

DESMOND TUTU TB CENTRE ANNUAL REPORT

2019



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Letter from the Director

Reflecting on the past year, we have much to be thankful for at the Desmond Tutu TB Centre. Our centre is truly a place where we care about our work, our local communities, and also for each other.

During 2019, several major milestones were achieved. We have had successful completion and close-out of a seminal HIV prevention trial, HPTN 071 (PopART), one of the largest HIV prevention trials ever conducted in history. In addition to the substantial clinical and scientific benefit to study communities and the global research community, one of the major successes was the appropriate and timely consultation and dissemination with all relevant local stakeholders, including local communities, government partners and implementing partners, before formal trial results were disseminated at international meetings. Capacity building and the retention of many highly skilled personnel after the completion of PopART was highly encouraging, as was the successful transition of key personnel to other research and implementing organizations.

The Centre was awarded the largest single direct research grant in the university's history from UNITAID, for the "BENEFIT-Kids" project, addressing key unmet needs in the treatment and prevention of drug-resistant tuberculosis in children. This 3-year project promises to transform access to much-needed treatment for children and significantly improve the knowledge base of treatment for children with drug-resistant tuberculosis and their families and communities.

Capacity building was a key highlight in 2019, with the promotion of Dr Rory Dunbar, Dr Graeme Hoddinott and Dr Florian Marx, to senior researcher positions, while Dr Anthony Garcia-Prats and Dr Peter Bock were promoted to Associate Professors.

Our community engagement platforms and our institutional Community Advisory Board (CAB) has grown from strength to strength, with meaningful consultation about the design, implementation and dissemination of our research becoming the standard.

The Centre graduated multiple postgraduate students and published more than fifty high-quality peer-reviewed publications, an indication of our ongoing scholarship, our extensive collaboration and our strong focus on knowledge dissemination.

On a sad note, the Centre formally bid farewell to its founding director, Professor Nulda

Beyers, and Professor Robert Gie, who both retired from their wonderfully productive academic careers to pursue new challenges and passions. We are thankful for their inspiring and selfless leadership, their mentorship and for the living legacy they have left behind. What an honour and privilege to have been mentored and trained by such amazing individuals.

We look forward to a productive and impactful 2020. We have much work to do and many challenges and opportunities to meet. We believe that our strong core values, our unique human capital and our equitable collaborations will carry us through this year and into the future.

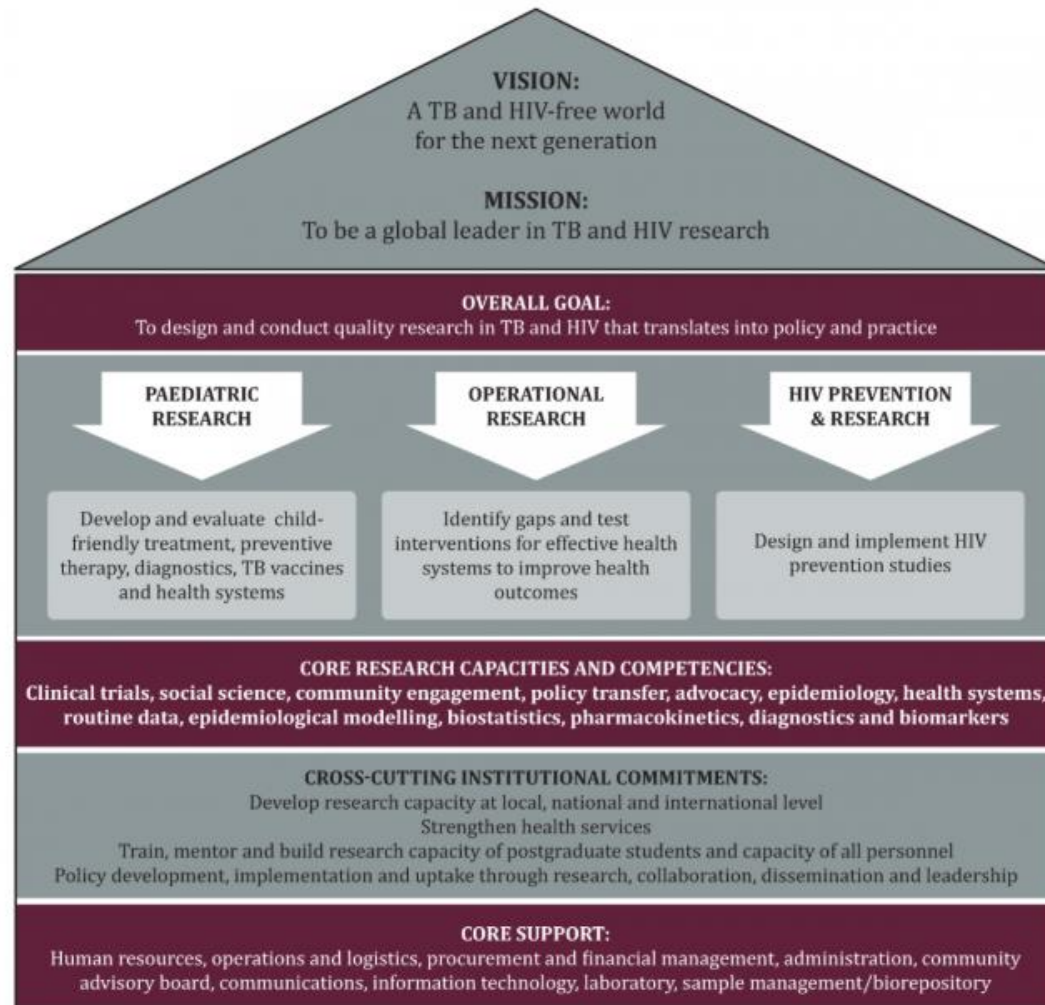
A handwritten signature in black ink, appearing to read 'Anneke C. Hesseling', with a stylized flourish at the end.

Professor Anneke C. Hesseling

Director: Desmond Tutu TB Centre

Distinguished Professor in Paediatrics and Child Health

DTTC Strategy House



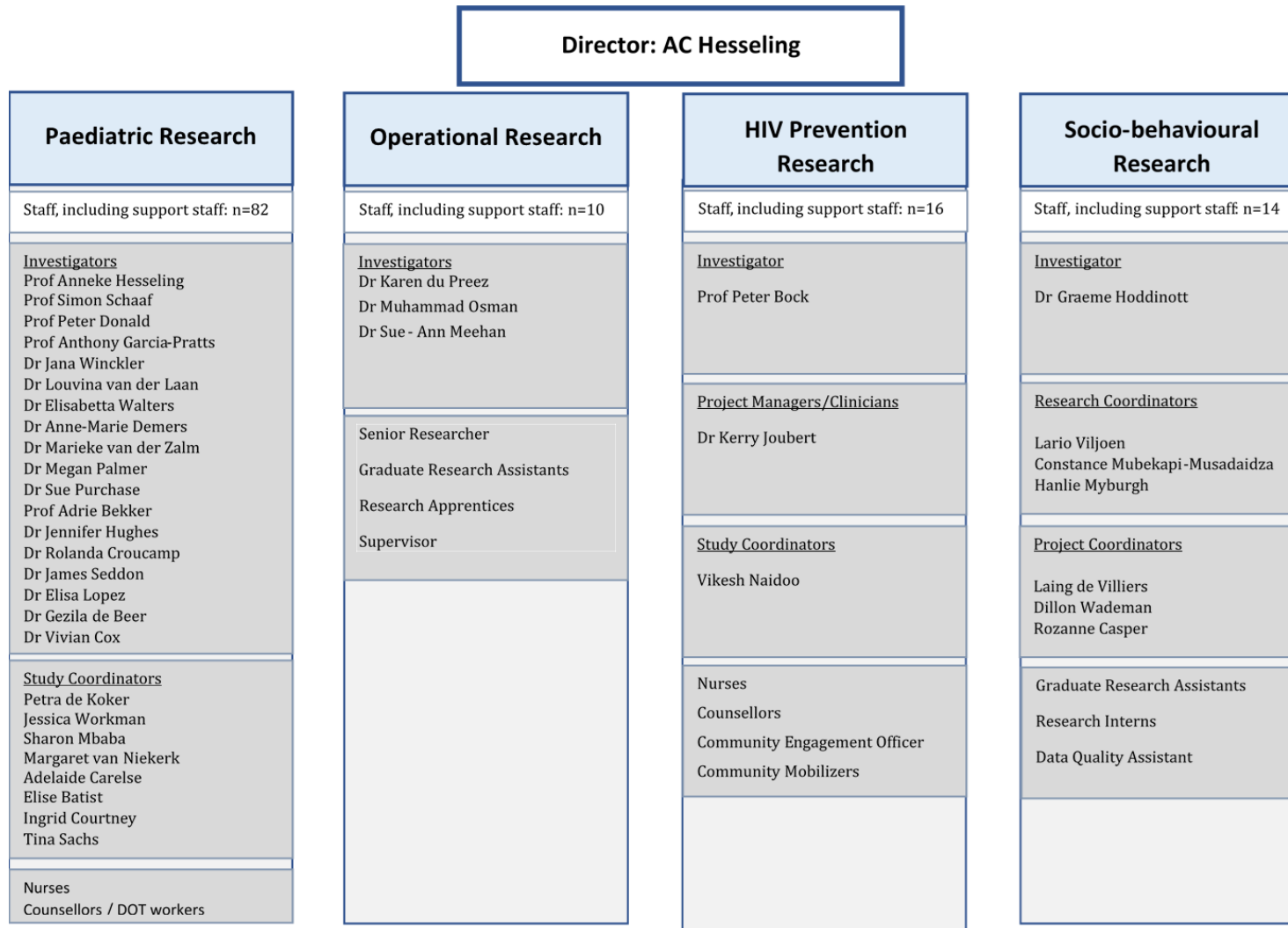
Glossary of Terminology

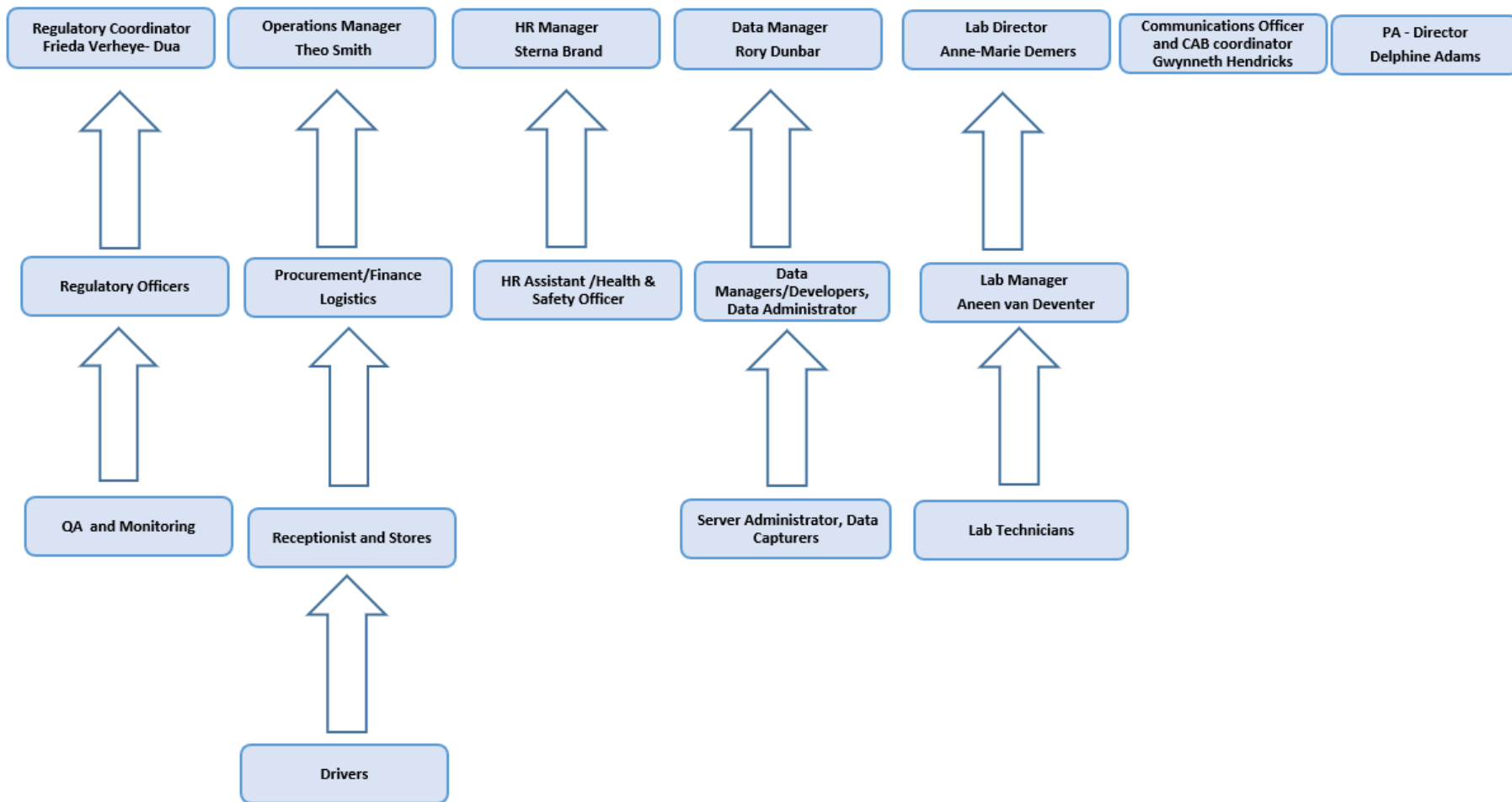
ACTG	AIDS Clinical Trials Group
AIDS	Acquired Immunodeficiency Syndrome
ART/ARV	Antiretroviral Therapy / Antiretroviral
BCH	Brooklyn Chest Hospital
BMC	BioMed Central
BMRC	British Medical Research Council
CAB	Community Advisory Board
CD4	Cluster of Differentiation 4
CDC	US Centers for Disease Control and Prevention
CIDER	Centre for Infectious Disease Epidemiology and Research
CTU	Clinical Trials Unit
CWG	Community Working Group
CXR	Chest X-ray
DAIDS	Division of AIDS, NIAID
DFID	Department for International Development
DoH	South African National Department of Health
DR-TB	Drug-Resistant Tuberculosis
DS-TB	Drug-Susceptible Tuberculosis/Drug-Sensitive Tuberculosis
DTTC	Desmond Tutu TB Centre
EDCTP	The European & Developing Countries Clinical Trials Partnership
FAMCRU	Family Clinical Research Unit
FMHS	Faculty of Medicines and Health Science
HIV	Human Immunodeficiency Virus

