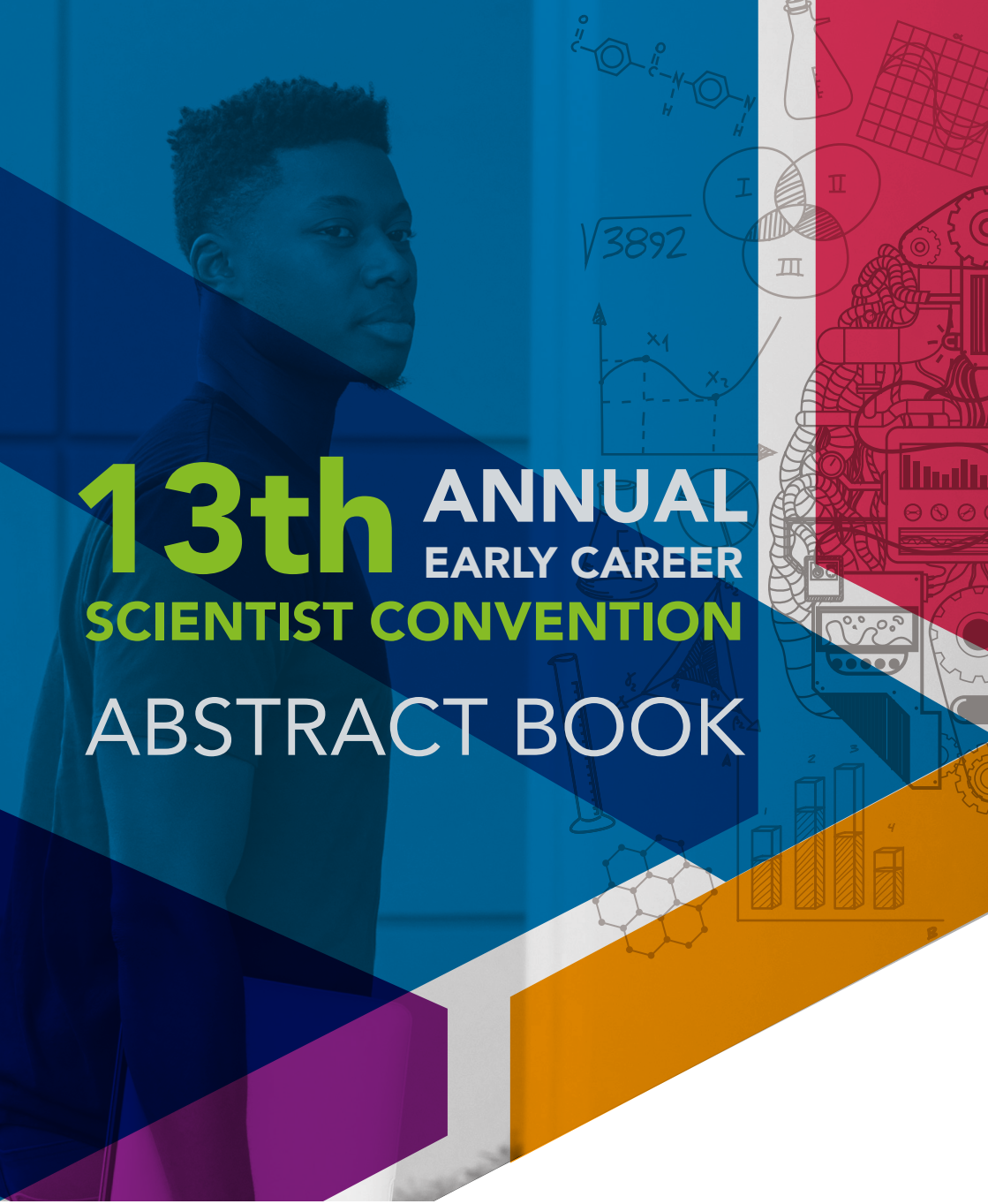

13th ANNUAL EARLY CAREER SCIENTIST CONVENTION

ABSTRACT BOOK

saMRC advancinglife

CELEBRATING 50 YEARS

TABLE OF CONTENT

MESSAGE FROM THE VICE PRESIDENT

Jeffrey Mphahlele, PhD

The SAMRC Early Career Scientist Convention is an annual prestigious convention of the future scientists on the African continent. It is a highly sought-after scientific event for the next generation of scientists in health research. More precisely, it is the instrument for the SAMRC to replenish the pool of future research leaders on the sub-continent.

However, the broader intellectual development to achieve the highest qualification in research, the doctoral degree, is not without challenges. PhD takes a lot of work and one needs to be focussed for 3 to 5 years. Your initial induction into the world of research should gradually place you in a unique position to become more independent as you navigate the world of academic research, presentation and publication. Yet there will be some things that you have not learnt in the course of PhD. This is where the notion of "Progress, not Perfection" kicks in, and the role of "Mentors not Tormentors" is appreciated and valued.

According to the World Federation for Mental Health, there is no health without mental health. How to balance physical and mental health to sustain your wellbeing varies from individual to another. No wonder when one reads the acknowledgement section of most PhD theses, the list of friends and relatives whom were the source of strength and encouragement during the PhD journey is almost always the longest. Not even supervisors, mentors and financial support would match such a list.

The World Health Organisation has declared mental health a serious public health problem and the statistics on various mental disorders are shocking. The root causes vary, from work pressure to personal challenges. This year's World Mental Health Day, which coincidentally falls on the 10th October 2019, will focus on suicide prevention to raise awareness on the extent of this public health issue around the world. It is hard to imagine that every 40 seconds, someone loses their life to suicide globally. In the recent past, there has been regretfully a spike in mental health cases amongst students in higher institutions. This is a cause for concern. The South African Depression and Anxiety Group (SADAG) estimates that as many as one in six South Africans suffer from anxiety, depression or substance-use problems (excluding more serious conditions such as bipolar disorder or schizophrenia). And more chilling is the fact that only a quarter of the people with a diagnosable mental disorder are receiving treatment.

In conclusion – I would like to emphasise that nothing is impossible if there is a "will" and "drive". So a PhD is possible if there is a "desire" and "potential". My sincere thanks to the Research Capacity Development team, under the leadership of Dr Thabi Maitin in steering the Early Career Scientist Conventions since inception. I am confident that you will find this year's convention inspirational and rewarding in many ways, especially learning the skills and strategies of emotional resilience and the ability to bounce back after disappointment during the PhD journey.

MESSAGE FROM DIVISION MANAGER

Thabi Maitin, PhD

It is always such a joy to me to reach this time of the year when we all meet to encourage each other.

There are various new and exciting developments to celebrate this year:

We have new staff members at RCD:

- Dr Lindokuhle Ndlandla. Lindo is RCD Programmes Manager. She will be focusing on all affairs concerning all RCD Post graduate funding vehicles.
- Ms Colleen Van Wyk who successfully competed for the position of National Health Scholars Program Coordinator.

I heartily welcome these two new staff. Sadly, I can not promise them an easy ride at RCD! Our work is increasing more and more in all aspects of complexity, beneficiary numbers, new strategic programmes and budget complexities

RCDs international portfolio and footprint is growing with the attendant legal and management challenges. Some of the examples are below:

Essence for Health: I have had the privilege to co-chair the Working Group on Research Investments. The focus is on LMICs. A report emanating from this work is being tabled to the World Bank and the task moves on to exploring implementation stage.

You may visit https://www.who.int/tdr/partnerships/essence/meetings/Minutes-ESSENCE-MembersMeeting15-16April2019-London.PDF?ua=1 to get a glimpse of RCD's participation on behalf of the SAMRC.

Capacity Development of Dental Human Capacity Initiative for South Africa : We have just signed off an MoU with UWC and Norway to initiate work on this. There is already an agreed to programme of SA dental scientists to visit Norway for the first leg in the implementation of the partnership.

Biostatistics Human Capacity Development initiative: We have just launched this new initiative, working with the university of Hasselt in Belgium. Again this is to assist the SAMRC accelerate the development of Biostatistician PhDs for South Africa – a scarce skill worldwide.

National Clinician Scholars Programme: The pilot intercalated MBChB PhD programme hosted by UCT is going national and taking on a higher and more national approach to the programme. We hope to report further on this in next year's conference

IMVACC - International Master of Vaccinology (IMVACC). The programme is growing. We are enrolling the fourth cohort at the university of Lausanne in Switzerland in January 2020. South Africa will soon have a highly skilled cohort of vaccinologists developed through its division of research capacity development.

News and new SLA - Bongani Mayosi National Health Scholars Programme *(BM- NHSP).* With the change of administration in Government, the programme has gained more visibility and commitments to its growth and sustainability. A resounding successful launch of the new name for the programme in honour of the late Professor Bongani Mayosi was attended by dignitaries from SAMRC. Government and the funding private sector companies and their CEOs. A fresh injection of top of funding is currently getting sign off through the legal channels of SAMRC and the National Government through Treasury. This should mean more intake for the programme in 2020.

About the early Career Scientist Convention: We are very excited to have relaunched the oral presentation of work by beneficiaries. This we had put on hold during the transition into Post restructuring and putting many new RCD programmes on track. Such developments are courtesy to Dr De Villiers, who has provided much relief to me personally but also for the Division at large for running with the scientific agenda. I thank you sincerely Anniza!

Lastly, as always, remember and celebrate yourselves that you are the cream of upcoming clinical and health research scholars in South Africa. The SAMRC has entrusted the generation of new knowledge in clinical health sciences to you to see us into the digital frontier.

I value each and every one of you and I wish you all the best in 2020!

