa</td>
<td>A study of the frequency and underlying causes for &quot;TB symptoms&quot; in patients attending for HIV care in South Africa</td>
<td>Alison Grant</td>
<td>South Africa</td>
</tr>
<tr>
<td>Sarah-Lou Bailey</td>
<td>Understanding the threat of diabetes mellitus to TB control in sub-saharan Africa; the impact of HIV and diabetes control</td>
<td>Helen Ayles</td>
<td>Zambia</td>
</tr>
<tr>
<td>Marriott Nweusa</td>
<td>Mortality in people with suspected pulmonary tuberculosis in the era of scale-up of antiretroviral therapy</td>
<td>Liz Corbett</td>
<td>Malawi</td>
</tr>
<tr>
<td>Sarah Prentice</td>
<td>Does BCG vaccination provide short and longer-term protection against heterologous invasive infectious disease by stimulating the innate immune system?</td>
<td>Stephen Cosse</td>
<td>Uganda</td>
</tr>
</tbody>
</table>

## Teaching

TB Centre members have recently revised and updated the TB module, available as part of distance learning and face-to-face taught programmes, and as a standalone module. This module draws on the inter-disciplinary expertise of TB Centre staff and includes topics relating to immunology, pathogen biology, clinical disease, epidemiology, TB control and the social determinants of the TB epidemic.

TB Centre lead – Jackie Cliff

TB Centre members typically run an "Intro to TB Modelling" course at the annual Union World Conference on Lung Health.
Stephen Lawn annual memorial lecture and prize

In September 2016 we lost our esteemed colleague Stephen Lawn, Professor of Infectious Diseases and Tropical Medicine at LSHTM, to brain cancer. His prolific research career (yielding > 250 publications) focussed on the diagnosis and treatment of TB in people living with HIV. Prior to his death Steve and his wife Joy established the Stephen Lawn Memorial Fund which awards an annual prize for an outstanding early-career researcher working on HIV-associated TB in Africa and supports an annual lecture, delivered in March, by a leading TB researcher.

To donate, visit the Stephen Lawn Memorial Fund JustGiving page.