HPTN	HIV Prevention Trials Network
HREC	Health Research Ethics Committee
ICAB	IMPAACT Community Advisory Board
INH	Isoniazid
ILTFU	Initial lost to follow-up
IMPAACT	International Maternal Paediatric Adolescent AIDS Clinical Trials Group
IRD	Interactive Research and development
ISMMS	The Icahn School of Medicine at Mount Sinai
ITBSL	International Tuberculosis Specialty Laboratory
LTBI	Latent TB infection
MA	Master of Arts
MDR-TB	Multidrug-Resistant Tuberculosis
MPhil	Master of Philosophy
MRC	Medical Research Council
MRC CTU	Medical Research Council Clinical Trials Unit
MS	Mass Spectrometry
MSF	Médecins sans Frontières
NIAID	National Institute of Allergy and Infectious Diseases
NIH	National Institutes of Health
ORAP	Operational Research Assistance Project
PEPFAR	President's Emergency Plan for AIDS Relief
PI	Principal Investigator
PK	Pharmacokinetics
RIF	Rifampicin

RGMO	Research grants management office
SACEMA	South African Centre for Epidemiological Modelling & Analysis
SC	Steering Committee
SU	Stellenbosch University
TBTC	TB Trials Consortium
TPT	TB preventative therapy
WHO	World Health Organisation

Organogram





Total staff component = 122

Desmond Tutu TB Centre: Highlights for 2019

Key Achievements

- The DTTC received a three-year multi-country grant from UNITAID for the “BENEFIT Kids Project”, focusing on better treatment for children affected by MDR-TB. This grant is the largest single award ever received by Stellenbosch University.
- The DTTC led the submission of the competitive renewal grant application for the NIH-funded clinical trial networks, for the Stellenbosch Clinical Trials Unit (CTU), including the DTTC, FAMCRU and TASK.
- On World TB day, the Desmond Tutu TB Centre hosted a series of presentations with the theme “TB through the lens of time” which included presentations by Peter Donald, Sue Purchase and a performance by the DTTC Community Advisory Board (CAB). The DTTC launched the Robert Gie Ikamva Wing at Tygerberg Campus.
- Findings of the HPTN 071 (PopART) trial were disseminated at the Conference on Retroviruses and Opportunistic Infections (CROI) in Seattle. March 2019.
- The First International Post-Tuberculosis Symposium & Working Meeting was held at Stellenbosch University from 22-23 July 2019. Several DTTC staff were involved with hosting and presenting at the symposium.
- Dr Muhammad Osman received the 2019 HD Brede Award for Postgraduate Research in Infectious Disease in the Clinical research category at the Faculty of Medicine and Health Sciences annual academic day.
- Dr Liz Walters was been awarded a clinical fellowship position (paediatric clinical immunology) at the Royal Victoria Infirmary in Newcastle-upon-Tyne.
- The new DTTC website was launched
- Dr Graeme Hoddinott, Dr Florian Marx and Dr Rory Dunbar were promoted to the position of senior researcher.
- Dr Peter Bock and Dr Anthony Garcia-Prats were promoted to the position of associate professor.
- DTTC staff presented at several key local and international conferences, including the 50th Union World Conference on Lung Health in Hyderabad, India and the AIDS Impact Conference in London.
- DTTC staff successfully published more than 50 manuscripts during 2019.

Postgraduate students

- Anneke Hesseling was awarded four new PhD scholarships through her SARcHi chair.
- Gerald Maarman received an Y2 NRF (National Research Foundation) rating and was featured on the Stellenbosch University Website.
- Graeme Hoddinott was awarded a PhD in Psychology from the University of KwaZulu Natal.
- Eight students from the DTTC were newly registered for PhD degrees.
- Dionne Jivan and Kyla Meyerson, from Sociobehavioural Sciences, were accepted into the highly competitive Clinical Psychology Masters programmes at Stellenbosch University and the University of Johannesburg respectively.

Dissemination and social events

- The DTTC Annual Dissemination meeting was held at Hazendal on the 15th of November with 180 attendees.
- DTTC staff celebrated Heritage Day with a lunch event on the 27th of September.
- DTTC staff participated in the annual Stellenbosch University Sports Day on the 1st of November.



Figure 1. DTTC staff at the Annual Dissemination event, the Union Conference in India and the Stellenbosch University Sports Day.

Research Updates

Research Focus Area One: Paediatric Tuberculosis

The DTTC continues to build upon its world class reputation of clinical research in paediatric tuberculosis (TB). The DTTC is a global leader in therapeutics for the prevention and treatment of TB in children, especially in the context of drug-resistant TB.

The DTTC hosts a South African National Research Foundation SARcHi Chair in Paediatric Tuberculosis, Anneke Hesseling, who is Centre director and Distinguished Professor in Paediatrics and Child Health, at Stellenbosch University. Key focus areas for paediatric research include 1) therapeutics for Drug Susceptible (DS) and Drug Resistant TB (DR-TB) in children and in pregnant women, 2) trials on TB preventive therapy for DS and DR-TB in children, 3) lung health, diagnostics and biomarkers in children, and 4) epidemiological and implementation research.

Major areas of interest specifically include the evaluation of novel therapeutic strategies for Multidrug resistant TB (MDR-TB) in children, where the Centre is a global leader in its field and is generating seminal data on an ongoing basis. The DTTC has again expanded its state-of-the-art paediatric pharmacokinetics (PK) clinical research unit at Brooklyn Chest Hospital (BCH) and has established three new clinical research sites.

Expanding national collaborations have included Shandukani (Dr Lee Fairlie, WHRI), and PHRU (Professor Neil Martinson, Dr Avy Violari) and new international collaboration have included the Uppsala Pharmacometric modelling group and Professor Tony Hu, Arizona State University and Professor Bob Husson (Boston Children's Hospital). The DTTC is also increasingly collaborating with other African research groups including in Uganda, Zambia, Mozambique and Namibia. During 2019, Dr Karen du Preez and Dr Muhammad Osman joined a national South African epidemiological TB programme review with the World Health Organization (WHO), strengthening our existing collaboration to support paediatric TB at both national and international level.

The DTTC paediatric group is a well-performing clinic site for the DAIDS-funded International Maternal, Paediatric, Adolescent AIDS Clinical Trials (IMPAACT) where it is currently conducting five IMPAACT TB trials and also for the US Centres for Disease

Control (CDC) TB Clinical Trials Consortium (TBTC), where it leads Study 35, a TB prevention trial of short course rifapentine and isoniazid, in children. This seminal trial opened in October 2019, with the DTTC being the only site, globally, to enrol in this study .

The paediatric TB research group at the DTTC has been exceptionally productive during 2019. They have graduated two MA degrees and two PhD students, with two new PhD students registered, one postdoctoral fellow from Spain (Dr Elisa Lopez), and a BMRC-funded (British Medical Research Council) research fellow from Imperial College London, Dr James Seddon (who has received an extraordinary appointment at the DTTC as Senior Researcher).

The group's research has resulted in more than 40 publications in international peer-reviewed journals (Appendix I), participation in several national and international TB treatment and prevention guideline meetings, including with the WHO, and with the South African National Department of Health (DoH).

The group has had three major international grants awarded, and several local grants.

The group has embarked on new collaborations with Imperial College London; Rutgers University; BJMC, Pune, India; and La Salle Medical Health Sciences Institute College of Medicine, De La Salle University Medical Centre, the Philippines. The group has also developed new national partnerships in South Africa, and new collaborative partnerships in Africa (Uganda and Zambia).

The therapeutics group has been shaping the science and implementation of paediatric TB treatment trials through leadership in the National Institutes of Health (NIH) funded IMPAACT and the CDC TBTC trial consortia.

The DTTC paediatric group alone contributed 14 presentations to the 50th annual International Union against Tuberculosis and Lung Disease conference in Hyderabad, India, in October 2019, with 7 oral presentations, including two late breaker session.

Crosscutting Projects: prevention and treatment of MDR-TB

BENEFIT Kids (Better Evidence and Formulations for Improved MDR-TB

Treatment for Children) (Project leads: Dr Anthony Garcia-Prats, Prof Anneke Hesselning) is a Unitaid-funded project which will run over a 3-year period (October

2019 – September 2022) with the aim of developing an evidence-based package of improved prevention and treatment tools to reduce paediatric MDR-TB morbidity and mortality. This evidence package will be made available for adoption and scale-up. BENEFIT Kids is a large project that is divided into three outputs with multiple partners' and stakeholders' involvement:

- Output 1 aims to provide improved evidence from existing data for better MDR-TB treatment for children through two systematic reviews of the MDR treatment literature in paediatrics and will feed into WHO guideline development.
- Output 2 consists of 5 clinical trials to deliver improved evidence for better MDR-TB prevention and treatment for children:
 - Trial 1 is called “**Delamanid Crush study**”, which is led by TASK and assesses the relative bioavailability in adults of Delamanid dispersed in water compared to whole tablet form. Delamanid is a key new drug used to optimise MDR treatment regimens and is more easily administered to children in a dispersed formulation. Understanding whether dispersing impacts on bioequivalence is important.
 - Trial 2 is the “**PERFORM study**” (Pharmacokinetics of lEvofloxacin FORmulations in children with MDR-TB exposure) and evaluates the pharmacokinetics and acceptability of 100 mg dispersible compared to 250 mg non-dispersible tablets of levofloxacin in children exposed to MDR TB. Levofloxacin is used in both MDR treatment regimens and as prevention for children exposed to MDR-TB and this study aims to look at how formulation may affect drug exposure (which impacts on safety and efficacy).
 - Trial 3 is called the “**CATALYST study**” (Clofazimine and moxifloxacin PK, safety and AccepTAbiLiTY for paediatric TB treatment), a phase I/II trial of the pharmacokinetics, safety, tolerability and acceptability of new formulations of clofazimine and moxifloxacin in children treated for rifampicin-resistant TB. These two study drugs are often included in MDR-TB treatment regimens and the trial aims to evaluate new child-friendly formulations. This is a multi-site study which will recruit at the DTTC Brooklyn Chest Hospital (BCH) site as well as in India (partner

BJMC and JHU, PI: Dr Aarti Kinikar) and the Philippines (De la Salle Medical Centre, PI: Dr Mel Frias) University.

- Trial 4 is “TB CHAMP” (please see Therapeutic trials: prevention of MDR-TB below)
- Trial 5 is the “PETITE study” (Pharmacokinetic and safety of the 4-In-1 granules in neonates) which will be led by neonatologist Adrie Bekker. This is an open label, single arm, two-stage trial to evaluate the single and multi-dose pharmacokinetics and safety of the abacavir/lamivudine/lopinavir/ritonavir (30/15/40/10mg) (4-in-1) fixed-dose granule formulation in HIV-exposed neonates.
- Output 3 aims to produce targeted formulation development and market shaping to improve availability of child-friendly formulations of key 2nd-line TB drugs and will be undertaken in partnership with TB Alliance.

The large grant for this ambitious project was awarded by Unitaid to the DTTC, Stellenbosch University in Quarter 4 of 2019 and the project was launched at the 2019 Union Conference in India, October 2019. All clinical trials will commence recruitment in the second half of 2020.

Therapeutic trials: prevention of drug-susceptible TB

TBTC Study 35: (PI Anneke Hesselning) This multisite study funded by the United States Centre for disease control (CDC) and the CDC Foundation, aims to evaluate the pharmacokinetics (PK), safety and tolerability of rifapentine given in a novel, water-dispersible fixed dosed combination with Isoniazid (INH) which is developed and supplied by Sanofi. This FDC of Rifapentine and Isoniazid which has been shown to be efficacious in preventing progression from latent TB infection (LTBI) to disease, will be given once-weekly, for 12 weeks, in HIV-infected and HIV-uninfected children between the ages of 0-12 years in whom treatment for LTBI is indicated. Current LTBI treatment is daily INH for 6 months, adherence to this regimen is poor as it is not a child friendly regime or formulation. It is important to treat LTBI to prevent progression to disseminated or severe forms of TB in young children, therefore a regimen that improves adherence to LTBI treatment, will potentially decrease TB related childhood morbidity and mortality. This study hopes to inform dosing (especially in children

under two years), provide more safety data and assess acceptability of this novel FDC of Rifapentine and Isoniazid.

Therapeutic trials: treatment of drug-susceptible TB

SHINE: (Site PI: Anneke Hesselning). The SHINE trial (Shorter treatment for minimal TB in children) is a multi-site open-label trial that aims to evaluate the efficacy and safety of 4-month vs. the standard 6-month TB treatment regimen for non-severe DS-TB in children. The trial is sponsored by the Medical Research Council Clinical Trials Unit (MRC CTU) at University College London. Recruitment was completed in July 2018, with 1204 children enrolled in South Africa, Zambia, Uganda and India. The DTTC enrolled a total of 315 children. The new WHO-endorsed dispersible fixed-dose combination of first-line TB drugs was used in this trial: nested pharmacokinetics sampling was completed in 31 children, and the DTTC led the qualitative work around the acceptability and palatability of this formulation. The DTTC is also coordinating the process for central expert review of the chest X-rays taken on the SHINE trial – approximately 1200 CXR images have been reviewed thus far and will inform the final adjudication of certainty of TB diagnosis and classification of trial outcomes. The results of the SHINE trial, which are expected in Quarter 3 of 2020, could pave the way for future trials looking at TB treatment shortening in children.

Project P1026s: (PI Jenny Hughes). IMPAACT 1026s is a phase IV observational PK study that started in November 2017 and closed to recruitment in December 2019. The primary aim of the trial is to describe PK of selected ARV drugs, TB drugs and contraceptives currently used in the clinical care of HIV-infected and HIV-uninfected women with TB or drug-resistant TB. Overall, 13 women have been enrolled on the drug-resistant TB arm and 8 of these women were enrolled at the DTTC; planning for the analysis of these data is underway. This study will provide critically needed information on the PK in pregnant women of medications used to treat MDR-TB. A follow-up study, IMPAACT 2026, which also aims to describe the PK properties of ARV, TB, and hormonal contraceptive drugs administered during pregnancy and postpartum (in blood and breastmilk), is in preparation and will open in 2020.

IMPAACT P1101: (Site PI: Anneke Hesselning) this IMPAACT-funded multisite network phase I/II trial evaluated the PK and safety of Raltegravir, a new integrase inhibitor, in

combination with first-line TB treatment, including rifampicin. Children were HIV-infected, on TB treatment, but not currently on ARVs. This patient group was difficult to enrol in Cape Town, given good HIV prevention and treatment services in children, however enrolment was successfully completed and the study has officially been closed. Data analysis for this study has nearly been completed and publications are underway.