CONTRIBUTORS

Keynote Speakers	
1.	Dr Goodman Sibeko -- Head of Addiction Psychiatry at the University of Cape Town
2.	Dr Darren Green – Consults globally on Executive Corporate applications of Neuroscience in both business and high performance sport
Scientific Committee Members	
1.	Dr Nadine Harker – Alcohol, Tobacco and Other Drug Research Unit (SAMRC)
2.	Dr Jillian Hill – Non-Communicable Diseases Research Unit (SAMRC)
3.	Dr Lawrence Mabasa – Biomedical Research and Innovation Platform (SAMRC)
4.	Dr Ebrahim Samodien – Biomedical Research and Innovation Platform (SAMRC)
Masterclass Conveners	
1.	Dr Lawrence Mabasa – Biomedical Research and Innovation Platform (SAMRC)
2.	Dr Carry Brooke Sumner- Alcohol, Tobacco and Other Drug Research Unit (SAMRC)
3.	Dr Kim Jonas – Health Systems Research Unit (SAMRC)
4.	Dr Ebrahim Samodien – Biomedical Research and Innovation Platform (SAMRC)
5.	Dr Jillian Hill – Non-Communicable Diseases Research Unit (SAMRC)
6.	Dr Janan Dietrich – Health Systems Research Unit (SAMRC)
7.	Dr Salome Maswime – Private Investigator (University of Cape Town)
8.	Dr Phumla Sinxadi – University of Cape Town
9.	Dr Tarryn Willmer – Biomedical Research and Innovation Platform (SAMRC)
10.	Dr Ntevhe Thovhogi – Biomedical Research and Innovation Platform (SAMRC)
11.	Dr Nadine Harker – Alcohol, Tobacco and Other Drug Research Unit (SAMRC)
12.	Dr Tara Carney – Alcohol, Tobacco and Other Drug Research Unit (SAMRC)
13.	Dr Kim Nguyen – Non- Communicable Diseases Research Unit (SAMRC)
14.	Dr Nireshni Chellan – Biomedical Research and Research Unit (SAMRC)
15.	Dr Brendon Pearce – Postdoctoral fellow, University of the Western Cape
16.	Dr Awelani Mutshembele – TB Platform (SAMRC, PTA)
17.	Prof Andre Kengne – Unit Director, Non-Communicable Diseases Research Unit (SAMRC)
18.	Dr Cindy George – Non-Communicable Diseases Research Unit (SAMRC)
19.	Dr Nasheeta Peer – Non-Communicable Diseases Research Unit (SAMRC)
20.	Dr Lindokuhle Ndlandla – Research Capacity Development (SAMRC)

Oral Presentations	
1.	Dr Ntevhe Thovhogi – Postdoctoral fellow, Biomedical Research and Innovation Platform (SAMRC)
2.	Dr Awelani Mutshembele – TB Platform (SAMRC, PTA)
3.	Dr Carrie Brooke Sumner – Alcohol, Tobacco and Other Drugs Research Unit (SAMRC)
4.	Dr Tara Carney – Alcohol, Tobacco and Other Drugs Research Unit (SAMRC)
5.	Dr Kim Nguyen – Non- Communicable Diseases Research Unit (SAMRC)
6.	Dr Janan Dietrich – Health Systems Research Unit (SAMRC
7.	Dr Rabia Johnson – Biomedical Research and Innovation Platform (SAMRC)
Poster Presentations (short orals)	
1.	Dr Jillian Hill – Non-Communicable Diseases Research Unit (SAMRC)
2.	Dr Kim Nguyen – Non-Communicable Diseases Research Unit (SAMRC)
3.	Dr Cindy George – Non-Communicable Diseases Research Unit (SAMRC)
4.	Dr Ntevhe Thovhogi – Biomedical Research and Innovation Platform (SAMRC)
5.	Dr Lawrence Mabasa – Biomedical Research and Innovation Platform (SAMRC)
6.	Dr Anelisa Jaca – Cochrane, South Africa (SAMRC)
7.	Dr Kim Jonas – Health Systems Research Unit (SAMRC)
8.	Dr Brendon Pearce – Postdoctoral Fellow, University of the Western Cape
9.	Dr Tarryn Wilmer – Biomedical Research and Innovation Platform (SAMRC)
10.	Dr Awelani Mutshembele – TB Platform (SAMRC, PTA)
11.	Dr Carrie Brooke Sumner – Alcohol, Tobacco and Other Drug Research Unit (SAMRC)
12.	Dr Ebrahim Samodien – Biomedical Research and Innovation Platform (SAMRC)
13.	Dr Lindo Ndlandla – Research Capacity Development (SAMRC)
14.	Dr Janan Dietrich – Health Systems Research Unit (SAMRC)

With grateful thanks…

Research Capacity Development (RCD) would like to acknowledge the following colleagues who have been contributing to the work of RCD diligently and selflessly over the years. They are indeed the extended RCD team:

	Name & Surname	SAMRC Portfolio	Contribution and Role at RCD
1.	Prof Johan Louw	Director – Biomedical Research and Innovation Platform (BRIP)	Chair: RCDs Grants and Scholarships Selection Committee (MSc/PhD/Postdoc programmes)
2.	Prof Andre Kengne	Director – Non-Communicable Diseases Research Unit (NCDRU)	Chair: RCDs Grants and scholarships Selection Committee (MD. PhD programme)
3.	Dr Shaheen Mowla	Research Scientist – University of Cape Town (UCT)	Member: RCDs Grants and Scholarships Selection Committee
4.	Ms Jean Fourie	Language Practioner/ Senior Scientist	Editor: RCD print and other resources
5.	Ms Sumaya Behardien	Senior Legal Advisor - SAMRC	Advisor: RCD legal matters, processes, and resources
6.	Mr Clive Glass	Grants Manager – Grants, Innovation, and Product Development	Member: RCDs Grants and Scholarships Selection Committee
7.	Ms Noluthando Sikhutshwa	Business Partner: Project Management and Accounting Office SAMRC	Oversight: RCD Financial matters, processes, and budgets

KEYNOTE SPEAKERS

BIO-SKETCH

Dr Goodman Sibeko

Dr Goodman Sibeko, MBChB, PhD serves as Head of Addiction Psychiatry at the University of Cape Town. His work has focused on interventions using non-specialist workers in the management of severe mental illness, and he has a developing research portfolio focused on task sharing models for the treatment of harmful substance use, mental health and HIV. He serves as Co-Director of the South Africa HIV Addiction Technology Transfer Centre.

BIO-SKETCH

Dr Darren Shiloh Green

Darren Shiloh Green was born in Pietermaritzburg. He later moved to Port Elizabeth where he attended Grey High School where he flourished in 3 provincial sports while becoming Matric of the Year as well as the Junior Mayor of Port Elizabeth. He is an Alumnus of the University of Stellenbosch, where he completed both his undergraduate degree in Medicine and 4 years of postgraduate training in Neurology. During his Varsity years he achieved the honour of being selected for the Maties and WP U21 sevens squad and eventually was shortlisted for the SA U23 rugby squad to Singapore , before bowing out of competitive rugby in his senior years at University due to a shoulder injury. The singing doctor became a finalist in the first season of SA's POP IDOLS competition where he was a well-loved persona.

Darren went on to become an authority in the Media Health and Wellness space after gracing the radio airwaves on the 94.5 KFM Breakfast show with Ryan O Connor – this catapulted his popularity as one of the country's most engaging health personalities. His influence then spread in print media where he became a National columnist for IOL and had 2 weekly pieces in the Daily news in KZN as well as the Cape Argus. This has led to him taking the up the charge to spearhead many health and lifestyle initiatives nationwide. He is in the business of actual Health – challenging mindsets and paradigms pertaining to holistic wellness rather than just physical health. Darren loves simplifying complex medical issues and illuminating useful aspects for practical benefits to patients. His passion is teaching and empowering people with an understanding and insight into the mind/body connection and shifting human capacity.

Currently he consults globally on Executive Corporate applications of Neuroscience in both business and High-performance sport. He is a senior Brain Coach and neuro-wellness facilitator for Neurozone Global and speaks on pertinent health matters linked to Behavioural Economics. In addition, he is actively still practising as an Emergency Physician at one of South Africa's Leading Cardiac Units. In addition, he operates on all media platforms as a Lifestyle Wellness Consultant.

RESEARCH CAPACITY DEVELOPMENT (RCD) STAFF

Left to right: Ms Jorene Naidoo, Ms Philistia Joshua, Ms Colleen Van Wyk, Dr Anniza de Villiers (Senior Scientist), Dr Thabi Maitin (Division Manager), Mr Thobile Mabuya
Insert: Dr Lindokuhle Ndlandla (Project Manager)

RESEARCH CAPACITY DEVELOPMENT (RCD)

FUNDING CATEGORIES 2019/20

ADMINISTRATORS	SCHOLARSHIP PROGRAM/GRANT TYPE	TARGET GROUP	PURPOSE/IMPORTANCE	VALUE OF SCHOLARSHIP/GRANT
Mr. Thobile Mabuya	SAMRC Clinician Researcher MD. PhD Development programme	Post MBChB/D.D. S studying towards their PhD degree	Response to dearth of MD. PhD cadre within the health research team in SA and Globally	R500K p.a salary contribution x 4 yrs.
Ms. Jorene Naidoo	SAMRC Internship scholarship programme	MSc's and PhDs research training for generic black scientists	Directly supports transformation. In-house research skills transfer programme.	PhD: R200K p.a x 3yrs. MSc R160K p.a x 2yrs (package incl. tuition)
Ms. Colleen Van Wyk	Bongani Mayosi National Health Scholarship Program (NHSP)	Doctoral (and Masters where compelling) Research training Internships for SA young Scientist	Gold standard Public Private Partnership for PhD development in SA. (Stakeholders: NHRC/ NDoH/ PHEF and SAMRC partnership)	Various: equivalent to after-tax take-home package for profession according to SA Government Full-time Cost of Employment figures.
Ms. Colleen Van Wyk	Biostatistics Human Capacity Development	Master's and Doctoral scholarships in the field of Biostatistics at a South African University	Subsistence/cost of living and studying	PhD: R200 000 p.a x 3 years Masters: R160 000 p.a x 2 years (Package incl. tuition)