Site of Disease PK (SOD) STUDY: Pharmacokinetics of antituberculosis drugs at the site of disease in children with complicated intrathoracic tuberculosis (PI: Anneke Hesseling, Elisa Lopez-Varela, Pierre Goussard). This was a uniquely innovative proof of concept paediatric study investigating the pharmacokinetic of anti-tuberculosis drugs at the site of disease in children with complicated pulmonary tuberculosis, compared to plasma exposures. A total of 15 cases were included and the data has been analysed and will be published shortly, providing the first estimates globally on TB drug penetration into intrathoracic lesions in children

OptiRif Kids: Optimising rifampicin exposure in children (PI: Anneke Hesseling) this phase I/II open label multi-cohort dose escalation study aimed to evaluate the pharmacokinetics and safety of increased doses of rifampicin in HIV-negative children with tuberculosis. This trial, funded by the TB Alliance, was an investigator-initiated trial conducted at the DTTC and at Shandukani trial site in Johannesburg. Three dosing cohorts were enrolled, starting with the standard dose of 15-20 mg/kg of rifampicin, and using population PK to model optimal doses. Ultimately, adult PK targets for rifampicin (using a high dose of 35 mg/kg per day in adults) in children, requiring 60 mg/kg daily rifampicin in children. There were no significant safety concerns. This study for the first time determined the dose requirements for rifampicin, a key sterilizing TB drug, to achieve new higher rifampicin adult exposures, and paves the way for the evaluation of high-dose rifampicin in new TB treatment regimens.

Therapeutic trials: prevention of MDR-TB

TB-CHAMP (MDR-TB preventive therapy trial): (DTTC PIs: Anneke Hesseling, Simon Schaaf, James Seddon) This is the first ever randomized phase III placebo-controlled trial to assess the efficacy of levofloxacin preventive therapy vs. placebo in child contacts of multidrug-resistant (MDR) TB. The target sample size is 1009 children 0-5

years of age. The main trial opened to accrual in Q4 2017 at the DTTC. As of 31 January 2019, 647 children had been screened and 505 enrolled in the study. Interim analysis is planned for when these 500 contacts have been followed up for at least 24 weeks. The trial, led by the DTTC, was previously funded by the BMRC/Wellcome Trust/DFID, and has recently received funding until September 2022 from UNITAID as part of the BENEFIT KIDS grant. The trial includes 3 South African sites, including Shandukani (WHRI, Johannesburg, Dr Lee Fairlie), PHRU Matlosana, Klerksdorp (Prof. Neil Martinson) and the DTTC.

Therapeutic trials: treatment of MDR-TB

IMPAACT 2005: (PI Anneke Hesselning). IMPAACT 2005 is an NIH-funded phase I/II open-label, single arm study to evaluate the pharmacokinetics (PK), safety and tolerability of delamanid in combination with an optimized background regimen for MDR in HIV-infected and HIV-uninfected children with MDR-TB. Delamanid is a new drug used for the treatment of MDR TB in children and adults. Optimizing its use in children is crucial as its inclusion in an MDR treatment regimen allows for the exclusion of painful injectable drugs (and their unacceptable side effect of permanent hearing loss, among others) and shortening of treatment duration. 48 participants, aged 0-17 years, will be enrolled into four age-based cohorts over a period of 72 weeks and will receive delamanid for 24 weeks. PK and safety data will be collected. The trial is expected to open to accrual in Quarter 2 of 2020.

Otsuka 232/233: (PI: Anthony Garcia-Prats, Louvina van der Laan): Along with a site in the Philippines, the DTTC is implementing this industry sponsor-funded (Otsuka, Japan) Phase 1 (232) and Phase 2 (233) trials which seek to characterize the pharmacokinetics and safety of delamanid in children with MDR-TB. New drugs are desperately needed for the treatment of children with MDR-TB, and these trials are critical for ensuring timely access to this important new medication. In this age de-escalation trials, all age groups (0 to 17 years) have fully enrolled for both studies. Data from these groups informed WHO guidance in 2016 for the use of delamanid in children 6-17 years of age with MDR-TB, and in 2018 for Group 3 (ages 3-6 years). The 232 study is now closed with final data analysis ongoing, and the long-term follow-up

of Group 4 (0 to 2 years) in study 233 was completed Jan 2020, with the final analysis now ongoing.

MDR PK 2: (PI: Anthony Garcia-Prats) MDR-PK2 is an NIH-funded observational study that aims to evaluate the pharmacokinetics, safety, tolerability and acceptability of model-optimized doses of key drugs used in MDR TB treatment regimens: levofloxacin, moxifloxacin and linezolid. The study enrolled 89 children and closed to accrual in 2018. Seven children remain in clinical follow-up and are expected to complete the study within the next two months. Data from this study has already informed updated WHO paediatric dosing guidelines and has generated several manuscripts and Dr Garcia-Prats' PhD 2019; further analyses are ongoing.

IMPAACT P1108: (PIs Anneke Hesselning, Simon Schaaf). IMPAACT 1108 is an NIH funded phase I/II trial to determine the optimal and safe dose of bedaquiline in HIV-infected and HIV-uninfected children with MDR TB. P 1108 is a multi-centre trial which enrolls children in age-based cohorts in an age de-escalation strategy and is being undertaken in South Africa, India and Haiti. The target sample size is 75 and 8 of the 15 children enrolled thus far were enrolled at the DTTC. Bedaquiline is a critically important treatment option for both adults and children as it allows for the use of shorter, injectable-sparing MDR TB treatment regimens. Data from P1108 has already informed WHO paediatric dosing guidelines and bedaquiline is now available in South Africa for children 6 years of age and older in the routine TB programme. Cohorts 2 and 3 (children < 6 years of age) will open in Quarter 1 2020.

Lung health, diagnostic and biomarker studies

(PIs Elisabetta Walters, Marieke van der Zalm and Anne-Marie Demers)

UMOYA ("Breathe"). Intra-thoracic tuberculosis in children: moving towards better diagnosis and improved lung health: (PIs Liz Walters, Marieke van der Zalm). A diagnostic cohort study that builds on a previous diagnostic study led by Liz Walters and has leveraged funding from NIH, Thrasher Foundation, EDCTP (The European & Developing Countries Clinical Trials Partnership) and the South African MRC. UMOYA started recruitment November 2017 and currently has 270 children enrolled. The aim is to enrol 300 children with suspected TB and 100 healthy sibling controls from

Tygerberg hospital and Karl Bremer hospital. The study will continue to evaluate improved diagnostic strategies for paediatric TB, including novel laboratory techniques for both molecular and culture-based diagnosis on respiratory and stool specimens. It will support ongoing evaluation of blood and urine biomarker work. In addition, the study will continue work to evaluate the interaction between viral and bacterial co-pathogens with TB and plans to assess and monitor lung function longitudinally in all children.

Additional funding and sub-studies were included in the platform in 2019 including:

- Butterfly ultrasound funded by the Bill and Melinda Gates Foundation. The Butterfly ultrasound study is a proof-of-concept study which aims to explore the use of lung ultrasound to discriminate between TB and non-TB lung disease in a paediatric population. Children will largely be recruited for the study from the Umoya platform. The Butterfly ultrasound is a handheld, single probe ultrasound device that connects to a phone or tablet and interfaces with a user-friendly App. The fact that this is a point-of-care tool designed for non-expert use, combined with its affordability, makes the Butterfly ultrasound a promising diagnostic tool, particularly in low-resource settings.
- Influenza project; subcontract with University of the Western Cape and Professor Megan Shaw to investigate genetic diversity of the influenza virus in children with suspected pulmonary TB. This is a 2-year subcontract; The Icahn School of Medicine at Mount Sinai (ISMMS) holds the contract from NIAID/NIH. UWC and Stellenbosch University will receive funds from a subcontract between ISMMS and the University of the Western Cape
- QOOL kids (Quality of life for children); Temporary Research assistance funding from the University of Stellenbosch for M Anthony working towards her PhD (Graeme Hoddinott/ Marieke van der Zalm).
- TiKa novel processing mycobacteriology method project; funding from the IMPAACT International Tuberculosis Specialty Laboratory (ITBSL) with kits provided by TiKa Diagnostics Ltd.

Evaluation of novel TB biomarkers in children

Study 1. Urine proteomics: This project aims to identify host-derived urine proteins that are differentially expressed in children with TB compared to children with non-TB illness. The project is in collaboration with USA partners Robert Husson and Hanno Steen from Boston Children's Hospital, USA. This final year, the focus of the project has been to optimize the LC-MS/MS platform to achieve a high detection of proteins in urine samples. This is done in the Steen laboratory at Boston Children's Hospital, Harvard University. Data analysis will include both traditional logistic regression approaches (led by Harvard University) as well as bio-informatics methods (led jointly by Harvard and Stellenbosch Universities). A doctoral student, Ashley Ehlers, under the supervision of Prof Tabb from SU's Division of Molecular Biology and Human Genetics, has been awarded a scholarship by Boston Children's Hospital, to work on this project. Final data-analysis is expected in 2020.

Study 2. Serum bio-signatures. This project aims to identify pathogen-derived serum antigen peptides that are differentially expressed in children with TB compared to children with non-TB illness, using a novel NanoShell-MS assay. The project is in collaboration with US partner Tony Hu from Arizona State University and data-analysis is ongoing.

Epidemiological and operational research for paediatric TB

Please refer to Research focus Area Two: Health Systems and Operational Research for updates of paediatric focused epidemiological and operational research studies.

Research focus Area Two: Operational Research

The aim of the research in this pillar is to help improve TB and HIV care by building an evidence base for effective programme implementation. Operational research focuses on identifying gaps in health programme quality, efficiency and effectiveness, evaluating factors that contribute to these, and testing interventions to improve outputs and outcomes.

This research focus area also includes epidemiological and routine data analyses,

modelling, and health system strengthening research, all contributing to the overall aim of generating evidence to strengthen program implementation.

Highlights for 2019 includes the team's involvement with the WHO South African TB epidemiological review which was conducted in October 2019.

Health Systems and Operational Research

Evaluating 10 years of TB control in South Africa: (PI: Muhammad Osman; co-investigators: Karen du Preez, Anneke Hesselning, Rory Dunbar). Routine TB surveillance data have been under-utilised in identifying and understanding programme weaknesses and finding ways to address these. The socio-economic determinants that may be contributing to poor TB control have not been adequately evaluated. As South Africa scales up TB control efforts to achieve the even more ambitious “End TB Strategy” goals, a more data-driven approach to TB control efforts is required. This study aims to undertake a comprehensive, in-depth analysis of TB control in South Africa to review epidemiological trends from 2004 to 2016 and to identify achievements and programme gaps where intervention is required. This project is not funded and is being implemented in collaboration with National Department of Health.

During the 2019 WHO South African TB epidemiological review, through this study we were able to assist NDOH with historical TB data for SA for 2004 – 2016 that had been cleaned and finalised. This contributed to a time series of aggregate district-level data that was uploaded onto DHIS2 and has been critical to the success of both the epidemiological as well as the national TB program review completed in 2019.

Current analyses include:

1. Case notifications and outcomes in adults and children
2. Spatial variability in South Africa
3. Key populations: Children and previously treated TB patients

LINKEDin: reducing initial loss to follow up among tuberculosis patients in South Africa: (PIs: Anneke Hesselning and Muhammad Osman). This study is funded by the Bill

and Melinda Gates Foundation. Individuals diagnosed with TB, but who are lost to follow up before initiation of TB treatment and/or TB notification are referred to as “initial loss to follow up” (ILTFU). This study aims to: 1) demonstrate the impact of an automated notification system of TB patients in hospitals on increasing the number of notified TB cases; and 2) demonstrate the impact of the implementation of an automated alert-and-response TB patient management system on increasing the proportion of TB patients who are linked to TB services and who initiate treatment at different levels of health care. Implementation began in 2019 in 6 hospitals and 31 primary health care facilities in 3 provinces of South Africa; Western Cape, Gauteng and KwaZulu Natal. The DTTC is working closely with implementing partners; Centre for Infectious Disease Epidemiology and Research (CIDER) in the Western Cape Province, Right to Care in Gauteng Province and Interactive Research and development (IRD) in KwaZulu Natal, as well as local and provincial health departments. Using a before/after design, the study will measure the proportion of TB patients who are ILTFU at baseline and again at the end of the implementation phase. In the WCP, 4 sub-studies are being implemented to; 1) estimate costs associated with the interventions 2) determine patient experiences and social determinants of linkage to care, 3) quantify mortality among ILTFU TB patients and 4) pilot an innovative strategy for linkage to TB care. Preliminary analysis has identified that >50% of presumptive TB patients do not have smart phones or any cellular phone (self-reported). Some of the reasons TB patients provided for not linking to care includes; not knowing their TB result, insufficient information provided at discharge (hospital diagnosed patients) and mobility. Those who did link had good family support and were motivated to get well for their children. Implementation of the study interventions will continue until June 2020.

Operational Research Assistance Program (ORAP): The overall aim of ORAP is to undertake operational research as an integral component of health programmes in South Africa to contribute to improved quality and performance of the health system.

In November 2016, a new miniature version of ORAP was implemented in the Western Cape. Participants (5 from health services) have embarked on an experiential learning course to develop three independent study protocols for research to be undertaken. Five mentors from the DTTC are supporting the trainees through protocol development, study implementation and publication of their findings. All three projects are approved

for implementation by the Stellenbosch University Health Research Ethics Committee (HREC).

During 2019, data collection was completed, and mentored sessions were conducted to support the process of manuscript preparation

Research Focus Area Three: HIV Prevention Research

The DTTC has made great strides in the field of HIV prevention with two studies as part of the HIV Prevention Trials Network (HPTN) conducted during 2018.

HPTN 071 (PopART): (SA PI: Peter Bok, Nulda Beyers) HPTN 071 (PopART) enrolment and follow-up was completed in June 2018. The HPTN 071 primary outcome results showed a 7% reduction in HIV incidence between Arm A (full intervention) to Arm C (control), which was not statistically significant ($P=0.51$), and a 30% reduction comparing Arm B (intervention) to Arm C (control), which was statistically significant ($P=0.006$). Following this, the DTTC team disseminated study results to a wide range of scientific, stakeholder, community and media audiences. The HPTN 071 results contributed significantly to the understanding of the role of treatment as prevention and have been widely disseminated both locally and internationally. Lessons from HPTN 071 include those gained during implementation of household HIV prevention intervention strategies and ART initiation at high CD4 counts. These implementation lessons have also been disseminated both locally and internationally and have resulted in the development of the South African DoH's community workers programme.

HPTN 084 (LIFE): (PI: Peter Bock) HPTN 084 (LIFE) is a phase 3, double blind, safety and efficacy study of long-acting injectable cabotegravir compared to daily oral TDF/FTC for PrEP in HIV- women. The projected total number of participants for recruitment across all sites is 3200. Enrolment is scheduled to continue till April 2020 and follow up until May 2022. Participants are HIV negative women aged 18 to 45 at high risk for HIV acquisition. By the end of December 2019, the DTTC Kuilsriver site had enrolled 111 participants. As the role of pre-exposure prophylaxis is not clearly defined yet in high burden settings such as SA, the results of the HPTN 084 study are keenly awaited as injectable PrEP may contribute significantly to reducing the number of new HIV cases. The DTTC received the HPTN Network Staff Excellence in Leadership Award to the DTTC, at the annual HPTN annual meeting, Washington DC, June 2019.

Crosscutting Research (Supporting all three research focus areas)

Sociobehavioural Sciences

During 2019, the Sociobehavioural science team continued to successfully implement a broad range of data collection and analysis activities as components of the wider DTTC research portfolio. The team has made strong contributions to all three research focus areas at the Centre. These activities range from determining how Quality of Life is measured for children affected by TB (Qool Kids); people's experiences of linking (or not linking) to TB treatment/care (LINKEDin); and an overview of current TB-preventative implementation across South Africa (TIP Study) for the South African TB Think Tank. Across activities, all data collection, management, processing and preparation for analysis is standardised and managed by a dedicated data quality team. In 2019, the team transcribed and translated approximately 1000 hours of recorded interview/discussion data.

In 2019, the team had several highlights, including the graduation of one PhD student, two master's students, and two honours students. A further three students were formally registered for the PhD degrees. Dr Graeme Hoddinott, the team lead, was also promoted to senior researcher. In addition, two team member, Kyla Meyerson and Dionne Jivan, were accepted into the highly competitive master's in clinical psychology programmes at the University of Johannesburg and the University of Stellenbosch respectively. The team led on or contributed to more than 8 major research grant applications for the Centre. Team members presented their work on several local and international platforms, including the AIDS Impact conference in London; the first Post lung health symposium held at Stellenbosch; and the Union Conference in India. The team submitted 7 academic manuscripts for publication.

A priority for 2020/2021 is to support staff in building capacity to lead in project implementation. A further priority is to continue to encourage post-graduate studies, and in doing so, building on the culture of academic learning and publication.

Sociobehavioural Science and Paediatric TB

Qool Kids: In-depth qualitative interviews and observations with caregivers were conducted about the perceptions and understanding of quality of life in children with lung health complications. The study was nested in the UMOYA study: A diagnostic

cohort that evaluates the improved diagnostics strategies for paediatric tuberculosis. This set of interviews were conducted between October 2019 and November 2019. Semi-structured discussions were conducted with 10 caregivers' in order to understand their perceptions of quality of life and the effects that tuberculosis may have on the child's overall well-being. Data processing will be concluded in January and a report prepared in February 2020. A manuscript will be prepared for submission in 2020 as part of Michaile Anthony's PhD.

TiP Study: (PI: G Hoddinott). The TB Preventative Therapy review project (TiP Study) is funded by the South African TB Think Tank and comprised of two components: An scoping of review of literature on the state of TB preventative therapy (TPT) in South Africa; and a case description of TPT implementation at health facilities in three provinces in South Africa in order to describe the care cascade. We conducted 3 days of semi-structured observations per facility in the 31 selected facilities in the Western Cape, Eastern Cape and KwaZulu Natal. and conducted in-depth key-informant interviews (n=134) across the health facilities. Participants included: TB nurses, HIV nurses, counsellors, community health workers, community, doctors, facility managers, pharmacists, TB patients, and patients on TPT. The technical report has been submitted to the funders and finer analysis is ongoing.

TB CHAMP costing: The TB-CHAMP trial is testing a novel, child-friendly formulation of levofloxacin (see *Therapeutic trials: prevention of MDR-TB* above). In 2019 the TB CHAMP costing component was designed to assess the economic impact of paediatric MDR-TB treatment on households. As part of the costing component, 25 surveys were to be conducted with paediatric participants (aged 0-5 years) caregivers of Afrikaans and isiXhosa speaking backgrounds. Participants were given an electronic tablet and asked to complete a costing survey assessing the financial cost of MDR-TB on the household. Out of the stated 25 surveys to be conducted; 11 surveys were completed. The costing survey now awaits ethical approval to expand the age group of participants for the survey to reach its intended goal of 25 participants.

Sociobehavioural Science and Operational Research

LINKEDin (Reducing initial loss to follow up among tuberculosis patients in South Africa) – Two sub-studies:

Patient Experiences: This qualitative sub-study of the LINKEDin study was conducted to explore patient experiences of linking (or not linking) to care following TB diagnosis. We conducted repeated interviews (qualitative cohort) and semi-structured observations with TB patients in one sub-district within the Cape Town Metro district between June 2019 and January 2020. We included TB patients who linked without intervention (n=5), after an SMS or phone call (n=5), after a home visit from a community care worker (n=5) and failed to link (n=5). The qualitative data collection was done from June 2019 and will be completed in January 2020. Analysis of the data is ongoing.

WIARS: The 'WhatsApp-based interactive alert and response system (WIARS)' sub-study aimed to pilot and evaluate an innovative interactive communication strategy to prevent loss to follow-up among presumptive TB patients who submitted sputum for diagnosis at the local clinic in a high-incidence community in suburban Cape Town. The intervention consisted of three levels of communication: (1) WhatsApp-based interactive reminders to attend scheduled clinic visits, (2) the inclusion of proxy contacts in a WhatsApp chat to support attendance, and (3) prompts to share location information and receive a phone call for participants who missed a scheduled appointment. A total of 122 study participants were enrolled by the end of 2019. Results for the study are expected to be available in the first half of 2020.

Sociobehavioural Science and HIV Prevention Research

HPTN 071 (PopART) and HPTN 071a (Stigma Ancillary Study): The PopART study was a randomised controlled trial conducted in 21 communities Zambia and South Africa to determine if the implementation of a door-to-door HIV prevention package (including access to universal access to HIV testing and treatment) would decrease HIV incidence over the course of the trial. The Stigma Ancillary Study was a mixed method study that nested enquiry about HIV stigma across the PopART study. In particular, it the study examines how health care worker knowledge, attitudes, and experiences of delivering HIV care are influenced by, and influence, the delivery and uptake of the PopART intervention. The PopART project ended in 2018, and the Sociobehavioural science team was involved with several dissemination events during 2019. This included providing logistical support for local community engagement events;

attendance at the AIDS Impact conference in London to disseminate Stigma data on an academic platform; and submitting several academic manuscripts related to key findings of the trial.

Epidemiological Modelling of TB Control

Tuberculosis modelling

Modelling of tuberculosis and the impact of TB control interventions constitutes an additional core competency to be built at the DTTC in the forthcoming years. In 2019, a new strategic TB modelling partnership and research programme between the DTTC and the South African Centre of Excellence in Epidemiological Modelling and Analysis (SACEMA) was initiated. This novel initiative is intended to provide a platform for mathematical modelling and intervention research to inform decision making for TB control at national level in South Africa as well as internationally.

Joint DTTC SACEMA TB Modelling Group

The joint DTTC-SACEMA TB Modelling Group, led by senior researcher Dr Florian Marx, currently consists of 10 members with backgrounds in medicine, epidemiology/public health, data management and statistics. In 2019, the group worked on a joint research project which aims to project the population-level impact of ART scale up on TB incidence and mortality in the nine South African Provinces. This first modelling project is expected to be completed in the first half of 2020. Dr Muhammad Osman and Dr Florian Marx became members of the new Task Group “TB Epidemiology and Modelling” of the TB Think Tank (National Department of Health). Dr Florian Marx received funding from the South African Medical Research Council, the TB Think Tank and SACEMA to host a National Symposium entitled “Mathematical Modelling Research to Guide Decision Making for Tuberculosis Control in South Africa”, which is scheduled to take place in late January 2020. The symposium will be a collaborative effort between the DTTC, SACEMA, CIDER (University of Cape Town) and the National TB Think Tank.

DTTC Grants Awarded: 2019

During 2019, staff at the DTTC applied for and received several large grants from multiple funding institutions. As a special achievement, Karen du Preez received an impact score of 14 on her NIH K43 Emerging Global Leader Award application. Several

enrolled students at the DTTC were also successful in their funding applications.

Grant	Title/Description	PI/ recipient
Unitaid	BENEFIT Kids: Better Evidence and Formulations for Improved MDR-TB Treatment for Children	Tony Garcia-Prats Anneke Hesselning
Bill and Melinda Gates Foundation	Butterfly study. Pilot study linked to UMOYA (Ultrasound device app).	Megan Palmer Marieke van der Zalm
NIH K43 Emerging Global Leader Award	Interdisciplinary and multi-level approach to estimate the disease burden and outcomes of childhood tuberculous meningitis (Award start date Feb. 2020)	Karen du Preez
South African Medical Research Council - National Conference	National Symposium: Mathematical Modelling Research to Guide Decision Making for Tuberculosis Control in South Africa	Florian Marx
Meningitis Now	SURE+DP: Diagnosis and Prognosis for paediatric tuberculous meningitis through the SURE treatment trial.	Robin Basu Roy (PI) James Seddon (Co-I)
Stellenbosch University: Scientific travel Fund	Travel funding for attending The TB Union Conference in India in October 2019	Sue-Ann Meehan Marieke van der Zalm

MRC/DFID African Research Leader scheme 2019 MR/T008814/1	Hotspots, hospitals and households: enhanced drug-resistant tuberculosis case finding in Namibia (H3TB)	Mareli Claassens James Seddon
Urban Infrastructures of Well-Being Programme	A method for rapidly assessing context in urban communities to optimise public health interventions: the case of water infrastructure in sub-Saharan African cities.	Virginia Bond (PI) Graeme Hoddinott (Co-PI)
Stellenbosch University: Temporary Research Assistance Funding	Project: Measuring TB-associated quality of life in young children.	Graeme Hoddinott
Sub-contract: University of the Western Cape	The Influenza project (part of Umoya). Support for a virology study to examine the influenza genetic diversity in children with and without PTB.	Megan Shaw Marieke van der Zalm
Imperial College Global Challenges Research Fund	Understanding the biology, morbidity and social context of adolescent tuberculosis	James Seddon
NRF PhD Completion grant	PhD: Love, sex and romance in the context of universal access to HIV testing and treatment	Lario Viljoen
Stellenbosch University Postgraduate Support Bursary.	MPhil: Exploring ways in which the management of household incomes affect antiretroviral therapy (ART) adherence of people living with HIV in the Western Cape	Abenathi Mcinziba

Awards and Other Recognition

1. Gerald Maarman received an Y2 NRF (National Research Foundation) rating and was featured on the Stellenbosch University Website. February 2019.
2. Dr Muhammad Osman received the 2019 HD Brede Award for Postgraduate Research in Infectious Disease in the Clinical research category at the Faculty of Medicine and Health Science annual academic day. Title: Treatment Outcomes in Global Systematic Review and Patient Meta-Analysis of Children with Extensively Drug-Resistant Tuberculosis.
3. The DTTC, as part of the HPTN 071 (PopART) study received an award for Staff Excellence in Leadership Award from the HIV Prevention Trials Network in Washington, USA. 5 June 2019.
4. The HPTN also awarded the DTTC a Certificate of Excellence for the HPTN 084 (LIFE) study in recognition for timely query resolution.
5. Dr Rory Dunbar was formally promoted by Stellenbosch University to Faculty Researcher, securing funding for next three years.
6. Liz Walters has been awarded a clinical fellowship position (paediatric clinical immunology) at the Royal Victoria Infirmary in Newcastle-upon-Tyne, starting 30 October 2019.
7. Dr Graeme Hoddinott was promoted to Senior Researcher at the DTTC
8. Dr Peter Bock was promoted to the position of Associate Professor at the DTTC.

DTTC Academic meetings

The TB Clinical Forum 2019, hosted by the DTTC at the Stellenbosch University Faculty of Medicines and Health Science (FMHS) and organized by the City of Cape Town officials, was held monthly between February and November 2019 with the objective of creating an interactive platform for academic researchers and government official in health services. Experts from the FMHS and The City of Cape Town presented a broad range of relevant scientific research topics. An average of 50 participants attended these lively CPD-accredited interactional meetings on Friday afternoons, facilitating

dialogue between service providers for TB and HIV care, and researchers at the DTTC and the medical faculty. Ten speakers from the DTTC presented during 2019.

TB Clinical Forum 2019

Date	Presenter	Topic
8 February	Muhammad Osman (DTTC) Anja Reuter (MSF) Kay Joseph (CCT) Dawood Da Costa (NHLS)	Highlights from the 49 th Union World Conference on Lung Health, The Hague, Netherlands
8 March	Anneke Hesselning (DTTC) James Seddon (DTTC) Gerhard Theron (SU)	TB Prevention in adults and children Maternal TB Prevention
12 April	Graeme Hoddinott (DTTC)	How do we involve communities in TB/HIV programmes and research? The Role of CAB/CAG.
10 May	Rod Dawson (UCT) Dr Veronique de Jager (TASK)	Management of DS-TB Failure: Practical Approach to Care Kit guidelines and algorithms of the TB drug sensitivity in adults and children Increasing the dosages of Rifampicin in adults.
14 June	Jennifer Hughes (BCH)	Management of DS and DR -TB in pregnancy and research updates
12 July	Liz Walters (DTTC) Helene Rabie (SU)	HIV/TB Co-infection in children-current challenges and future opportunities
16 August	Graeme Meintjies (UCT)	HIV/TB Co-infection in adults- update

13 September	Muhammad Osman (DTTC) Florian Marx (DTTC) Sue-Ann Meehan (DTTC)	The use of routine data in TB/HIV research
25 October	Anneke Hesseling (DTTC)	Update on Paediatric TB treatment Trials
8 November	DTTC and MSF Speakers	Highlights from the 50 th Union World Conference on Lung Health held in Hyderabad India

DTTC Academic Meetings 2019

The DTTC Academic Meetings 2019, held fortnightly at the Faculty of Medicines and Health Science (FMHS) targeted academic researchers to engage in ground-breaking research initiatives. Speakers from local and abroad were invited to present their area of research in a broad range of relevant topics.