Ms. Philistia Joshua	SAMRC Research Capacity Development Initiative (RCDI) programme at Selected Universities – Post graduate programme	Target institutions rather than Individual Researcher Capacity Development: Project leaders in selected under resourced institutions	Directly support transformation. Develop research capacity and to work towards closing the gap in rate of generation of knowledge between established research intensive universities and under resourced universities	R1ML p.a. per selected university for 5 years
Mr Thobile Mabuya	SAMRC Intramural Postdoctoral Award	Post-Doctoral Award	R250K salary contribution and R100K for project running expenses	R250 000.00 + R100 000.00 = R350 000.00 p. a x 5 years
Ms Philistia Joshua	Mid-Career Scientist Programme (MCSP)	Mid-career scientist to facilitate their retention in the public sector in areas of strategic interest to the NDoH and the SAMRC	To establish mid-career scientist to fast track and transition to independent researchers who will become equipped to write their own grants and thereby secure their own salary and research support. Showcasing SAMRC/ Selected Universities partnership	R1 250 000.00 first year and R1 500 000.00 second year of funding
Mr Thobile Mabuya	International Masters in Vaccinology (IMVACC) programme	South African citizens from designated race/gender individuals with MBChB/ MBBCHB background must hold M-Med degree or any specialty discipline (e.g. FCP) recognized by CMSA	This is an e-learning facilitated program with the University of Lausanne funded jointly with the SAMRC	R375 000 per candidate up to the completion of the degree (MSc)
Ms Jorene Naidoo	SAMRC Research Development Grant	Strategic PhDs/Research Development Grant/ Staff Development Grant	As detailed in motivation and request and as agreed. Once-off last year of PhD	Up to R250 000.00 p. a x 1 year

EARLY CAREER SCIENTIST CONFERENCE 2019: 9 – 11 OCTOBER 2019

Progress not perfection: Balancing mental and physical health on your PhD journey

Wednesday, 09 October 2019: Masterclasses		
09h30 – 10h00	Arrival/Registration	
10h00 – 10h10	Welcome and Housekeeping	Programme Director: Dr Nadine Harker
10h10 – 10h20	Welcome	Dr Thabi Maitin, RCD Division Manager
10h20 – 10h30	Welcome address	Mr. Brinton Spies Executive Director Human Resources
10h30 – 11h15	**Masterclass 1** (Plenary): Completing a PhD: Stories of hope and perseverance Facilitator: Dr Lawrence Mabasa Participants: Dr Salome Maswime, Dr Phumla Sinxadi, Dr Riaan Cedras	
11h15 – 11h30	**Tea**	
11h30 – 12h30	**Masterclass 2:** After the PhD: What now? Facilitators: Dr Carry Brooke-Sumner; Dr Kim Jonas	**Masterclass 3:** Surviving a PhD (mental wellbeing intact) Facilitators: Dr Ebrahim Samodien; Dr Jillian Hill; Dr Janan Dietrich
11h30 – 12h30	**Breakaway session (Clinicians):** Facilitators: Dr Salome Maswime; Dr Phumla Sinxadi	
12h30 – 13h30	**Lunch**	
13h30 - 15h30	**Masterclass 4:** Completing my PhD - Early stage laboratory (animal and human) studies Facilitators: Dr Tarryn Willmer; Dr Ntevhe Thovhogi	
	Masterclass 5: Completing my PhD - Early stage public health and clinical studies Facilitators: Dr Nadine Harker; Dr Tara Carney; Dr Kim Nguyen	
	Masterclass 6: Completing my PhD - Late stage laboratory (animal and human) studies Facilitators: Dr Nireshni Chellan; Dr Brendon Pearce; Dr Awelani Mutshembele	
	Masterclass 7: Completing my PhD – Late stage public health and clinical studies Facilitators: Prof Andre Kengne; Dr Cindy George, Dr Jillian Hill	
10h30 – 15h30	**Masterclass 8: IMVACC – Progress and Feedback** Facilitators: Dr Nasheeta Peer; Dr Lindokuhle Ndlandla	

Thursday, 10 October 2019: Scientific Programme Venue		
08h30 -08h55	Arrival/Registration	
08h55 – 09h00	Welcome and Housekeeping	Dr Nadine Harker
09h00– 09h30	**Keynote Address**	**Dr Darren Green**
	Oral Presentations (Parallel sessions)	
09h30 – 10h55	**Session 1: Non-communicable diseases** **Facilitator:** Dr Ntevhe Thovhogi **Adjudicator:** Dr Awelani Mutshembele **Timekeeper:** Ms. Philistia Joshua	**Session 2: Mental Health/Public Health** **Facilitator:** Dr Carrie Brooke-Sumner **Adjudicator:** Dr Tara Carney **Timekeeper:** Mr. Thobile Mabuya
09h30 – 09h35	**Introduction**	**Introduction**
09h35 – 09h45	Exercise training improves whole body insulin sensitivity, but does not alter ectopic fat or hyperinsulinemia in obese black South African women **M Fortuin-de Smidt**	Exploring the perspectives of health service providers on applying mental health policy and interventions for school- children in the Western Cape, South Africa **K Mgoqi**
09h45 – 09h55	The impact of genetic polymorphisms on the SLCO1B1 gene transcription factor binding sites on enalapril treatment outcome in hypertensive patients **R Musoliwa**	Feasibility and acceptability of a clinician monitored PTSD Coach Online intervention: A pilot randomised control trail in a low resource setting **E Bröcker**
09h55 – 10h05	Prevention of Doxorubicin-induced Cardiotoxicity by Galenia Africana: A Mechanistic Study **N Sangweni**	Impact of Resilience on Depression in Mothers Exposed to Intimate Partner Violence or Trauma: Findings from a South African Birth Cohort **W Barnett**
10h05- 10h15	Lessertia frutescens and Echinacea purpurea effects the bioavailability and metabolism of ethinylestradiol based contraceptives **N Hlengwa**	Cannabis use and hippocampal subfield volumes in males with first episode schizophrenia and healthy controls**F Scheffler**
10h15-10h25	Utility of endoscopic duodenal biopsies in patients investigated for malabsorptive features: A South African National Health Laboratory Services database study **S Hlatshwayo**	Mental health system costs, resources and constraints in South Africa: a national survey and case study for universal health coverage **S Docrat**

Thursday, 10 October 2019: Scientific Programme Venue		
10h25 – 10h40	**Questions**	**Questions**
10h40 – 11h00	**Tea**	
	Session 3: Non-communicable diseases **Facilitator:** Dr Ntevhe Thovhogi **Adjudicator:** Dr Kim Nguyen **Timekeeper:** Ms. Colleen van Wyk	**Session 4: Communicable Diseases** **Facilitator:** Dr Janan Dietrich **Adjudicator:** Dr Rabia Johnson **Timekeeper:** Ms. Philistia Joshua
11h00 – 11h05	**Introduction**	**Introduction**
11h05 – 11h15	The effect of Beta Secretase Inhibitor and Rooibos treatment on C57BLKS db/db mice **Y Ntamo**	Pulmonary rehabilitation for people with Tuberculosis in a high HIV-positive setting: A pilot randomised control trial **S Manie**
11h15 – 11h25	Impact of salt induced hypertension on captive-bred Vervet monkeys (Chlorocebus aethiops) **S Khoza**	HIV treatment and blood pressure in adolescents and young adults from a hospital-based HIV-treatment cohort **N Dwane**
11h25 – 11h35	Validation of equations to estimate glomerular filtration rate in South Africans of mixed ancestry **J Holness**	The decentralised drug-resistant TB programme in South Africa: From policy to implementation **W Jassat**
11h35 – 11h45	Overweight and obesity trends in South African women of childbearing age: 1998 to 2017 **M Nglazi**	IL-4i1 regulates macrophage mediated immune responses to acute Mycobacterium tuberculosis infection **L Hlaka**
11h45 – 11h55	Synthesis and characterization of N-Acetylcysteine-loaded PLGA nanofibers as a neuro-scaffold **G Mahumane**	The effect of asymptomatic STI's on male foreskin susceptibility to HIV **L Rametse**
11h55 – 12h10	**Questions**	**Questions**
12h10 – 12h45	**Lunch**	

Thursday, 10 October 2019: Scientific Programme Venue			
	Day 2: Afternoon Session - Poster Presentations (short orals)		
12h45 – 14h00	**Session 5:** **Facilitator:** Dr Jillian Hill **Adjudicators:** Dr Kim Nguyen; Dr Cindy George; Dr Ntevhe Thovhogi **Timekeeper:** Ms. Colleen van Wyk	**Session 6:** **Facilitator:** Dr Lawrence Mabasa **Adjudicators:** Dr Anelisa Jaca, Dr Kim Jonas, Dr Brendon Pearce **Timekeeper:** Mr. Thobile Mabuya	**Session 7:** **Facilitator:** Dr Tarryn Willmer **Adjudicators:** Dr Awelani Mutshembele, Dr Carrie Brooke-Sumner, Dr Ebrahim Samsodien **Timekeeper:** Ms. Philistia Joshua
1	How children make meaning of sexual trauma **N Titi**	The effects of indigenous South African plant extracts (Cotyledon orbiculata and Tulbaghia. Violacea) on triple negative breast cancer cells **M Alaouna**	Molecular characterization of proteins involved in iron-sulphur cluster assembly in mycobacteria **J Arries**
2	Supervision System of WBOTs in Ngaka Modiri Molema District, North West Province **T Assegaai**	Experience of women who started pre-exposure prophylaxis (PrEP) in Durban, South Africa as part of a standard HIV prevention package in a large multicenter clinical trial **I Beesham**	Preliminary Findings: Psychological Impacts of Environmental Degradation in Vhembe District, Limpopo Province **G Barnwell**
3	Novel proteomic biomarkers for acral lentiginous melanoma **I Basson**	Designing research for individualization **B Carpenter**	Biomarkers to predict TB treatment response **I Boshielo**
4	Classifying gene expression data with mixture models **M Botes-de Klerk**	Introducing an arteriovenous fistula pre-cannulation assessment care-bundle to reduce complications in patients with an arteriovenous fistula on haemodialysis **A Damons**	A prospective longitudinal study of the impact of ante- and postnatal maternal mental health on the neuro-developmental trajectories of children during the first 18 months **M Burger**