Date	Presenter(s)	Topic
21 February	Samantha Fry	The perinatal outcomes of teenage pregnancies at Tygerberg Hospital.
7 March	Muhammad Osman	Systematic review of risk factors for TB mortality in South Africa.
14 March	Cheryl Day	Cellular immunity in <i>Mycobacterium tuberculosis</i> and HIV co-infection.
28 March	Peter Bock	Primary outcomes from the HPTN 071 (PopART) trial.
11 April	Graeme Hoddinott Hanlie Myburgh	<u>Socio-behavioural science and the future of HIV programmes</u>

	Rozanne Casper	<p>Behaviour change and responses to the HPTN 071 (PopART) intervention in Zambia and South Africa</p> <p>Men's talk of HIV testing as maintaining social identity: a discourse analysis of qualitative data from the HPTN 071 (PopART) trial in South Africa and Zambia</p> <p>Implementing 'universal' access to antiretroviral treatment in South Africa – a scoping review and critical analysis of challenges and opportunities</p>
2 May	Liz Walters	The bacteriological spectrum of TB in a hospital-based cohort of children with intrathoracic TB
23 May	Florian Marx	Mathematical modelling of TB prevention and care in South Africa: Updates from the joint DTTC-SACEMA working group and prospects for future research and collaboration.
6 June	Nomtha Mandla	HPTN 071(PopART) Lessons learnt on reaching MEN
20 June	<p>Graeme Hoddinott</p> <p>Lario Viljoen/ Virginia Bond</p> <p>Laing de Villiers</p>	<p><u>HIV stigma and health services</u></p> <p>Did HIV stigma undermine the effectiveness of the HPTN 071 (PopART) intervention?</p> <p>A little bit more, a little bit less stigma: socio-structural factors that change community level stigma over time in Zambia and South Africa, HPTN 071 (PopART)</p>

		Identifying fluidity in the context of HIV prevention
11 July	Elsabe Brits	Storytelling & Science communication: When the curse of knowledge hits the jargon wall
25 July	Tony Garcia-Prats	Project Overview-Better Evidence and Formulations for Treatment of MDR-TB in Children- (BENEFIT KIDS)
1 August	Caryn Upton	CRUSH TB: Novelties in a TB trial
22 August	Sue-Ann Meehan Kyla Meyerson	Retention in care and factors critical for effectively implementing antiretroviral community-based adherence clubs in a rural district in the Western Cape The reasons why I haven't tested yet" – A discourse analysis of qualitative data to understand why some people have never tested for HIV in Cape Town, South Africa
12 September	Karen du Preez	Childhood TB in South Africa - spatiotemporal heterogeneity
19 September	Brian Allwood	Post TB lung disease: What do we actually know
24 October	Elisa Lopez Kyla Meyerson	Site of disease pharmacokinetics in children with complicated intrathoracic TB. Caregivers' and Health Workers' Perceptions of the Psychological Effects

		of Caregiver-child separation during tuberculosis hospitalization
19 Nov.	Denise Naniche	The HIV epidemic in rural Mozambique: reaching the first 90 target
28 Nov.	Presentations by the socio-behavioural science team: Melissa Nel Michaele Anthony	A scale for rapidly ascribing socio-economic status estimates to neighbourhoods using observational and participatory research techniques A photovoice study: Exploring the maternal embodied experience of women experiencing a high-risk pregnancy.

TB Advocacy

In celebration of World TB Day 2019, the DTTC held an event on Friday, the 29th of March 2019 at Tygerberg Campus for students and staff. Prof Anneke Hesseling announced the winners of the DTTC social media photo competition, #TBsTimeIsUp, which generated much interest amongst staff and students. The winning entries came from, Mercia Kuhn, (DTTC); Michelle Moerdykem (Medical student) and Dzunisani Baloyi (DTTC). Linked to the “Stop TB” partnership’s global campaign, “It’s Time”, our programme, “TB through the Lens of Time”, featured three inspiring presentations:

- The history and future of TB treatment – Peter Donald
- Looking through a different lens: TB in Literature and the Arts – Sue Purchase
- A community perspective on TB – DTTC Community Advisory Board

Thereafter, Prof Hesseling hosted the launch and official opening of the “Robert Gie Ikamva Wing”, a new centre for paediatric TB research at Tygerberg. Robert Gie is considered one of the champions of TB research at Stellenbosch University and the isiXhosa word, “Ikamva” means “Future”.

The DTTC Community Advisory Board (DTTC CAB)

The DTTC Community Advisory Board (CAB) was established in November 2015 to assist with the prioritisation and development of research protocols and to drive the research agenda of the organisation by guiding and sensitising researchers to the issues within the community including guidance on documentation and participant recruitment strategies. During 2019, the DTTC CAB reviewed 5 study protocols; 7 DTTC grant applications; and issued letters of support for 5 projects and contributed to the 2020/2021 Workplan Report for the HPTN network.



Figure 2. The DTTC Community Advisory Board

DTTC CAB activities: January to December 2019

International meetings: Three members represented the DTTC CAB at international meetings during 2019. CAB chairperson, Godfrey Tabata, attended the HPTN Annual Meeting from 1 – 5 June in Washington, USA; The CAB co-chair, David Galetta attended the IMPAACT Annual Meeting from 10 – 14 June; and CAB TB advocate, Goodman Makanda, attended the 50th Union World Conference, in Hyderabad, India, in October 2019.

Local meetings: The DTTC CAB held monthly general meetings and quarterly Steering Committee (SC) meetings for the executive body. The CAB's ICAB (IMPAACT Community Advisory Board) representative participated in the IMPAACT network bi-monthly teleconference calls and the CAB HPTN network representative participated in the HPTN Community Working Group (CWG) monthly teleconference calls, including the HPTN Global Community Working Group conference calls.

World TB Day: CAB members participated in the Annual World TB Day commemoration with a drama performance highlighting the issue of stigma and TB in the community. The CAB also participated in the “It’s Time” photo competition, hosted by the DTTC as part of the Stop TB Partnership initiative.

Capacity building: Experienced CAB members developed a capacity building programme and trained new members at the CAB Orientation Day on the 13th of April.

Workshops, symposiums and lectures: Two CAB members attended the South African National AIDS Council Stakeholder Workshop in Johannesburg on May 28th.

Three CAB members also attended the TB/HIV Care South Africa: TB Advocacy for Civil Society Workshop in Woodstock from 8-9 July 2019.

Twelve CAB members attended the Annual International Desmond Tutu Peace Lecture on 7th of October with keynote speaker, Strive Masiyiwa, philanthropist and entrepreneur. The topic for the event was “Tackling Corruption in the Private & Public Sector: Restoring Citizen Trust Locally and Globally”.

One CAB member shared his life journey with XDR-TB at the Post-TB Lung Symposium held at Stellenbosch from 22 – 23 July and again at the 2019 DTTC Annual Dissemination Meeting, held on the 15th of November. Fifteen CAB members attended the dissemination event.

In the media: A youth CAB member shared her experience of living with MDR-TB on Red Cross Children’s Hospital Radio on the 30th of March as part of their World TB Day programme on human rights.

Extramural: On the 23rd of February, youth CAB members attended the Stellenbosch University Open Day to find out more about course offerings, entrance requirements, accommodation and funding opportunities.

In December, all CAB members received branded DTTC summer t-shirts and winter down-feather puffer jackets, sponsored by the DTTC studies.

Condolences: Condolences were extended to colleagues and CAB members at TASK Applied Sciences with the passing of Community Engagement Officer, Vela Mhlola. CAB members attended the memorial and funeral services in October.

Conferences, academic meeting and events

Conferences

During 2019, team members from the DTTC participated in and presented at several local and international conferences, including the Union World Conference on Lung Health held in Hyderabad, India; the AIDS Impacts conference in London; the South African TB conference in Durban; the first International Post-Tuberculosis Symposium at Stellenbosch University; the Stellenbosch University Research Day; and several other events.

International conferences and events

Conference on Retroviruses and Opportunistic Infections (CROI). Seattle, United States. 4 - 7 March 2019.

Attendees: Sue-Ann Meehan and Nomtha Mandla

Oral presentation

1. HPTN 071 (PopART): The impact of universal HIV testing and treatment in Zambia and South Africa. RJ Hayes, DJ Donnell, S Floyd, **N Mandla**, J Bwalya, K Shanaube, A Moore, SH Eshleman, C Fraser, WM. El-Sadr, **P Bock**, **N Beyers**, H Ayles, S Fidler.

Poster presentation

1. Better virological outcomes when initiating early ART in the HPTN 071 (PopART) trial in South Africa. G Fatti, A Grimwood, **S Meehan**, JB Nachega, J Nelson, K La Sorda, G van Zyl, N Grobbelaar, H Ayles, R Hayes, **N Beyers**, S Fidler, **P Bock**, on behalf of the HPTN 071 (PopART) study team.

26th International HIV Dynamics and Evolution conference. Portugal, 24 - 27 March 2019.

Poster presentation

1. Near full-length HIV-1 subtype B sequences from the early South African epidemic, detecting a BD unique recombinant form (URF) from a sample in 1985. **AE Obasa**, S Engelbrecht, GB Jacobs

14th International AIDS Impact Conference. London, UK, July 2019.

Plenary session: HIV stigma and Universal Test and Treat: results from the HPTN 071 (PopART) Stigma ancillary study.

Oral presentations:

1. Did HIV stigma undermine the effectiveness of the HPTN071 (PopART) intervention? **G Hoddinott.**
2. A little bit more or less stigma: socio-structural factors that influence community level stigma over time in Zambia and South Africa, HPTN 071 (PopART). **L Viljoen.**

50th Union World Conference on Lung Health. Hyderabad India, 30 October- 2 November 2019.

Press briefing

1. Unitaidd Project Press Briefing on BENEFIT Kids Project. **T Garcia-Prats.**

Panel Discussions

1. Unitaidd New MDR-TB Projects Launch Event, Panel discussion, BENEFIT Kids Project. **T Garcia-Prats.**
2. The use of new diagnostic tools (Ultra, Fuji LAM, digital CXR), alternative specimens (NPA and stool), and improving diagnosis in children with HIV, pneumonia and malnutrition. **J Seddon.**

Oral Presentations

1. Site of disease pharmacokinetics in Children with complicated intrathoracic TB. **E Lopez.**
2. Update on important publications in childhood TB. **J Seddon**
3. No more neglect for children with MDR-TB: The BENEFIT Kids Project. **T Garcia-Prats.**
4. Children with MDR-TB: Practical considerations on drugs and dosages for designing a treatment regimen. **T Garcia-Prats.**

5. Optimizing rifampicin exposure in children towards treatment shortening and treatment of severe disease: Opti-Rif. **T Garcia-Prats.**
6. Lung Health and well-being after TB: Clinical picture and definitions, across the life course. **M van der Zalm.**
7. Update on clinical and programmatic management of MDR-TB and XDR-TB: MDR-TB in children. **HS Schaaf.**
8. Defining the epidemic in children: Drug resistance surveillance in children with confirmed tuberculosis in the era of Xpert MTB/RIF Ultra. **HS Schaaf.**
9. Adjunctive Therapy for Tuberculous Meningitis in the Reducing Deaths from Tuberculous Meningitis Symposium. **J Seddon.**
10. Detection and prevention of DR-TB in children and adolescents in Africa in the symposium. **J Seddon.**
11. Palatability and acceptance of routinely used formulations of levofloxacin, Moxifloxacin and linezolid among South African children treated for multidrug-resistant tuberculosis - Closing the gap: addressing challenges of identification and management of childhood TB. **J Winckler.**

Poster presentations:

1. Caregivers' and health workers' perceptions on the effects of caregiver-child separation during long-term hospitalisation for MDR-TB: a qualitative study in the Western Cape, South Africa. **K Meyerson.**
2. The effect of age and sex on tuberculosis case notification rates in South Africa: 2004 – 2016. **M Osman.**
3. Paediatric and adolescent tuberculosis mortality in South Africa: 2004 – 2016. **M Osman.**
4. Under reporting among tuberculosis (TB) patients diagnosed in hospital – highlighting a gap in the South African TB Care cascade. **S Meehan.**
5. Implementing an enhanced case-finding strategy for children and adolescents exposed to rifampicin-resistant tuberculosis: lessons from Khayelitsha, South Africa. E Mohr-Holland, I Apolis I, ... **J Seddon**, et al.
6. Excellent treatment outcomes amongst children with drug-resistant tuberculosis: a cohort study from Tajikistan. J Achar, **J Seddon** ... et al.

Guidelines:

1. **J Hughes** led the paediatric component of the updated 2019 South African National MDR-TB treatment guidelines.

11th World Society for Paediatric Infectious Diseases conference. Manila, Philippines. 5-8 November 2019.

Oral Presentations

1. Treatment of multidrug resistant TB in children – a changing scene. **HS Schaaf**.

First International Post-Tuberculosis Symposium & Working Meeting. Stellenbosch University, 22-23 July 2019.

65 invited delegates from around the world took part in the two-day event. Attendees from the DTTC included: Marieke van der Zalm, Brian Allwood, Florian Marx, Anneke Hesselning, Graeme Hoddinott, Dillon Wademan and Muhammad Osman.

Session chairs

1. **G Hoddinott** chaired a session: “Impact on post-Socioeconomic long-term consequences”.
2. **F Marx** chaired a session: “Former TB patients in the context of the End TB Strategy”.
3. **M van der Zalm** chaired a session: Paediatric complications of TB”

Presentations:

1. Targeting TB control to former TB patients. **F Marx**.
2. Mortality after TB. **M Osman**.
3. Life after tuberculosis: Some data, some examples, some thoughts and some theory. **D Wademan**.

Local academic conferences and events

Africa day at Stellenbosch University. Tygerberg Campus. 24 May 2019.

1. Theme: Contribution to the SDGs through our partnerships.

Presentation: “FMHS Case studies of partnerships on the continent”. **P Bock** on behalf of the HPTN 071 (PopART) team.

Post- Tuberculosis Interest Group meeting. Tygerberg Campus. 19 June 2019

1. “TB is a disease which hides in the body”: Fears and experiences of recurrent TB in Zambia and South Africa. **D Wademan**.
2. Targeting TB prevention & care to people with a history of previous TB treatment. **F Marx**.

SACEMA Public Lecture. STIAS, Stellenbosch. 6 May 2019

1. Heterogeneity in the risk of disease progression – implications for tuberculosis control in high-transmission settings. **F Marx**.

South Africa AIDS Conference. Durban, 11-13 June 2019.

National Department of Health/PEPFAR Satellite session: Toward HIV epidemic control - Lessons from research to practice

Oral presentations:

1. HPTN 071 (PopART) Primary Results and Implementation Lessons. Peter Bock.
2. Retention in care and factors critical for effectively implementing antiretroviral community-based adherence clubs in a rural district in the Western Cape. **P Bock, G Hoddinott**, L Maschilla, R Holtman, N Grobbelaar, **D Wademan, R Dunbar**, G Fatti, J Kruger, N Ford, C Gunst, **S Meehan**
3. HPTN 071(PopART) Lessons learnt on reaching men. **N Mandla**

TB Think Tank Satellite Session: New Policy Directions for the SA TB Programme

Oral presentation:

1. Aiming towards zero deaths. **M Osman.**

6th Southern African Students' Psychology Conference. Johannesburg, 24 -26 June 2019.

Oral presentation:

1. Exploring Caregivers' and Health Workers' Perceptions on the Effects of Caregiver-child Separation during Long-term Hospitalisation for MDR-TB in the Western Cape: A Qualitative Study. **K Meyerson.**

MPhil Transdisciplinary Health and Development Studies Student research presentations. Tygerberg Campus, 29 July 2019.

1. The development and validation of a quality of life measure for children living with tuberculosis in the Western Cape South Africa. **M Anthony.**
2. Understanding how food security influences Anti-Retroviral Therapy (ART) adherence for people living with HIV (PLHIV) in Khayelitsha, Western Cape. **B Mbenyana.**
3. Exploring the ways in which the management of household incomes affect ART adherence behaviour of people living with HIV in the Western Cape. **A Mcinziba.**
4. Exploring relationships between members of different generations: An older person's perspective. **D Baloyi.**

62nd Annual Academic Year Day at Tygerberg Medical Campus, Stellenbosch University, 21 August 2019.

Peter Bock, Rory Dunbar, Florian Marx and Sue-Ann Meehan were invited to give 'state of the art' presentations (based on their PhDs).

Oral presentations:

1. Reducing tuberculosis in the local communities through targeted prevention and care strategies – the example of former TB patients in suburban Cape Town. **F Marx.**
2. How can operational modelling inform the scale-up of new molecular diagnostic tools for tuberculosis? **R Dunbar.**
3. The impact of the HPTN 071 (PopART) intervention on mortality and AIDS related morbidity amongst HIV positive adults in South Africa. **P Bock.**
4. The contribution of a community based HIV counselling and testing (HCT) initiative in working towards increasing access to HIV counselling and testing Cape Town, South Africa. **S Meehan.**

Poster presentation:

1. Palatability and acceptability of routinely used formulations of Levofloxacin, Moxifloxacin and Linezolid among South African children treated for multidrug-resistant tuberculosis. **J Winckler.**

National TB Think Tank Meeting, Johannesburg, 14 of August 2019.

Presentations:

1. Systematic review of risk factors or TB mortality in South Africa 2010-2018. **M Osman.**
2. Update on the TB Preventative therapy review study (TiP Study). **G Hoddinott.**

25th Annual South Africa Psychology Congress, Johannesburg, South Africa, 4 – 6 September 2019.

Oral presentation:

1. A photo-voice study: Exploring the maternal embodied experiences of women experiencing a high-risk pregnancy. **M Anthony.**

Annual Public Health Association of South Africa (PHASA) Conference. Cape Town, South Africa, 16 – 18 September 2019.

TB Symposium oral presentation:

1. The advancements of Paediatric TB – the South African story. **K du Preez.**

Scientific Meetings, Workshops and training events

February 2019

- UNITAID meeting. Geneva. 11-17 February 2019. Attended by Tony Garcia-Prats.
- Impaact meeting. Washington DC. 11-13 February 2019.
- TB PADO meeting. Geneva, Switzerland.. 14-15 February 2019. Anneke Hesselning attended.

March 2019

- 3rd Tuberculous Meningitis International Consortium Meeting. Lucknow, India. 1-2 March 2019. James Seddon attended.
- TB Diagnostics and biomarker meeting.. 4-5 March 2019. Liz Walters presented.
- Here be lungs 8th annual conference, Stellenbosch, South Africa. 6-8 March 2019. Marieke van der Zalm attended.
- NICD meeting on Modelling & Capacity Building at the DTTC. (Florian Marx) attended. 14 March 2019.
- TB Consortium Meeting, Durban. Anneke Hesselning, Muhammad Osman, Sue-Ann Meehan attended. 18 March 2019.
- Anneke Hesselning attended an NDOH meeting in Johannesburg for the release of the new guidelines on preventative therapy for TB in adults using Rifampicin and Isoniazid. Regimen shortening, information on the guidelines of MDR treatment, strengthening services and care preferences, inclusive of adolescents and children 0-14years. 18 March 2019.
- BARC Refresher Training course in Johannesburg. TB CHAMP team attended. 15 March 2019.

- Leadership Training. Margaret attended a practical course (PULSE) presented by Stellenbosch and sponsored by SETA. 4 March 2019.

April 2019

- The TB Champ Trial Steering Committee attended a Webex meeting. 30 April 2019.

May 2019

- Liz Walters travelled to Belgium and the United Kingdom. Meeting with collaborators from Imperial College in London and with Dr Meyts (H.O. Clinical Immunology) in Leuven. Exploring possible fellowship opportunities in clinical immunology. 9 – 17 May 2019.
- Anneke Hesseling, Jana Winckler and Caryn Upton from TASK attended the TBTC meeting in Atlanta, USA. 13-17 May 2019.
- DTTC staff attended the Symposium on Race as a variable in scientific research - Controversies & Concerns presented at Tygerberg campus. 13 May 2019.
- Lario Viljoen, Laing de Villiers, Siphosethu Nco and Luthando Ngwatyu attended the SANAC National Stakeholders Meetings, Johannesburg. Review and approval of draft three-year implementation plan for a comprehensive response to human rights and gender-related barriers to HIV and TB services. 29 May 2019.
- Sue-Ann Meehan completed a research ethics courses (through TRREE) as part of her orientation and training as a member of the Health Research Ethics Committee (HREC) committee. April 2019.
- Asanda Mfazwa and Noludwe Mabandlela attended Good Clinic Practice training by CREDE in April and December respectively.
- Marieke van der Zalm and Margaret van Niekerk attended the Funding opportunities with the Trasher Research Fund seminar. 24 May 2019.
- Training for the Khayelitsha and Eastern Sub-Districts Medical Officers in paediatric chest x-ray reading. The meeting was led by MSF staff. James Seddon and Jenny Hughes attended. 29 May 2019.
- Frieda Verheye-Dua attended the SAHPRA Workshops. 31 May 2019 and 29 November 2019.

- The diagnostic team attended several refresher courses between May and June 2019. Training was presented by Margaret van Niekerk and Ngamso Cawe.

June 2019

- Lario Viljoen travelled to Zambart in Lusaka, Zambia for a writing workshop for the AIDS Impact conference paper. 3–5 June 2019.
- Jabulile Mantantana, Noziswe Makola, Gwynneth Hendricks and CAB chairperson, Godfrey Tabata attended the HPTN Annual Meeting in Washington, USA. 1-5 June 2019.
- Anneke Hesseling, Anne-Marie Demers, Petra de Koker, Tony Garcia-Prats, Simon Schaaf, Frieda Verheye-Dua, Gwynneth Hendricks and CAB co-chairperson, David Galetta attended the IMPAACT Annual Meeting and scientific retreat in Washington, USA. 10 - 14 June 2019.
- Anne-Marie Demers attended the ACTG (AIDS Clinical Trials Group) Annual Meeting, Crystal City Hotel, Washington DC, USA. 21-24 June 2019.
- Staff attended the Western Cape TB Consortium working group quarterly meeting. 28 June 2019.
- DTTC staff attended the African Microbiome Institute (AMI) Scientific Forum. Speakers: Dr Lucky Nesengani and Dr Suventha Moodley. 5 June 2019.
- Sterna Brand attended the Siyakhula (Embracing the new normal) course, presented by Stellenbosch University on Stellenbosch campus from 19 -21 June 2019.
- Rozanne Casper, Kyla Meyerson, Arlene Marthinus and Michaile Anthony attended a talk by Dr Gail Wyatt from UCLA entitled “Are experiences of trauma and its measurement country or culture bound? An empirical response” at the Stellenbosch Psychiatry department. 20 June 2019.
- Michaile Anthony, Verah Luke and Khanyisa Mcimeli attended the “Inside Out Pop-Up Story Salon” at Community House, Salt River. 20 June 2019.

July 2019

- Anne-Marie Demers visited the European Society of Biology from 1- 5 July 2019.
- Marieke van der Zalm attended the South African Thoracic Society (SATS)

symposium in Pretoria and face-to-face meeting with the African infant and pre-school lung function working group. 6 July 2019.

- DTTC staff members attended the Clinical Trials Unit Academic meeting held at Tygerberg. Elsabe Brits presented on story-telling and science communication. 11 July 2019.
- The HPTN 084 Participant Retention Event was held on 19 July 2019.
- Rory Dunbar and the DTTC data team attended the Launch of the Stellenbosch University School of Data Science and Computational Thinking at STIAS in Stellenbosch on 29 July 2019.
- Community advisory Board (CAB) members Siphosethu, Thandiwe and Khanyisa Mcimeli from Social Sciences attended the TB Advocacy for Civil Society Workshop, in Woodstock. 8 - 9 July 2019.
- The HPTN 084 Team attended a recruitment and retention workshop at the Devonvale Wine and Golf Estate on 12 July 2019.
- Anneke Hesseling, Petra de Koker, Jana Winckler, Anne-Marie Demers and Anneen van Deventer attended Study 35 training. 15-16 July 2019.
- Laing de Villiers attended a PhD student exchange programme with King's College in London, UK from 15 July to 15 August.

August 2019

- Karen du Preez attended the "Let's pack your Science Communication Toolbox Worskhop" presented The Centre for Research on Evaluation, Science and Technology (CREST), Stellenbosch University. 6 August 2019.
- Muhammad Osman, Sue-Ann Meehan, Florian Marx, Marieke van der Zalm, Liz Walters and Graeme Hoddinott attended the National TB Think Tank Meeting in Johannesburg. 14 August 2019.
- Sue-Ann Meehan and Muhammad Osman conducted LINKEDin site visits Baragwanath and Edenvale Hospitals and Alexandra clinics. 15 – 16 August 2019.
- Liz Walters travelled to the United Kingdom from the 31 August to 11 September to meet with the team at the "Host Defence Unit" at the Royal Victoria Infirmary in

Newcastle-upon-Tyne, where she took up a clinical fellowship position from 30 October 2019.

- Dzunisani Baloyi, Michaile Anthony and Kyla Meyerson did data collection for the TiP Study in the Eastern Cape and Kwazulu-Natal from August – September.

September 2019

- Hanlie Myburgh visited the University of Amsterdam (UvA) from September to November. She is registered for a PhD in the Anthropology Department at UvA.
- Muhammad Osman and Sue-Ann Meehan travelled to Johannesburg (City) and KwaZulu-Natal (Ugu District) for LINKEDin site visits in August and September 2019 respectively.
- James Seddon met with Mareli Claassens in Windhoek, Namibia, to discuss the British MRC African Research Leader Fellowship interview. James had a tour of the University of Namibia and the National TB Hospital.
- James Seddon travelled to Namibia for the first Namibian National TB Research Consortium Meeting on 11 September 2019.
- The final Infection Prevention Control training for 2019 was presented by Leverne Africa and Klassina Zimri. 6 September 2019.
- Karen du Preez attended a Thesis Writing Skills Workshop presented by the Stellenbosch University Language Centre. 16-17 September 2019.

October 2019

- Jessica workman presented SharePoint training to all DTTC staff. 2 October 2019.
- Anneke Hesseling travelled to Atlanta, USA for the TBTC meeting. 3-8 October 2019.
- Florian Marx, Anneke Hesseling, Sue-Ann Meehan and Muhammad Osman attended the DISRUPT TB Consortium Meeting. 3 October 2019.
- Anneke Hesseling participated in a National TB Think Tank CP Therapy Preventative Taskforce quarterly meeting. 22 October 2019.
- Muhammad Osman, Karen du Preez and Rory Dunbar provided off site support for the TB Epi Review Meeting. 24-25 October 2019.

- 10 DTTC staff members travelled to Hyderabad, India for the 50th Union World Conference on Lung Health in October.
- Portia Hendricks attended the Stellenbosch University Supervisory course over 3 days in October 2019.
- Muhammad Osman attended the MRC Early Career Scientist Convention. 9-11 October 2019.
- Staff members from the DTTC attended the IPC course and obtained a test score of 90% and more: Shane Maker, Cindy Seconds, Warren Zimri, Marsha Maker, Rubaine Sayers, Danite Bester and Jennifer Hughes.
- Adnaan Samsodien attended the Infection and Prevention Control Day at Tygerberg Hospital. 24 October 2019.

November 2019

- Graeme Hoddinott was invited by Anova to be part of a panel discussion at the Department of Health (Cape Metro) Quality Summit. 1 November 2019.
- Jessica Workman visited TB Champ Sites in November – Matlosana and Shandukani.
- Denise Nanche, a Research Professor and Co-Chair of the Viral and Bacterial Infections Programme at the Barcelona Institute of Global Health (ISGLOBAL), presented a special Lunch Time Academic Meeting on the 18th of November: The HIV epidemic in Rural Mozambique: reaching the first 90 target.
- Elisa Loez, Gert van Zyl, Sue-Ann Meehan and Peter Bock met with Denise Nanche from IS Global to discuss possible research collaboration 18 November 2019.
- James Seddon travelled to London for clinical duties. 22 November - 8 December 2019.
- Megan Palmer travelled to Sierra Leone for the TB Speed project. 22 November 2019.
- Anneke Hesseling and Karen du Preez participated in the National Preventative Therapy Working group call for the South African Think Tank. 26 November 2019.
- Several staff members attended the Paediatrics and Child Health Academic Day of Excellence. 27 November 2019.

- Muhammad Osman and Sue-Ann Meehan attend the LINKEDin WC TB Consortium Working Group Meeting. 29 November 2019.

December 2019

- The Socio-behavioural Science Team held their Strategic Retreat at Tygerberg. 2 December 2019.
- Marieke van der Zalm represented the DTTC at the Department Strategic Meeting. 6 December 2019.
- Florian Marx attended the 7th International Conference on Infectious Disease Dynamics in South Carolina and attended meetings in New Haven and Boston. 2 -13 December 2019.
- Lario Viljoen and Karen du Preez attended the masterclass in scientific communication at the Centre for Research on Evaluation, Science and Technology (CREST), in Stellenbosch. 4-5 December 2019.
- Boniswa Jali completed her PGDip in nursing management.
- John Wolmerans and Asanda Mfazwe completed the Plus Programme presented by Stellenbosch University.
- Jenny Hughes attended the APLS course. 21 - 22 November 2019.
- National TB Preventative Therapy Working Group met on the 26th of November in Pretoria.
- Lario Viljoen and Tina Sachs attended online Unipro training from Unitaid. 11 December 2019.