Thursday, 10 October 2019: Scientific Programme Venue			
5	Monoclonal antibody production against Mycobacterium tuberculosis curli pili **T Butelezi**	Impact of ART adherence and retention interventions on viral load and vertical transmission during pregnancy and breastfeeding, a simulation model **T Glass**	Patient Cost of Accessing HIV/TB Healthcare Services in Rural KZN **T Chetty**
6	Integrative analysis of epigenetic modifications in a breast cancer cell line (MCF-7) treated with a bioactive extract of Bidens Pilosa **PK Chokoe**	Is the introduction of violence and injury observatories associated with a reduction in violence-related injury in adult populations? A systematic review and meta-analysis **A Jabar**	Statistical Measures for Multivariate Spatial Autocorrelation **TB Darikwa**
7	Identifying biomarkers of subclinical TB and protective immunity through the molecular and cellular comparison between peripheral and local disease sites **N Sibiya**	Predicting patient outcomes in the South African pharmacovigilance study using joint modelling **M Lekganyane**	In vivo and in vitro studies to investigate the role of autophagy in human tuberculosis In vivo and in vitro studies to investigate the role of autophagy in human tuberculosis **NP Gina**
8	Investigating the cardioprotective effect of intralipid in both pre-clinical and clinical settings **N Hadebe**	Evidence on factors influencing contraceptive use and sexual behaviour in South Africa: A systematic scoping review **M Hlongwa**	Modelling risk factors of diabetes in South Africa **N Grundlingh**
9	Neutrophils as effector cells in resistance to infection by Mycobacterium tuberculosis in HIV-infected persons **E Kroon**	Systematic review on plant-based diet in relation to CVD risk in Africa **T Lopes**	Can biomarkers in scalp hair identify patients at risk of a heart attack? **E Mabotha**

Thursday, 10 October 2019: Scientific Programme Venue			
10	Inter-individual genetic variation and the development of uncontrolled hypertension in patients with concomitant type 2 diabetes mellitus in Eastern Cape South Africa **S Mabhida**	Pharmacogenetics of tenofovir **K Motjane**	Investigating the uptake efficiency of Cisplatin within African-specific haplotypes of OCT2 **M Sedres**
	Questions	**Questions**	**Questions**
14h00 – 14h10	**Break**		
14h10– 14h55	**Session 8:** **Facilitator:** Dr Cindy George **Adjudicators:** Dr Kim Nguyen; Dr Jillian Hill; Dr Ntevhe Thovhogi **Timekeeper:** Ms. Philistia Joshua	**Session 9:** **Facilitator:** Dr Kim Jonas **Adjudicators:** Dr Anelisa Jaca, Dr Lindo Ndlandla, Dr Brendon Pearce **Timekeeper:** Ms. Colleen van Wyk	**Session 10:** **Facilitator:** Dr Janan Dietrich **Adjudicators:** Dr Awelani Mutshembele, Dr Carrie Brooke-Sumner, Dr Ebrahim Samsodien **Timekeeper:** Mr. Thobile Mabuya
1.	Evaluation of anticancer activity of Momordica balsamina extracts and potential interactions with a conventional anticancer drug in colon cancer **K Malemela**	Differentiation in high glucose increases lipid accumulation, lipolysis and oxidative stress 3T3-L1 adipocytes **M Mamushi**	The economic burden of depression co-morbidity with chronic disease and its association with utilization, adherence and quality of life: a baseline analysis **V Mafunda**
2.	A prospective study of the epidemiology and immunological basis of epidermal necrolysis-associated depression **E Zitha**	The association of single Nucleotide Polymorphisms with the anti-hypertensive drug hydrochlorothiazide among indigenous South African Zulu patients **CM Masilela**	Effects of rooibos phenolic compounds on the gut microbiota of Vervet monkeys (Chlorocebus pygerythrus) **N Mangwana**
3.	Latent Variable Models for Longitudinal Outcomes from a Parenting Intervention Study **C McCready**	Joint Modelling the CD4 Count and Mortality in a Cohort of Patients Initiated on HAART: a longitudinal study **NN Mchunu**	Multilevel modelling for cross-classification and multiple membership data in data in public health **M Mazinu**

Thursday, 10 October 2019: Scientific Programme Venue			
4.	Cancer mortality in South Africa (1997 – 2016): Adopting temporal, spatial and health economic modelling approaches **ML Nhleko**	Early life factors and longitudinal blood pressure trajectories are associated with elevated blood pressure in early adulthood: Birth to Twenty Plus Cohort **S Naidoo**	The role of Mycobacterium tuberculosis L,D-transpeptidase in TB pathogenesis **N Mkhwanazi**
5.	Mouse and human macrophages upregulate MX1 and MX2 genes upon infection with mycobacteria **RD Pietersen**	Joint modelling of longitudinal colony forming unit count and time-to-event data emanating from tuberculosis trials **S Nigrini**	Semiparametric techniques for multilevel discrete survival data **T Nevhingoni**
6.	Effect of an educational intervention on knowledge and perceived quality of life amongst diabetes patients of Centers for Diabetes and Endocrinology in North-West Province and Gauteng Province **S Richter**	Phenotypic of lewis and secretor histo-blood group antigens from saliva of infants suffering from gastroenteritis **K Rakau**	Determinants of anaemia in women and men in South Africa: Application of GLMMs and Spatial statistics **SI Sithole**
7.	The Role of Extracellular Matrix on Esophageal Cancer Cell Drug Response **DA Senthebane**	Investigating the anti-cancer properties of Dodonaea viscosa, a medicinal plant used by Cape Bush doctors **A Saferdien**	Beneficial effect of isoorientin in insulin-resistant adipocytes **K Ziqubu**
8.	Plasma cytokine biomarkers in African patients with HIV-associated Kaposi sarcoma **F Shaik**	Homocysteine, genetic variants and dietary predictors' cross-sectional associations with cardiovascular measures in a group of black South Africans **J Van Schalkwyk**	
15h00	**Busses leave for Gold Restaurant**		

Friday, 11 October 2019: Scientific Program		
08h55 – 09h00	Welcome and Housekeeping	
09h00 – 09h30	**Keynote Address 2-**	Dr Goodman Sibeko
Oral Presentations (Parallel Sessions)		
09h35 – 11h30	**Session 11: Communicable diseases** **Facilitator:** Dr Awelani Mutshembele **Adjudicator:** Dr Lawrence Mabasa **Timekeeper:** Ms. Colleen van Wyk	**Session 12: Non-Communicable diseases** **Facilitator:** Dr Carrie Brooke-Sumner **Adjudicator:** Dr Anelisa Jaca **Timekeeper:** Ms. Philistia Joshua
09h35 – 09h40	**Introduction**	**Introduction**
09h40 – 09h50	Whole-genome Transposon Mutagenesis to Elucidate the Genetic Requirements for Vitamin B12 Biosynthesis and Assimilation in Mycobacteria **R Mbau**	Epigenetic alterations associated with childhood trauma and adult mental health outcomes: A systematic review **J Nothling**
09h50 – 10h00	The role of antigen presenting cells and T cells in mice infected with CNS-TB **K Kgoadi**	Misuse of codeine in South Africa: A multifaceted study of the nature and extent of the problem and methodological considerations **S Dada**
10h00 – 10h10	Infant lung function at one year of age after admission for RSV infection: a case control study **C Verwey**	Trends in suicide mortality in South Africa, 1997 to 2016 **T Kootbodien**
10h10 – 10h20	Targeted depletion of RibF, a putative bifunctional FAD synthetase/ flavokinase in Mycobacterium smegmatis **MB Raphela**	Using Maternity Case Records to obtain births data for estimation purposes: Documenting methodological challenges **M Nhlapo**
	Breaching the barrier: targeting cell wall enzymes of Mycobacterium tuberculosis for development of novel TB drugs **M Shaku**	Validation process of a vaccine hesitancy measuring tool in the Western Cape **E Oduwole**
10h20 – 10h35	**Questions**	**Questions**
10h35 – 10h50	**Tea**	
	Session 13: Communicable Disease **Facilitator:** Dr Brendon Pearce **Adjudicator:** Dr Ntevhe Thovhogi **Timekeeper:** Mr. Thobile Mabuya	**Session 14: Non-Communicable Diseases** **Facilitator:** Dr Annelisa Jaca **Adjudicator:** Dr Kim Nguyen **Timekeeper:** Ms. Philistia Joshua

Friday, 11 October 2019: Scientific Program		
10h50 – 10h55	**Introduction**	
10h55 – 11h05	Haplotype structure of solute carrier (SLC) promoters in the Xhosa population of South Africa **Z Abrahams-October**	The design and implementation of a patient-centred therapeutic exercise and sport intervention for young people with substance-use disorders in treatment settings: improving behavioural health and quality of life in South Africa **W Lucas**
11h05 – 11h15	Hospitalisation in Perinatally HIV-infected adolescents on antiretroviral therapy in South Africa: A prospective study **L Frigati**	Understanding violence within protest: A case-study of the Rhodes Must Fall movement at the University of Cape Town (2015–2016) **M Motimele**
11h15 – 11h25	Cardiopulmonary dysfunction in perinatally HIV infected South African adolescents on antiretroviral therapy: Baseline findings from the Cape Town Adolescent Antiretroviral Cohort **L Githinji**	Preliminary report of late effects of childhood cancer and treatment in a South African cohort **A Van Zyl**
11h25 – 11h35	Adaptation to living with HIV as a chronic illness and patient self-management: A scoping review **N Sematlane**	Dietary diversity, food choices and nutritional status of adults at risk of Diabetes Mellitus type II, residing in resource poor communities around Cape Town **S Madlala**
11h35 – 11h45	**Discussion**	
11h50 – 12h20	**Celebrating the completers**	
12h20 – 13h00	**Closure and award ceremony**	**Closing address:** Prof Jeffrey Mphahlele Vice President SAMRC **Votes of Thanks:** Mr. W Lucas (on behalf of scholars)/Dr A de Villiers / Dr T Maitin **Awards:** Dr Thabi Maitin Division Manager RCD and Prof J Mphahlele **Final word:** Programme Director Dr Nadine Harker
13h00 -	**Lunch**	

EARLY CAREER SCIENTIST CONVENTION 2019

SAMRC CLINICIAN RESEARCHER (M.D PHD) DEVELOPMENT PROGRAMME

No.	INITIALS	SURNAME	UNIVERSITY/ RESEARCH UNIT	ABSTRACT TITLE
1.	I.	Beesham	University of Witwatersrand	Experience of women who started pre-exposure prophylaxis in Durban, South Africa as part of a standard HIV-prevention package in a large multicentre clinical trial
2.	M.	Fortuin-de-Smidt	University of Cape Townz	Exercise training improves whole-body insulin sensitivity but does not alter ectopic fat or hyperinsulinemia in obese black South African women
3.	L.	Githinji	University of Cape Town	Cardiopulmonary dysfunction in perinatally HIV-infected South African adolescents on antiretroviral therapy: Baseline findings from the Cape Town Adolescent Antiretroviral Cohort
4.	N.	Hadebe	University of Cape Town	Investigating the cardio-protective effects of intralipid in both pre-clinical and clinical setting
5.	S.	Hlatshwayo	University of Cape Town	Utility of endoscopic duodenal biopsies in patients investigated for malabsorption: A South African National Laboratory Services database study
6.	JL.	Holness	University of Stellenbosch	Validation of equations to estimate glomerular filtration rate in South Africans of mixed ancestry
7.	A.	Jabar	University of Cape Town	Is the introduction of violence and injury observatories associated with a reduction in violence-related injury in adult populations? A systematic review and meta-analysis
8.	W.	Jassat	University of the Western Cape	The decentralised drug-resistant TB programme in South Africa: From policy to Implementation

No.	INITIALS	SURNAME	UNIVERSITY/ RESEARCH UNIT	ABSTRACT TITLE
9.	T.	Kootbodien	University of Cape Town	Trends in suicide mortality in South Africa, 1997 to 2016
10.	E.	Kroon	University of Stellenbosch	Neutrophils as effectors cells in resistance to infection by Mycobacterium tuberculosis in HIV- infected persons
11.	S.	Naidoo	University of Witwatersrand	Early life factors and longitudinal blood pressure trajectories are associated with elevated blood pressure in early adulthood: Birth to Twenty Plus Cohort
12	J.	Naidoo	University of Cape Town	Genetics of hypertension and associated Chronic Kidney Disease in a South African population with hypertension
13.	L.	Rametse	University of Cape Town	The effect of asymptomatic STI's on male foreskin susceptibility to HIV
14.	F.	Shaik	University of KwaZulu Natal	Plasma cytokine biomarkers in African patients with HIV-associated Kaposi sarcoma
15.	L.	Van de Heuvel	University of Stellenbosch	Hair cortisol as a biomarker of stress and resilience in females
16.	C.	Verwey	University of Witwatersrand	Infant lung function at age one year after admission for RSV infection: A case control study
17.	E.	Zitha	University of Cape Town	A prospective study of the epidemiology and immunological basis of epidermal necrolysis-associated depression
SAMRC INTERNSHIP SCHOLARSHIP PROGRAMME (ISP)				
18.	Z.	Abrahams-October	University of the Western Cape	Haplotype structure of solute carrier (SLC) promoters in the Xhosa population of South Africa
19.	M.	Alouna	University of Witwatersrand	The effects of indigenous South African plant extracts *(Cotyledon orbiculate and tulbaghia. Violacea)* on triple negative breast cancer cells

No.	INITIALS	SURNAME	UNIVERSITY/ RESEARCH UNIT	ABSTRACT TITLE
20.	J.	Arries	University of Stellenbosch	Molecular characterization of protein involved in iron-sulphur cluster assembly in mycobacteria
21.	I.	Boshielo	University of Witwatersrand	Biomarkers to predict TB treatment response
22.	N.	Hlengwa	University of Zululand	Lessertia frutescent and Echinacea purpurea effects the bioavailability and metabolism of ethinylestradiol-based contraceptives
23.	S.	Khoza	University of KwaZulu Natal	Impact of salt induced hypertension on captive-bred Vervet monkeys (Chlorocebusaethiops)
24.	L.	Hlaka	University of Cape Town	IL-4i1 regulates macrophage mediated immune response to acute mycobacterium tuberculosis infection
25.	T.	Lopes	University of Stellenbosch	Systematic review on plant-based diet in relation to cardiovascular disease risk in Africa
26.	WC.	Lucas	University of Cape Town	The design and implementation of a patient-centred therapeutic exercise and sport intervention for young people with substance use disorders in treatment setting: improving behavioural health and quality of life in South Africa
27.	S.	Mabhida	University of Cape Town	Inter-individual genetic variation and the development of uncontrolled hypertension in patients with concomitant type 2 diabetes mellitus in Eastern Cape, South African
28.	S.	Madlala	University of the Western Cape	Dietary diversity, food choices and nutritional status of adults at risk of Diabetes Mellitus type II, residing in resource poor communities around Cape Town
29.	MP.	Mamushi	University of Stellenbosch	Differentiation in high glucose increases lipid accumulation, lipolysis and oxidative stress 3T3-L1 adipocytes

No.	INITIALS	SURNAME	UNIVERSITY/ RESEARCH UNIT	ABSTRACT TITLE
30.	N.	Mangwana	Cape Peninsula University of Technology	Effects of rooibos phenolic compounds on the gut microbiota of Vervet monkey (Chlorocebus pygerythrus)
31.	CM.	Masilela	University of the Western Cape	The association of Single Nucleotide Polymorphisms with the anti-hypertensive drug hydrochlorothiazide among indigenous South African Zulu patients
32.	R.	Mbau	University of Cape Town	Whole-genome Transposon Mutagenesis to elucidate the genetic requirements for vitamin B12 biosynthesis and assimilation in Mycobacteria
33.	H.	Mutavhatsindi	University of Stellenbosch	Progress in the development of small protein biosignature-based test for the diagnosis of TB disease
34.	Y.	Ntamo	University of Zululand	The effects of Beta Secretase Inhibitor and Rooibos treatment on C57BLKS db / db mice
35.	E.	Oduwole	University of Stellenbosch	Validation process of a vaccine hesitancy measuring tool in the Western Cape
36.	L.	Raphela	University of Cape Town	Targeted depletion of RibF, a putative bifunctional FAD synthetase / flavokinase in Mycobacterium smegmatis
37.	N.	Sangweni	University of Stellenbosch	Prevention of Doxorubicin-induced cardiotoxicity by Nonhlaceae sanguime: A mechanistic study
38.	M.	Shaku	University of Witwatersrand	Breaching the barrier: targeting cell wall enzymes of Mycobacterium tuberculosis for development of novel TB drugs
39.	N.	Titi	University of South Africa	How Children make meaning of sexual trauma
40.	K.	Ziqubu	University of Zululand	Beneficial effect of isoorientin in insulin-resistant adipocytes

No.	INITIALS	SURNAME	UNIVERSITY/ RESEARCH UNIT	ABSTRACT TITLE
BONGANI MAYOSI NATIONAL HEALTH SCHOLARSHIP PROGRAMME (BM-NHSP)				
41.	T.	Assegaai	University of the Western Cape	Supervision system of WBOT in the Ngaka Modiri Molema District, North West Province-
42.	W.	Barnett	University of Cape Town	Impact of Resilience on Depression in Mothers Exposed to Intimate Partner Violence or Trauma: Findings from a South African Birth Cohort
43.	G.	Barnwell	Nelson Mandela University	Preliminary Findings: Psychological impacts of Environmental Degradation Vhembe District, Limpopo Province
44.	IA.	Basson	University of Cape Town	Novel proteomic biomarkers for acral lentiginous melanoma
45	K.	Brittain	University of Cape Town	Long-term effects of unintended pregnancy on antiretroviral therapy outcome among South African women living with HIV
46.	E.	Brocker	University of Stellenbosch	Feasibility and acceptability of a clinician monitored PTSD Coach Online intervention: A pilot randomized control trial in a low-resource setting
47.	M.	Burger	University of Stellenbosch	A prospective longitudinal study of the impact of ante-and postnatal maternal mental health on the neuro-developmental trajectories of children during the first 18 months
48.	T.	Butelezi	University of KwaZulu-Natal	Monoclonal antibody production against Mycobacterium tuberculosis curli pili
49.	B.	Carpenter	University of KwaZulu-Natal	Designing research for individualization
50.	T.	Chetty	University of Cape Town	Patient cost of accessing HIV/TB healthcare services in rural KwaZulu-Natal

No.	INITIALS	SURNAME	UNIVERSITY/ RESEARCH UNIT	ABSTRACT TITLE
51.	S.	Dada	University of Stellenbosch	Misuse of codeine in South Africa: A multifaceted study of the nature and extent of the problem and methodological consideration
52.	A.	Damons	University of Stellenbosch	Introducing an arteriovenous fistula pre-cannulation assessment care-bundle to reduce complications in patients with an arteriovenous fistula on haemodialysis
53.	S.	Docrat	University of Cape Town	Mental health systems costs, resources and constraints in South Africa: a national survey and case study for universal health coverage
54.	N.	Dwane	University of Witwatersrand	HIV treatment and blood pressure in adolescents and young adults from a hospital-based HIV-treatment cohort
55.	L.	Frigati	University of Stellenbosch	Hospitalisation in Perinatally HIV-infected adolescents on antiretroviral therapy in South Africa: A prospective study
56.	P.	Gina	University of Cape Town	In vivo and in vitro studies to investigate the role of autophagy in human tuberculosis
57.	T.	Glass	University of Cape Town	Impact of ART adherence and retention interventions on viral load and vertical transmission during pregnancy and breastfeeding, a simulation model.
58.	D.	Govindasamy	Health Systems Research Unit	Measuring what youth in Africa value in public policy evaluation: A mixed-methods study on wellbeing among youth living and without HIV in sub-Saharan Africa
59.	M.	Hlongwa	University of KwaZulu-Natal	Evidence on factors influencing contraceptive use and sexual behavior in South Africa: A systematic scoping review
60.	D.	Kibuuka	Auckland University of Technology	The role of surveillance systems in the epidemiology of tuberculosis in South Africa