Ongoing 2019

- Joint SUN-CTU CAB Leadership Group Meetings (DTTC CAB EXCO; TASK CAB EXCO; FAMCRU ExCo). Meetings held throughout the year.
- Working Group for Data Analysis & Modelling (WGDAM). WGDAM is a working that aims to produce research outputs related to TB and health. The Working Group held weekly meetings at the DTTC from February onwards.
- The Research Methods for Transdisciplinary Health and Development Studies short course is offered by the Desmond Tutu TB Centre and the Sociology & Social

Anthropology Department and presented by Graeme Hoddinott and Lario Viljoen.
Four staff members also attending the course.

Visitors at the DTTC during 2019

In addition to several monitoring visits over the course of 2019, the DTTC also hosted the following visitors at the Centre:

Date	Visitor	Reason
14 – 15 March	Prof Cheryl Day, Emory University	Paediatric visit and Academic meeting presentation
15 March	Jenny Furin, WHO	Consultation
29 April	Lilly Verhagen, Utrecht	DTTC visit
13 May	Dr Pren Naidoo, Gates Foundation.	LINKEDin Site meeting at KDH and Site B
27 May	Daniel Chin and others from the Bill and Melinda Gates Foundation	LINKEDin: Study progress visit/ TB digitalisation in Khayelitsha, followed by a Site B visit
29 April – 3 May	Sara de Winter	Short internship
3-7 June	Mr Isaacs	SAHPRA GCP inspection on P1101 & HPTN084 studies
17 – 21 June	Dr Virginia Bond, Zambart, LSHTM	Manuscript writing workshop with the Socio-behavioural science team
30-31 July	ETR Project monitoring visit from RYMDS Unit : Sicelo Dlamini	Monitoring & Evaluation Unit National TB Programme
30 September- 4 October	Sarah Johnson	Sarah Johnson has been awarded a one-year Wellcome Trust Institutional Strategic Support

		Fund Global Health Clinical Research Training Fellowship from Imperial College
4 October	Right to Care Lucy Connell Thandi Dlamini	Visiting the LINKEDin team and completed site visits at Tygerberg and Khayelitsha District Hospital
10-11 October	Ekaterina Rykonova, Dessislavla Tarlton, Alex de Brun, Unitaaid Representatives	Kick-off meeting: BENEFIT Kids Project
9-11 October	Zvia Shwartz, Senior Specialist, External Affairs at the Global Alliance for TB Drug Development	Visiting Brooklyn Chest Hospital and DTTC
25 October	Bill & Melinda Gates Foundation	Community walkabout in the Nomzamo area.
15 November	Deborah Lewinshohn & David Lewinshohn. Oregon Health & Science University	Stellenbosch University visit
28 November	Eric McCollum. Johns Hopkins School of Medicine	Expertise in global child respiratory health visiting with Anneke Hesseling and Marieke van der Zalm
10 November	Catherine Snow	Visit to Desmond Tutu TB Centre
5 – 6 December	Erin Sizemore & Jessica Ricaldi Camahuali CDC, TBTC	Visit to Brooklyn Chest Hospital – TBTC Study 35

Key dissemination events

HPTN 071 (PopART) Dissemination Meetings

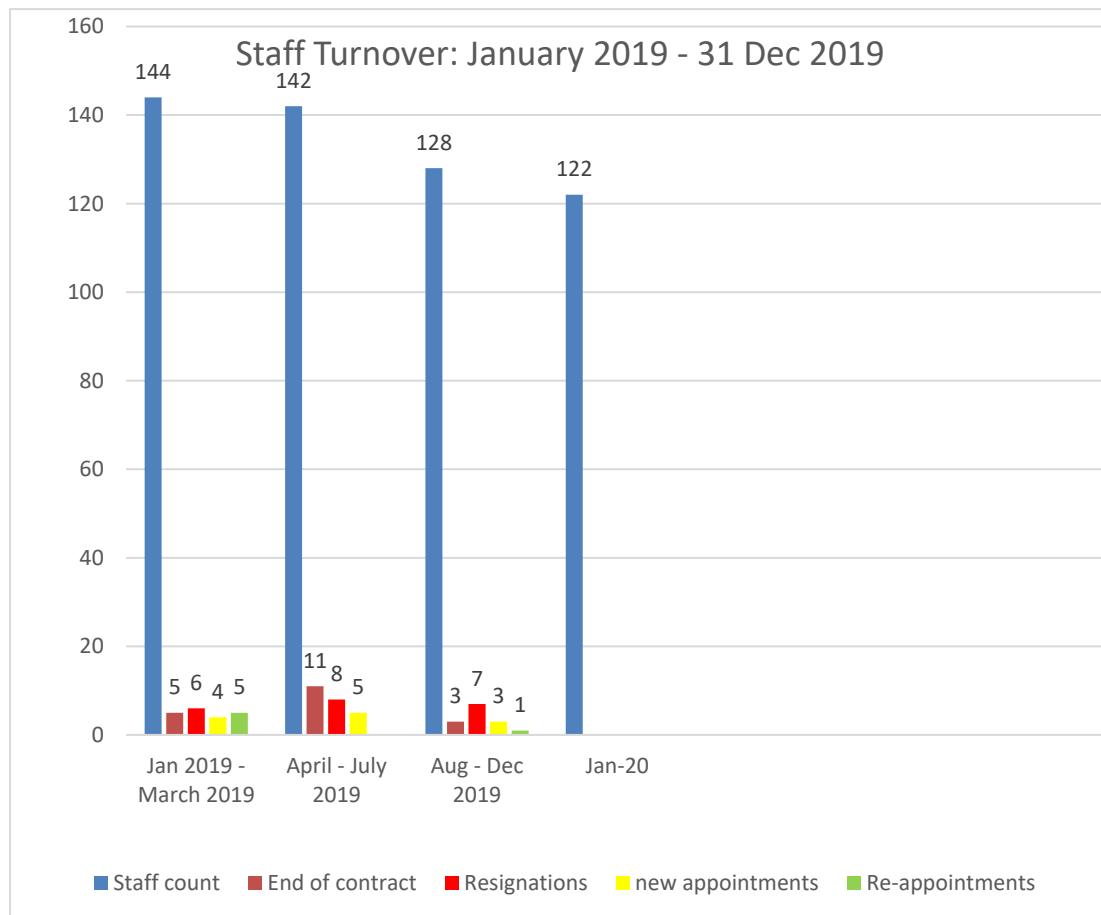
After five years of implementing the HPTN 071 (PopART) community randomised control trial, dissemination meetings were held in order to disseminate study results to stakeholders and community members. These events were held at local community halls and well attended by community members. HIV prevention messaging was presented through local drama groups and community stakeholders participated by providing HIV prevention messaging. Results were communicated through a PopART video and an interactive presentation.

Date	Attendees
1 March	PopART Stakeholders: Government stakeholders (Western Cape Government, health, COCT health, Stellenbosch University stakeholders, CTU members, CAB, former PopART staff.
11 - 19 March	7 Events with community members, former staff, and community stakeholders
26 March	CAB dissolving ceremony: PopART CAB members

Employees

During 2019 a total of 19 employee contracts ended. A total of 21 additional employees resigned, seeking permanent employment elsewhere. The Centre also employed 12 new staff members on different studies, linked to different post levels. Six staff members could be re-employed, ensuring that skilled staff are retained, as set out in our comprehensive HR retention strategy. Professor Anthony Garcia-Prats has relocated with his family to the United States of America and continues to work actively with the DTTC on multiple projects, including as lead on the UNITAID Benefit-Kids project.

The centre has expanded its focus on employee wellness, including TB and other infectious disease screening and prevention, infection control training, psychosocial support of individuals and teams, team building events, and yoga.



DTTC Governance

DTTC Executive Committee (ExCo)

The DTTC is led by the Director, Anneke Hesseling, who is assisted by an Executive Committee (EXCO) of 12 senior scientific and core support DTTC staff members. The Director, who chairs the EXCO, reports to the Executive Head of the Department of Paediatrics and Child Health, Faculty of Medicine and Health Sciences as well as the DTTC Governing Board, which is responsible for oversight of the DTTC's strategic management. The governing board is chaired by Professor Andrew Whitelaw, Dept. Medical Microbiology and NHLS, Tygerberg; vice-chair: Professor Wolfgang Preiser: Division Head: Medical Virology. All members of the ExCo committee play an active role in the management of DTTC, making key decisions to ensure the vision and mission of DTTC are maintained and expanded. Members also form part of the scientific strategy team and are responsible for driving the research agenda at DTTC forward, in line with the 3 DTTC research pillars. The role of this team is to provide scientific input into

research ideas put forward to the team and collaborate on potential research proposals.

The DTTC ExCo meets once a month. In addition, there is a dedicated scientific strategy meeting convened once a month for the ExCo and additional *ad hoc* member to discuss and plan ongoing and future research priorities and strategies.

In November 2019, the DTTC ExCo submitted a Clinical Trials Unit (CTU) application to strengthen core funding at the centre and to ensure continued support for studies conducted across all platforms at the DTTC.

Primary focus areas for 2020 will include applying to remain within the TBTC networks, which will ensure core and study specific funding over a 7-year period. In addition, the DTTC is actively applying for further research opportunities to strengthen the core funding for the centre.

DTTC Executive Committee Roles and Responsibilities

Name	Role
Prof Anneke Hesselning	DTTC Director and chair of DTTC ExCo
Dr Megan Palmer	Medical director of the Desmond Tutu TB Centre Brooklyn Chest Hospital Paediatric Pharmacokinetics Unit
Dr Marieke van der Zalm	Clinical lead: Paediatric lung health studies
Dr Frieda Verheye-Dua	Regulatory Manager
Prof Simon Schaaf	Lead investigator Paediatric MDR-TB studies
Dr Sue-Ann Meehan	Project Manager and co-investigator
Dr Peter Bock	Lead HIV Prevention research
Dr Muhammad Osman	Lead: Implementation Research
Dr Graeme Hoddinott	Lead Sociobehavioural Scientist
Mrs Sterna Brand	Human Resources Manager
Mr Theo Smith	Operations Manager

Dr Rory Dunbar	Data centre manager
Dr Anne-Marie Demers	Laboratory Director

Risk Management

Risks related to Human Resources, Finance and Regulatory are being monitored and evaluated on a regular basis.

The DTTC regulatory office will ensure that no study is commenced without appropriate regulatory approval.

The protection of study participant confidentiality remains a high priority for the DTTC in our aim to deliver high quality reputable research outputs. The DTTC will continue to support staff training in good clinical practice (GCP) and research confidentiality prior to any study commencement. Through constant data monitoring by dedicated data centre staff, dual entry of any research information as well as GCP training, the DTTC will continue to mitigate against data fabrication. The regulatory office will also monitor the import of drugs or export of any materials to research partners to ensure no transfer is commenced without appropriate documentation.

During 2019, the centre actively improved communications platforms, including the launch of the new DTTC website. The DTTC is also involved in ongoing efforts to improve marketing and communications efforts in order expand our local and global footprints and to further develop relationships with new and current external stakeholders.

Accessibility to communities for recruitment and retention of study participants is still a potential risk. The DTTC continues to support various DTTC Field offices in various communities. The DTTC has also invested in developing community advisory boards (CABs). Leadership management in field offices mitigates against any HR irregularities (attendance, working hours) that may arise.

There are ongoing efforts to obtain core funding to ensure the sustainability of core support staff and to decrease related risks. Due to the successful securing of funding for several new projects, several staff had contracts renewed. As such, there was a significant risk reduction in terms of human resources and lower staff turnover rates

were ensured.

Political instability and violence or unrest in study communities place staff and patient safety at risk. The DTTC has implemented many safety measures but have also identified various other measures to provide safe working conditions for staff. During 2020 all DTTC drivers will be retrained in defensive driving, including highjack prevention and evaluation. The high burden of TB disease and HIV infection among the population served, poses a health risk to DTTC staff. The DTTC has taken many infection control measures through modification of vehicles and site offices.

The first round of Infection prevention control (IPC) training was successfully completed during 2019. Evaluation methods have been implemented to secure ongoing training during 2020. The DTTC ensures that all staff receive annual health screenings. After the completion of a baseline Hepatitis B testing campaign for all staff during 2018 and 2019, staff were vaccinated in line with national guidelines.

The DTTC is committed to adhere to SU management code of conduct which includes diversity aspects and identifying candidates from disadvantaged backgrounds for internal promotion.

Ongoing formal training linked to supervision programs has been implemented to support master's and PhD students and will be maintained.

The DTTC employs a cadre of finance staff who work closely with the faculty research grants management office (RGM) to ensure no misappropriation of research funds takes place. Regular expenditure allocation, reporting and finance meetings are held to mitigate against any misappropriation. Correct budgeting in collaboration with RGM will also mitigate against large exchange rate loss. An internal promotion at operations level will secure management of best financial practice in the future.

Acknowledgements and Funders



South African Collaborators | Funders | Partners



SARCHI Chair in Paediatric TB (Hesseling)



Funded by Evidence for HIV Prevention in Southern Africa (EHPSA), a DFID programme managed by Mott MacDonald.



Appendix I. Research outputs – peer-reviewed scientific publications

DTTC Publications January 2019 – December 2019

Manuscripts

1. Allwood B, **van der Zalm M**, Makanda G, Mortimer K, on behalf of the Steering Committee of the 1st International Post-Tuberculosis Symposium*. The long shadow post-tuberculosis: “When we started TB treatment, no-one told us that it would never leave us.” *Lancet Infectious diseases*. *Lancet Infect Dis*. 2019 Nov;19(11):1170-1171. PMID: 31657778. **Andre F.S. Amaral, Uzochukwu Egere, Denise Evans, Diane Gray, Graeme Hoddinott, Olenalvanova, Rupert Jones, Florian M. Marx, Jamilah Meghji, Stellah Mpagama, Sanne van Kampen, Andrea Rachow, Ingrid Schoeman, Cari Stek, Dalene von Delft, Naomi Walker, and Robert Wallis.*
2. Basu Roy R, Whittaker E, **Seddon JA**, Kampmann B. Tuberculosis susceptibility and protection in children. *Lancet Infect Dis* 2019; 19: e96-e108. PMID: 30322790.
3. **Bock P**, Gunst C, Maschilla L, Holtman R, Grobbelaar N, **Wademan D, Dunbar R**, Fatti G, Kruger J, Ford N, **Hoddinott G, Meehan SA**. Retention in care and factors critical for effectively implementing antiretroviral adherence clubs in a rural district in South Africa. *J Int AIDS Soc*. 2019 Oct;22 (10):e25396. PubMed PMID: 31588668.
4. **Bock P, Nel K**, Fatti G, **Sloot R**, Ford N, Voget J, Gunst C, Grobbelaar N, Louis F, Floyd S, Hayes R, Ayles H, **Beyers N**, Fidler S; HPTN 071 (PopART) Team. Renal dysfunction by baseline CD4 cell count in a cohort of adults starting antiretroviral treatment regardless of CD4 count in the HIV Prevention Trials Network 071 [HPTN 071; Population Effect of Antiretroviral Therapy to Reduce HIV Transmission (PopART)] study in South Africa. *HIV Med*. 2019 Apr 8. PMID: 30963667.
5. Bond V, Ngwenya F, **Viljoen L**, Gumede D, Bwalya C, **Mantantana J, Hoddinott G**, Dodd PJ, Ayles H, Simwinga M, Wallman S, Seeley J. Value and limitations of Broad Brush Surveys used in community-randomized trials in Southern Africa. *Qualitative Health*

Research 2019; 29(5):700-718. PMID: 30556470. PMCID: PMC6533803.