No.	INITIALS	SURNAME	UNIVERSITY/ RESEARCH UNIT	ABSTRACT TITLE
61.	K.	Kgoadi	University of Cape Town	The role of antigen presenting cells and T cells in mice infected with CNS-TB
62.	M.	Lekganyane	University of Witwatersrand	Predicting patient outcome in the South African pharmacovigilance study using joint modeling
63.	E.	Mabotha	University of Cape Town	Can biomarkers in scalp hair identify patients at risk of a heart attack?
64.	V.	Mafunda	University of Cape Town	The economic burden of depression co-morbidity with chronic disease and its association with utilization, adherence and quality of life: A baseline analysis
65.	G.	Mahumane	University of Witwatersrand	Synthesis and characterization of N-Acetylcysteine-loaded PLGA nanofibers as a neuro-scaffold
66.	S.	Manie	University of Cape Town	Pulmonary rehabilitation for people with Tuberculosis in a high HIV-positive setting: A pilot randomized control study
67.	K.	Mgoqi	University of Cape Town	Exploring the perspectives of health services providers on applying mental health policy and interventions for school-children in the Western Cape, South Africa
68.	N.	Mkhwanazi	University of KwaZulu-Natal	The role of Mycobacterium tuberculosis L, D – transpeptidase in TB pathogenesis
69.	M.	Motimele	University of Cape Town	Understanding violence within protest: A case-study of the Rhodes Must Fall Movement at the University of Cape Town (2015-2016)
70	M.	Nhlapo	University of the Western Cape	Using maternity case records to obtain birth data for estimation purposes: Documenting methodological challenges
71.	M.	Nglazi	University of Cape Town	Overweight and obesity trends in South African women of childbearing age: 1998 to 2017

No.	INITIALS	SURNAME	UNIVERSITY/ RESEARCH UNIT	ABSTRACT TITLE
72.	ML.	Nhleko	University of Witwatersrand	Cancer mortality in South Africa (1997 – 2016): Adopting temporal, spatial and health economic modelling approaches
73.	J.	Nothling	University of Stellenbosch	Epigenetic alterations associated with childhood trauma and adult mental health outcomes: A systematic review
74.	M.	Osman	University of Stellenbosch	Good treatment outcomes in children with extensively drug-resistant tuberculosis: a systematic review and individual patient meta-analysis
75.	S.	Pasche	University of Stellenbosch	The lived experience of South African adolescents living in a low resource environment who have attempted suicide
76.	RD.	Pietersen	University of Stellenbosch	Mouse and human macrophages upregulate MX1 and MX2 genes upon infection with mycobacteria
77.	S.	Richter	University of Pretoria	Effects of an educational intervention on knowledge and perceived quality of life among diabetes patients of Centers for Diabetes and Endocrinology in North West Province and Gauteng Province
78.	F.	Scheffler	University of Stellenbosch	Cannabis use and hippocampal subfield volumes in males with first episode schizophrenia and healthy controls
79.	A.	Saferdien	University of Cape Town	Investigating the anti-cancer properties of Dodonaea viscosa, a medicinal plant used by Cape Bush doctors
80.	N.	Sematlane	University of the Western Cape	Adaptation to living with HIV as a chronic illness and patient self-management: A scoping review
81.	DA.	Senthebane	University of Cape Town	The role of extracellular matrix on oesophageal squamous cell carcinoma drug response
82.	NV.	Sibiya	University of Cape Town	Understanding and defining blood biomarkers of subclinical tuberculosis and their relationship to inflammation at the site of disease

No.	INITIALS	SURNAME	UNIVERSITY/ RESEARCH UNIT	ABSTRACT TITLE
83.	JP.	Van Schalkwyk	North-West University	Homocysteine, genetic variants and dietary predictors' cross-sectional associations with cardiovascular measures in a group of black South Africans
84.	A.	Van Zyl	University of Stellenbosch	Preliminary report of late effects of childhood cancer and treatment in a South African cohort
BIOSTATISTICS CAPACITY DEVELOPMENT				
NO	INITIALS	SURNAME	UNIVERSITY/ RESEARCH UNIT	ABSTRACT TITLE
85.	M.	De Klerk	University of Pretoria	Classifying gene expression data with mixture models
86.	T.	Darikwa	University of Limpopo	Statistical measures for multivariate spatial autocorrelation
87.	N.	Grundlingh	University of KwaZulu-Natal	Modeling risk factors of diabetes in South Africa
88.	M.	Mazinu	SAMRC	Multilevel modelling for cross-classification and multiple membership data in public health
89.	C.	McCready	University of Cape Town	Latent variable models for longitudinal outcomes from a parenting intervention study
90.	NN.	Mchunu	University of KwaZulu-Natal	Joint modelling CD4 count and mortality in a cohort of patients initiated on HAART: A longitudinal study
91.	T.	Nevhingoni	University of Venda	Semiparametric techniques for multilevel discrete survival data
92.	S.	Nigrini	University of Pretoria	Joint modelling of longitudinal colony forming unit count and time-to-event data emanating from tuberculosis trails
93.	SI.	Sithole	University of South Africa	Determinants of anaemia in women and men in South Africa: Application of Generalized Linear Mixed Models and Spatial statistics

No.	INITIALS	SURNAME	UNIVERSITY/ RESEARCH UNIT	ABSTRACT TITLE
SAMRC RESEARCH CAPACITY DEVELOPMENT INITIATIVE (RCDI): POST-GRADUATE PROGRAMME				
94.	K.	Chokoe	University of Limpopo	Integrative analysis of epigenetic modifications in a breast cancer cell line (MCF-7) treated with a bioactive extract of Bidens pilosa
95.	K.	Malemela	University of Limpopo	Evaluation of anticancer activity of Momordica balsamina extracts and potential interactions with a conventional anticancer drug in colon cancer
96.	R.	Musoliwa	University of the Western Cape	The impact of genetic polymorphisms on the SLCO1B1 gene transcription factor binding sites on enalapril treatment outcome in hypertensive patients
97.	K.	Rakau	Sefako Makgatho Health Science University, Pretoria	Phenotyping of Lewis and Secretor histo-blood group antigens from saliva of infants suffering from gastroenteritis
98.	M.	Sedres	University of the Western Cape	Investigating the uptake efficiency of Cisplatin within African-specific haplotypes of OCT2

SAMRC CLINICIAN RESEARCHER (MD.PHD) DEVELOPMENT PROGRAMME

PROGRAMME ADMINISTRATOR

Mr Thobile Mabuya

Experience of women who started pre-exposure prophylaxis in Durban, South Africa as part of a standard HIV-prevention package in a large multicentre clinical trial

[1]I Beesham, [2]JM Baeten, [1]S Evans, [1]M Beksinska, [3]LE Mansoor

[1] MatCH Research Unit (MRU), University of Witwatersrand, Durban, South Africa; [2] University of Washington, Seattle, Washington, United States; [3] Centre for the AIDS Programme of Research in South African (CAPRISA), Durban, South Africa

BACKGROUND

HIV prevention and standard of care in HIV-prevention trials are an evolving field. A summit held by the South African Medical Research Council in 2017 recommended the provision of pre-exposure prophylaxis (PrEP) to trial participants. Here we describe the experience of women who initiated PrEP at one study site during the Evidence for Contraceptive options and HIV Outcomes (ECHO) Trial.

METHODS

The ECHO Trial conducted from 2015 to 2018 followed 7829 women from 12 sites in four African countries. The primary trial outcome was HIV incidence. PrEP was provided on-site by ECHO staff from March 2018, as part of a standard HIV-prevention package. At the Commercial City site in Durban, South Africa, we invited women who initiated PrEP to participate in an interviewer-administered questionnaire and measured plasma tenofovir in a subset of women. Data were collected on REDCap (Research Electronic Data Capture) and analysed using Stata software.

RESULTS

Our findings will only be available once the primary outcome results from the ECHO trial have been publicly released, which is expected in July 2019.

CONCLUSION

N/A.

Exercise training improves whole-body insulin sensitivity but does not alter ectopic fat or hyperinsulinemia in obese black South African women

[1]M Fortuin de Smidt, [1,2]A Mendham, [3]J Hauksson, [4]O Hakim, [5]D Stefanovski, [1]J Swart, [4]L Goff, [6]S Kahn, [7]T Olsson, [1,2]J Goedecke

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BACKGROUND

We hypothesized that a 12-week exercise intervention in obese black South African women would improve insulin sensitivity (SI) and hyperinsulinaemia and that these changes would be associated with improvements in body composition and ectopic lipid content.

METHODS

Obese, SA women (mean age 23 ± 3.5 y) of isiXhosa ancestry (self-reported) were randomly assigned to 12-weeks of exercise training (n=23) or control (n=22) groups. Pre- and post-intervention testing included assessment of SI, insulin secretory response to glucose (AIRg), insulin secretion rate (ISR), hepatic insulin extraction (FEL) and disposition index (DI) (frequently sampled intravenous glucose tolerance test). Body fat mass and regional adiposity (whole body imaging); hepatic, pancreatic and skeletal muscle fat content and abdominal subcutaneous and visceral adipose tissue (magnetic resonance imaging) were also measured.

RESULTS

Exercise training improved SI and DI (median (interquartile range): 2.0 (1.2-2.8) to 2.2 (1.5-3.7) (mU/l)-1min-1, p=0.005 and 6.1 (3.6-7.1) to 6.5 (5.6-9.2) x103 arbitrary units p=0.028, respectively) and decreased body mass index and gynoid fat mass (median ± standard deviation: 34.1±2.8 to 33.8±3.1 kg/m2, p=0.029 and 18.5±1.7 to 18.2±1.6, p<0.001, respectively). AIRg, ISR and FEL, as well as ectopic fat, were unchanged after exercise training. The improvement in SI and DI was not associated with changes in body fat distribution or ectopic fat.

CONCLUSION

An exercise programme in black obese South African women improved SI and DI, but not hyperinsulinaemia. These improvements occurred independently of changes in body fat composition and distribution and ectopic fat but might be explained by intrinsic muscle and adipose tissue factors.

Cardiopulmonary dysfunction in perinatally HIV-infected South African adolescents on antiretroviral therapy: Baseline findings from the Cape Town Adolescent Antiretroviral Cohort

[1]L Githinji, [1]S Mahtab, [2,3]L Zühlke, [4]J Lawrenson, [5]L Myer, [1]D Gray, [1]HJ Zar

[1] SAMRC Unit on Child and Adolescent Health, Department of Paediatrics and Child Health Red Cross War Memorial Children's Hospital, University of Cape town (UCT); [2] Division of Paediatric Cardiology, Department of Paediatrics and Child Health Red Cross War Memorial Children's Hospital, UCT; [3] Division of Cardiology, Department of Medicine Groote Schuur Hospital, Faculty of Health Sciences, UCT; [4] Department of Paediatrics and Child Health, Stellenbosch University; [5] Division of Epidemiology & Biostatistics, School of Public Health & Family Medicine, UCT

BACKGROUND

Antiretroviral therapy (ART) has reduced morbidity and mortality in sub-Saharan Africa. However, the burden of coexistent cardiopulmonary disease in perinatally HIV-infected adolescents on ART has not been well-described. The aim of this study was to investigate the prevalence and associations of cardiopulmonary dysfunction in adolescents with perinatally acquired HIV (APH) on ART.

METHODS

For this cross-sectional analysis, 515 perinatally HIV-infected adolescents ages 9-14 years on ART for at least six months. A comparator group of 110 age-matched HIV-uninfected adolescents were tested between August 2013 and April 2015 using echocardiography, six-minute walk test (6MWT) and spirometry. Those with either abnormal spirometry or abnormal 6MWT and any right or left systolic or diastolic dysfunction or abnormal mean pulmonary arterial pressure were considered as having impaired cardiopulmonary function. Logistic regression was used to investigate the determinants of impaired cardiopulmonary function.

RESULTS

Overall, 474 APH (mean [SD] age, 12 [1.6] years; median [IQR] ART duration, 7 [4.6-9.3] years; median [IQR] CD4 count, 712 [571-959] cell/mm3) and 109 HIV-uninfected adolescents (mean (SD) age 11.8 (1.8) years, had successful cardiac and lung function testing. Impaired cardiopulmonary function was detected in 13% of APH and 8% of HIV-uninfected adolescents, p=0.136. Among adolescents with perinatally acquired HIV, those with low tricuspid annular plane systolic excursion (TAPSE) had significantly lower mean FEV1, 1.5 L vs 1.6 L, p=0.011. Height (OR 0.7, 95%CI 0.5-0.9), body mass index (OR 0.7, 95%CI 0.5-0.9) and past pulmonary tuberculosis (OR 2.3, 95%CI 1.2-4.4) were significantly associated with a low cardiopulmonary function.

CONCLUSION

Despite being on ART, cardiopulmonary dysfunction occurs in a considerable proportion of perinatally HIV-infected adolescents but no significant difference in uninfected controls. This finding requires further exploration. Factors associated with dysfunction may be amenable to public health interventions to reduce cardiopulmonary disease in this population.

Investigating the cardio-protective effect of intralipid in both pre-clinical and clinical settings

N Hadebe

Department of Anaesthesia and Perioperative Medicine and Hatter Institute for cardiovascular Research in Africa, University of Cape Town

BACKGROUND

We hypothesized that a 12-week exercise intervention in obese black South African women would improve insulin sensitivity (SI) and hyperinsulinaemia and that these changes would be associated with improvements in body composition and ectopic lipid content.

METHODS

Obese, SA women (mean age 23 ± 3.5 y) of isiXhosa ancestry (self-reported) were randomly assigned to 12-weeks of exercise training (n=23) or control (n=22) groups. Pre- and post-intervention testing included assessment of SI, insulin secretory response to glucose (AIRg), insulin secretion rate (ISR), hepatic insulin extraction (FEL) and disposition index (DI) (frequently sampled intravenous glucose tolerance test). Body fat mass and regional adiposity (whole body imaging); hepatic, pancreatic and skeletal muscle fat content and abdominal subcutaneous and visceral adipose tissue (magnetic resonance imaging) were also measured.

RESULTS

Exercise training improved SI and DI (median (interquartile range): 2.0 (1.2-2.8) to 2.2 (1.5-3.7) (mU/l)-1min-1, p=0.005 and 6.1 (3.6-7.1) to 6.5 (5.6-9.2) x103 arbitrary units p=0.028, respectively) and decreased body mass index and gynoid fat mass (median ± standard deviation: 34.1±2.8 to 33.8±3.1 kg/m2, p=0.029 and 18.5±1.7 to 18.2±1.6, p<0.001, respectively). AIRg, ISR and FEL, as well as ectopic fat, were unchanged after exercise training. The improvement in SI and DI was not associated with changes in body fat distribution or ectopic fat.

CONCLUSION

An exercise programme in black obese South African women improved SI and DI, but not hyperinsulinaemia. These improvements occurred independently of changes in body fat composition and distribution and ectopic fat but might be explained by intrinsic muscle and adipose tissue factors.

Utility of endoscopic duodenal biopsies in patients investigated for malabsorption: A South African National Health Laboratory Services database study

[1]S Hlatshwayo, [1]S Thomson, [1]M Setshedi

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BACKGROUND

Previous pre-clinical studies have suggested the cardio-protective effect of Intralipid against ischaemia reperfusion injury (IRI), but the exact mechanisms remain unknown. Additionally, its clinical translation in patients with coronary artery diseases undergoing coronary artery bypass grafting remains to be demonstrated. Our aim was therefore to 1) understand the mechanism of Intralipid in a rat model of IRI and 2) test the cardio-protective effect of Intralipid in humans undergoing coronary artery bypass grafting on cardiopulmonary bypass surgery.

METHODS

Animal Model: Isolated hearts from male Wistar rats were assigned into four groups: 1) Control; 2) Intralipid; 3) Intralipid + AG490 (an inhibitor of STAT3 pathway); 4) AG490. Following a 30-min period of stabilization, all hearts were subjected to 20 min of global ischaemia and 60 min of reperfusion. Intralipid 0.1% and AG490 were given during the first 30 min of reperfusion. Functional recovery was assessed by measuring rate pressure product (RPP: heart rate x left ventricular developed pressure) throughout the protocol. Heart tissue was collected at 7 min of reperfusion to measure STAT3 activation. Human Clinical Trial: Male and female patients scheduled for first-time elective coronary artery bypass grafting were included. Patients received a bolus injection of Intralipid 1.5 ml/kg 5 min before reperfusion. The primary endpoint is the measurement of troponin leak during the first 72 hours of reperfusion.

RESULTS

Animal Model: Intralipid improved functional recovery of the isolated hearts subjected to IRI compared to control (11264±1479 versus 21140±3672 beats*mmHg/min; $p<0.05$). Other experiments are still in progress. Human Clinical Trial: 19 of the 30 patients have been enrolled. The study is still in progress.

CONCLUSION

Our study should contribute to translating the use of Intralipid as a safe and inexpensive therapy to limit IRI in humans.

Validation of equations to estimate glomerular filtration rate in South Africans of mixed ancestry

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BACKGROUND

Endoscopic duodenal biopsies (EDB) remain a valuable diagnostic tool in patients presenting with malabsorption. We aimed to determine the yield of EDB and document the spectrum of conditions in those investigated for malabsorption in South Africa between 2004 and 2016.

METHODS

Histology data of patients who had EDB for malabsorption or suspicion of coeliac disease that were analysed at the National Health Laboratory Services (NHLS) were evaluated. Excluded were malignancies, inflammatory bowel disease, peptic ulcer disease, prior surgery and absence malabsorption features or suspicion of coeliac. Data were extracted for indication, comorbidities, predominant findings and diagnosis. EDB indication included chronic diarrhoea, iron deficiency anaemia, suspected coeliac disease, weight loss, vitamin deficiencies, and failure to thrive.

RESULTS

Over 12 years, 3253 patients (2082 females:1171 males; 43.5 ±19.3 years) had EDB for malabsorption. Indications were chronic diarrhoea 46%, iron deficiency anaemia 22%, unexplained weight loss 7%, vitamin B12 and folate deficiencies 5% and 0.6%, respectively. Of the biopsies, 82% were non-diagnostic, 55% normal, 17% non-specific duodenitis, and 10% had isolated epithelial lymphocytosis. Infectious causes were identified in 9% (296/3253), of which 51% were females, with a mean age of 31.5 years (SD±15.7). Infections identified included cryptosporidium 92, isospora 59, CMV 40, tuberculosis 32, other mycobacteria 29, giardia 25,

and others 59. HIV was documented in 185 (62%), organ transplantation in 10 (3%) and 2 (0.6%) were on immunosuppressive medication for autoimmune conditions. Patients meeting our criteria for coeliac disease were 113 (3.5%), 68% of whom were females and their mean age was 36.3 years (SD±21.4), of these patients, 10% had associated IDDM.

CONCLUSION

Opportunistic infections were the predominant cause of malabsorption in this cohort and coeliac disease was a close second. HIV co-infection was a predictor of an infectious cause and IDDM was more prevalent in the coeliac group.

Is the introduction of violence and injury observatories associated with a reduction in violence-related injury in adult populations? A systematic review and meta-analysis

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BACKGROUND

The aim of this study is to summarise the results from existing studies reporting on the effectiveness of the introduction of violence and injury observatories. We searched multiple electronic databases including but not limited to Pubmed, PsycINFO SCOPUS, Cochrane Collaboration, Campbell Collaboration and Web of Knowledge.

METHODS

We included non-randomised controlled trials, quasi-experimental designs, prospective and retrospective cohort studies, controlled before-and-after (CBA) studies and cross-sectional studies. We sought to include studies performed in any country and published in any language. The primary outcome was homicide, while the secondary outcome was assault. We searched a number of databases, supplemented by searches in grey literature, including technical reports. Searches comprised studies from January 1990 to October 2018. This review protocol has been published in the PROSPERO International Prospective Register of systematic reviews, registration number 2014:CRD42014009818.