6. **Bond V**, Nomsenge S, Mwamba M, Ziba D, Birch A, **Mubekapi-Musadaidzwa C**, **Vanqa N**, **Viljoen L**, **Pliakas T**, Ayles H, Hargreaves JR, **Hoddinott G**, Stangl A, Seeley J. "Being seen" at the clinic: Zambian and South African health worker reflections on the relationship between health facility spatial organisation and items and HIV stigma in 21 health facilities, the HPTN 071 (PopART) study. *Health & Place*. 2019; **55**:87-99. PMID: 30528346. PMCID: PMC6358039.
7. Chiang SS, Park S, White E, Cruz AT, Del Castillo H, Canales P, Friedman JF, Lecca L, Becerra MC, **Seddon JA**. Changes in weight-for-age z-score predict effectiveness of childhood tuberculosis therapy. *J Ped Infect Dis* 2019. PMID: 30715497.
8. Christian C, Burger, C., **Claassens M**, Bond V, and Burger R. 2019. Patient predictors of health-seeking behaviour for persons coughing for more than two weeks in high-burden tuberculosis communities: the case of the Western Cape, South Africa. *BMC health services research*, 19(1), p.160. PMID: 30866926
9. Crawford FW, **Marx FM**, Zelner J, Cohen T. Transmission modelling with regression adjustment for analyzing household-based studies of infectious disease: application to tuberculosis. *Epidemiology*. 2019 Nov 14. PMID: 31764276.
10. Dheda K, Gumbo T, Maartens G, **Dooley KE**, Murray M, Furin J, Nardell EA, Warren RM. The Lancet Respiratory Medicine Commission: 2019. Update: epidemiology, pathogenesis, transmission, diagnosis, and management of multidrug-resistant and incurable tuberculosis. *Lancet Respir Med*. 2019 Sep;7(9):820-826. PMID: 31486393.
11. Dippenaar A, De Vos M, **Marx FM**, Adroub SA, van Helden PD, Pain A, Sampson SL, Warren RM. Whole genome sequencing provides additional insights into recurrent tuberculosis classified as endogenous reactivation by IS6110 DNA fingerprinting. *Infection, genetics and evolution: journal of molecular epidemiology and evolutionary genetics in infectious diseases*. 2019:103948. Epub 2019/07/06. PubMed PMID: 31276801.

12. **du Preez K, Schaaf HS, Dunbar R**, Swartz A, Naidoo P, **Hesseling AC**. A simple intervention can close the hospital-reporting gap for childhood tuberculosis in South Africa. *Public Health Action* [*Accepted for publication*]
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Book Chapters

1. Whittaker E, Welch S, Cohen J, **Seddon JA.** Tuberculosis in Children and Adolescents. In: *Tuberculosis in Clinical Practice.* Ed. Onn Min Kon. Springer.

Appendix II: Students at the Desmond Tutu TB Centre during 2019

DTTC or DTTC-supported Students Registered (2019)				
Currently Registered Trainees: Master's Degree				
Name of trainee	Current position	Degree	Supervisor	Research Topic
Jabulile Mantantana, BPsych	Community Engagement, Recruitment, and Retention Officer	MPhil Transdisciplinary Public Health and development studies (SU)	Graeme Hoddinott	Continuity of ART for people who experience incarceration
Nosivuyile Vanqa	Social Science Research Officer	MPhil Transdisciplinary Public Health and development studies (SU)	Lindsey Reynolds	Traditional healers' perspectives on their roles supporting scale-up of HIV testing and treatment
Nelis Grobbelaar	Programme Director (ANOVA Health)	MPhil Transdisciplinary Public Health and development studies (SU)	Graeme Hoddinott	Integrating change to universal HIV-testing and ART regardless of CD4-count into routine health services
Melissa Nel	Social Science Research Apprentice	MPhil Transdisciplinary Public Health and development studies (SU)	Graeme Hoddinott Rory Dunbar	A scale for rapidly ascribing socio-economic status estimates to neighbourhoods using observational and participatory research techniques.
Leletu Busakwe	Student	MPhil Transdisciplinary Public Health and development studies (SU)	Graeme Hoddinott	The experiences of paediatric MDR-TB patients' (14-17 years old) hospitalised for treatment in terms of adolescent social and biological development
Abenathi Mcinziba	Social Science Research Assistant	MPhil Transdisciplinary Public Health and development studies (SU)	Lario Viljoen Peter Bock	Household level management of ART adherence choices in the context of socio-economic pressures

Stephanie Jacobs	Social Science Research Assistant	MPhil Transdisciplinary Public Health and development studies (SU)	Graeme Hoddinott Dillon Wademan	Families' affected by MDR-TB's understanding of disease and treatment
Chanda Mwamba	Student	MPhil Transdisciplinary Public Health and development studies (SU)	Graeme Hoddinott	Young women living with HIV in Zambia's motivators and experiences of status disclosure to intimate partners
Nozizwe Makola	Community Liaison Officer	MPhil in Applied Ethics specializing in Bioethics (SU)	Nicola Barsdorf Graeme Hoddinott	The role of Community Advisory Boards in protecting human subjects in large-scale community-randomised control trials – a case study of HPTN 071 (PopART)
Christopher Mahwire, MD	Medical Officer, DOH	MSc Epid (SU)	Pren Naidoo	Has the use of Xpert MTB/RIF diagnostic assay improved MDR-TB treatment success rates in KwaZulu Natal?
Marcel Kanyinda Kitnge	Student	MSc Epid (SU)	Pren Naidoo	Did the introduction of an Xpert MTB/RIF-based algorithm increase the proportion of bacteriologically confirmed PTB cases in Cape Town: An Interrupted Time Series Design?"
Lena Ronge, MD	Research Medical Officer Consultant	MSc Epid (SU)	Anneke Hesseling	Operational implementation of treatment of MDR-TB prevention in a community based clinical trial
Khanya Mama		MCom (SU)	Ronelle Burger Graeme Hoddinott	TB patients with confirmed diagnoses who decline/delay taking up treatment – exploring why
Bianca Hamman	Medical microbiology	MSc (SU)	Mae Newton-Foot Marieke vd Zalm	The role of respiratory co-infections and the microbiome in the clinical presentation and response to treatment in South African children with suspected TB
Gwyneth Hendricks	Communications Officer	MTECH: Public Relations Management		

Tashlyn Herandien	Social Science	MA Sociology (SU)	Efua Prah Hanlie Myburgh	Exploring intimacy and the usage of anti-retroviral treatment (ART) in heterosexual relationships of individuals living with HIV.
Bukeka Sawula	Student	MA Psychology (SU)	Barend De Villiers	A qualitative exploration into young mother's experiences of raising their children while they are living with HIV
Michaile Anthony	NRF Intern	MA Psychology (UWC)	M.G.Andipatin	A photo voice study: Exploring the maternal embodied experience of women experiencing a high-risk pregnancy
Dzunisani Baloyi	NRF Intern	MA Psychology (NWU)	MN Van Aardt	Exploring relationships between members of different generations: An older person's perspective.
Joanie Duvenhage	Dep Paediatrics	MMed	Simon Schaaf Anneke Hesseling	Incidence causes and outcome of management in cases of hepatocellular injury in paediatric patients on multidrug-resistant tuberculosis therapy

Currently registered PhD's (10)

Name of trainee	Current position	Degree	Supervisor	Research Topic
Nomtha Mandla, Physio	Project Manager: PopART	PHD (SU)	Lungiswa Nkonki Peter Bock	Recruitment, participation and retention of research participants in the HPTN 071 Population Cohort, South Africa.
Lario Viljoen, MA	Social Science Researcher	PhD (SU)	Lindsey Reynolds	Young women's sexual decision-making in the context of earlier ART-access
Karen du Preez, MD, MSc	Research Medical Officer	PhD (SU)	Anneke Hesseling Simon Schaaf Pren Naidoo	Complementary surveillance strategies and interventions to inform a tuberculosis care cascade for children
Laing de Villiers	Social Science Research Officer	PhD (SU)	Leslie Swartz Graeme Hoddinott	Identity fluidity on the margins of Cape Winelands communities
Dillon Wademan	Social Science Research Officer	PhD (SU)	Graeme Hoddinott Lindsey Reynolds	Family chronicity and intergenerational syndemics in the chronic management of TB, HIV, and diabetes
Hanlie Myburgh, MA	Social Science Researcher	PhD (UVA)	Ria Reis Lindsey Reynolds	The state and the citizen in the scale-up of HIV services in South Africa

Muhammad Osman, MD, Msc	Research Medical Officer	PhD (SU)	Anneke Hesseling Pren Naidoo Alex Welte	TB-associated mortality in South Africa: longitudinal trends and the impact of health system interventions
Louvina van der Laan, MD	Research Medical Officer	PhD (UCT)	Paolo Denti Anthony Garcia-Prats	Pharmacometric modelling as a tool to optimise TB Treatment in children
Rozanne Casper	Social Science Research Officer	PhD (RU)	Catriona Macleod Graeme Hoddinott	Young women's negotiation of gender identity in South Africa
Angelique Thomas	Social Science Research Officer	PhD (UCT)	Fiona Ross Lindsey Reynolds Graeme Hoddinott	Women who sell sex's management of intimacy
Post docs current				
Name of trainee		Degree	Supervisor	Research Topic
Marieke van der Zalm	Paediatrician	Postdoc (SU)	Anneke Hesseling	Lung function and respiratory pathogens in children with suspected TB
Rosa Sloot	Biostatistician	Postdoc (SU)	Pren Naidoo	Epidemiology- HPTN071 (PopART)

Appendix III: Media interaction (television, video, radio, printed media)

The DTTC has maintained an active profile in the media, both in print and radio in 2019.

Online and print media

The HPTN 071 (PopART) trial:

1. Times Live: <https://www.timeslive.co.za/sunday-times/lifestyle/health-and-sex/2019-03-05-new-hiv-infections-can-be-prevented-million-people-trial-shows/>
2. AllAfrica.com: <https://allafrica.com/stories/201903050002.html>
3. Independent Online: <https://www.iol.co.za/capetimes/news/tutus-hiv-trials-can-cut-the-rate-by-30-19681955>. This article was also the front-page lead in the Independent Group's print version, The Cape Times (Western Cape daily newspaper and online). A version of this article also featured in The Herald newspaper in the Eastern Cape province and in the Cape Argus in Cape Town
4. Eyewitness News: <https://ewn.co.za/2019/03/08/community-based-hiv-prevention-strategy-can-reduce-new-infections-study>
5. Sowetan Live: <https://www.sowetanlive.co.za/news/2019-03-05-new-hiv-infections-can-be-prevented-million-people-trial-shows/>
6. BizCommunity.com: <https://www.bizcommunity.com/Article/196/149/188120.html>

The BENEFIT Kids Project:

1. Cape Argus: SU signs grant agreement to combat children's TB. 23 October 2019.
2. Cape Times: R280m funding for Stellenbosch University to tackle child-friendly TB treatment. 23 October 2019.
3. www.iol.co.za. SU signs grant agreement to combat children's TB. 27 October 2019. Available: <https://www.iol.co.za/capeargus/news/su-signs-grant-agreement-to-combat-childrens-tb-35744110>

4. www.medicalacademic.co.za. Stellenbosch University develops safer treatment for kids with MDR-TB. 30 October 2019. Available: <https://www.medicalacademic.co.za/pulmonology/stellenbosch-university-develops-safer-treatment-for-kids-with-mdr-tb/>
5. Imperial College website: African Research Leader Grant Awarded. 10 December 2019. Available: <https://www.imperial.ac.uk/news/194327/795k-award-supports-african-research-partnership/>

Broadcast (radio and television)

The HPTN 071 (PopART) trial:

Co-investigator in South Africa, Peter Bock, from the Desmond Tutu TB Centre, was interviewed on the following TV and radio shows.

1. Voice of the Cape– Current Affairs Show. 6 March 2019.
2. Cape Talk. John Maytham Show. 7 March 2019.
3. Eye Witness News. Radio bulletin. 8 March 2019.
4. eNCA (Television news channel). 9 March 2019.

Paediatric and child TB specialist, Dr James Seddon and former MDR-TB research participant and survivor, 14-year-old, Ciara Goslett, were interviewed on RX Radio for the World TB Day and Human Rights programme:

1. Red Cross (RX) Children's Hospital Radio. 30 March 2019: Available: <https://rxradio1.podbean.com/e/talitha-interviews-dr-james-seddon-and-ciara-goslet-30-march-2019/>

BENEFIT Kids Project:

Prof Anneke Hesseling, director of the DTTC, was interviewed on several radio stations following the announcement of the BENEFIT Kids Project grant.

1. Voice of the Cape: Drive Time Presenter. Stellenbosch University has signed a new grant agreement with Unitaid, an organisation that invests in innovations to prevent TB. 29 October 2019. Available: <https://iono.fm/e/764126>.
2. Radio Tygerberg. Child TB will soon be better treated than in the past, this thanks to a research grant of over R280m to the University of Stellenbosch by Unitaid. 25 October 2019.
3. Cape Talk. Multi-million-dollar grant towards TB research signed off. 5 November 2019. Available: <http://www.capetalk.co.za/podcasts/127/afternoons-with-pippa-hudson/261424/science-tech-a-multi-million-dollar-grant-towards-tb-research-signed-off>

University media coverage:

1. The DTTC and the HPTN 071 (PopART) study in Stellenbosch University Media: *Researchers return to communities to deliver results of landmark HIV prevention study*. 7 May 2019. Available: <http://www.sun.ac.za/english/Lists/news/DispForm.aspx?ID=6405>