RESULTS

Of 3105 potentially relevant unique citations from all literature searches (three empirical studies, and four technical reports) met with our inclusion criteria. Studies were conducted in the United Kingdom (n=3), Colombia (n=2), Brazil (n=1) and Uruguay (n=1). Subgroup analyses according to the two types of models implemented, the violence and injury observatory (VIO) and the injury surveillance system (ISS), provided evidence for an association between implementing

the VIO model and a reduction in homicide count in high-violence settings (IRR=0.06; 95% CI, 0.02 to 0.19; 4 studies). The introduction of ISS showed significant results in reducing assault (IRR=0.80; 95%CI, 0.71 to 0.91; 3 studies).

CONCLUSION

This systematic review provides the best evidence available for the effectiveness of the introduction of violence and injury observatories and injury surveillance systems in reducing violence outcomes in adults in high-violence settings. The implementation of VIOs should be considered in high-violence communities where a reduction in homicide rates is desired.

The decentralised drug-resistant TB programme in South Africa: From policy to implementation

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BACKGROUND

A policy supporting decentralised drug-resistant (DR)-TB treatment provision was introduced in 2011, but implementation has not been optimal. With adequate investment in health, why does good policy sometimes fail to be implemented effectively? Drawing on the Policy Triangle framework, it is theorised that content, actors and processes of policy interact in context-specific ways to inform implementation.

METHODS

The research employed a multiple case study design in two provinces, with 25 embedded sub-units – 11 health facilities in KwaZulu-Natal and 14 in the Western Cape. Quantitative methods included secondary analysis of routine data that define programme performance. Qualitative methods included interviews with 90 MDR-TB experts, health policymakers and implementers at national, provincial and local levels; supplemented by a review of documents and field observations. Thematic analysis of interviews was undertaken.

RESULTS

Policy content results in varying interpretations of decentralisation and service delivery models, and lack of policy 'fit' with local resource and infrastructure. There is also contestation regarding policy priorities. Contextual factors that inform decentralisation of DR-TB care include the burden of disease, political pressure, infrastructure, and funding for implementation. Actors influence implementation positively and negatively, through their perceptions and organisational politics, and the presence of champions and resistors of change. The process of policy implementation bypassed district structures resulting in a lack of ownership. Provinces and districts also did not plan in a way that anticipated service delivery challenges, resource needs and mechanisms for

clinical governance. The DR-TB programme outcomes have not reached targets, and there is a tension between achieving coverage of decentralisation and maintaining quality of care.

CONCLUSION

As South Africa moves towards bold and progressive new treatment policy, we need to learn from lessons over the past ten years. A better understanding of policy dynamics will contribute lessons for strengthening future implementation of DR-TB policy.

Trends in suicide mortality in South Africa, 1997 to 2016

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BACKGROUND

Reliable mortality data are essential to identify vulnerable sub-populations at risk of suicide and to monitor changing patterns of risk over time. Few studies have assessed long-term trends of suicide in South Africa.

METHODS

The underlying cause of death data from vital registration was retrieved from Statistics South Africa. Suicide (X60-X84 and Y84) was coded using the 10th Revision of the International Classification of Diseases (ICD-10). We estimated the age-standardised mortality rate (ASMR) and years of potential life lost (YPLL) before age 65 years using the age at death of all suicides for both sexes from 1997 to 2016. Long-term trends in suicide mortality rates were analysed using joinpoint regression analysis.

RESULTS

In the 20-year study, we examined 8,573 (0.1%) suicides in South Africa of all persons 15 years and older from 1997 to 2016. Approximately 73% of all suicides occurred among those aged 15 to 44 years. The joinpoint regression analyses showed that while the mortality rate for male suicides remained stable in the study period, hanging and poisoning significantly increased by 3.9% and 3.5% per year, respectively. The mortality rate for female suicides increased significantly by 12.6% from 1997 to 2004 before stabilising, while female hanging significantly increased by 3.0% per year, from 1997 to 2016. Approximately 243,429 YPLL were attributable to suicide in the 20 years. The average annual loss caused by suicide was 9,559 YPLL (rate, 57.3 per 100,000 population) in males and 2,612 YPLL (rate, 14.9 per 100,000 population) in females.

CONCLUSION

Vital registration data can be an essential tool for the surveillance of suicide mortality and can inform targeted prevention strategies for sub-groups at increased risk of suicide in South Africa.

Neutrophils as effector cells in resistance to infection by *Mycobacterium tuberculosis* in HIV-infected persons

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BACKGROUND

Mycobacterium tuberculosis (M.tb) is transmitted by aerosol inhalation. Not all individuals exposed to *M.tb* become infected as inferred by a lack of T cell memory response to *M.tb* specific antigens. These individuals do not develop signs and symptoms suggestive of 'active tuberculosis' and are defined as resisters. Resistance to infection is supported by multiple lines of evidence. The contribution of the innate immune system and the cells involved in resistance remain incompletely elucidated. Neutrophils are some of the first phagocytes recruited from the pulmonary vasculature to the interstitium to control infection and are therefore prime candidates.

METHODS

Samples collected from 60 HIV-infected individuals enrolled in the NIH-funded ResisTB study in Cape Town, Western Cape, South Africa, have been subdivided into four groups based on their IGRA/TST results (positive/negative) and age categories (18-25 years, 35-60 years). Age was used as a surrogate for the cumulative likelihood of exposure in our area of high *M.tb* transmission. We will investigate any significant differences in the effector mechanisms of neutrophils in response to pathogenic *M.tb* (H37Rv) by comparing responses between innate resisters and infection susceptible individuals. Furthermore, we aim to ascertain if these differences potentially contribute to the innate resister phenotype.

RESULTS

Sampling for the study has been completed, and sample processing and analysis are underway.

CONCLUSION

Understanding the mechanism of innate resistance could aid the development of novel elimination strategies as well as provide urgently required correlates of protection for vaccine evaluation and design.

Early life factors and longitudinal blood pressure trajectories are associated with elevated blood pressure in early adulthood: Birth to Twenty Plus Cohort

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BACKGROUND

Multiple perinatal and early life risk factors have been implicated in the development of hypertension in later life. The Birth to Twenty Plus (BT20) cohort in Soweto (South Africa) recently showed a prevalence of elevated blood pressure (EBP) that ranged from 22,4% at age five years to 34,9% at age 18 years. We, therefore, sought to determine the prevalence of EBP at age 23 within this cohort and assess whether this could be linked to any perinatal, maternal and early life factors and previously defined childhood and adolescent blood pressure (BP) trajectories.

METHODS

Blood pressure and anthropometric measurements were carried out on members of the BT20 cohort at age 23 (n=1540, 49% males). Early life and maternal factors were obtained from previous data collected on the cohort. Blood pressure trajectory groups in childhood and adolescence were previously defined using group-based trajectory modelling.

RESULTS

Thirty-six percent had EBP of whom 63% were male (p <0,001). Females had a 77% lower risk of EBP (odds ratio 0.23 [95% confidence interval 0.16–0.34] per SD), and linear growth in early childhood conferred a 19% increased risk (1.19, [1.01–1.41] per SD). Childhood and adolescent BP trajectories contributed the most in terms of risk. Being in the highest systolic BP trajectory resulted in a four-fold higher risk and being in the highest diastolic BP trajectory resulted in a five-fold higher risk.

CONCLUSION

These findings suggest that risk for EBP in early adulthood is set in childhood and adolescence and emphasises the need for identification of children at high risk of progression.

Genetics of hypertension and associated Chronic Kidney Disease in a South African population with hypertension

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BACKGROUND

Hypertension is a common cause of chronic kidney disease (CKD) and end-stage renal disease (ESRD) in Africans; however, there are few studies from Africa. The aim of this study is to describe the epidemiology and outcomes as well as the genetics of these patients from a single centre in Cape Town, South Africa. We will review the local epidemiology of hypertension, ethnic differences in hypertension and CKD, and resistant hypertension and potential to do GWAS in some patients. Prevalence of kidney damage in these hypertensive patients. APOL1 involvement and other genes looked at in these populations previously.

METHODS

This 13-year retrospective outcome study was conducted on 2500 patients with hypertension from Groote Schuur Hospital hypertension clinic. Patients aged 18 years and over were included. All data for patients were captured on the Redcap database. Genetics were run on patients with appropriate data on stored serum samples collected from them.

RESULTS

Not applicable.

CONCLUSION

In this current study, we attempt to show a correlation in genetics previously documented in African Americans and Africans in causing hypertension and hypertension-associated CKD in a single centre in Cape Town.

The effect of asymptomatic STI's on male foreskin susceptibility to HIV

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BACKGROUND

South Africa has high rates of sexually transmitted infections (STIs; both HIV and non-HIV). The HIV prevalence rate in the South African population is 13.1%, with nearly 1 million people becoming infected daily with any of four curable STIs, chlamydia, gonorrhoea, syphilis, and trichomonas globally. Effective control of the HIV epidemic will require a better understanding of how the virus is transmitted and acquired in males. From empirical data and mathematical modelling, it is known that STIs (symptomatic and asymptomatic) increase the risk of HIV acquisition. My project will investigate the molecular and biological mechanisms underlying this epidemiological finding by measuring the impact of STIs on foreskin integrity and HIV permeability from men electing to undergo voluntary medical male circumcision (VMMC) and who have an asymptomatic STI.

METHODS

Foreskins and first-pass urine samples are being collected from 200 males (18–35 years) attending four provincial clinics in and around Cape Town for VMMC. Foreskin barrier integrity using the Franz Chamber assay is being assessed, along with the impact of asymptomatic non-HIV STIs *(Chlamydia trachomatis, Neisseria gonorrhoeae, Trichomonas vaginalis, and Mycoplasma genitalium)* on foreskin susceptibility upon in-vitro HIV challenge in 50 males. To identify whether Th17/Th22 cells are HIV targets in the foreskin, we will be using subtype C HIV that is photo-activated with incident light as well as immunophenotyping these cell subtypes by flow cytometry.

RESULTS

To date, we have identified 1:4 men in two MMC clinics who were infected with asymptomatic STIs (any of the four organisms above) and who then underwent VMMC. All the STI results are reported to the clinics for participants to receive treatment, while the other measurements are not yet available.

CONCLUSION

Through this study, we will provide insight into viral acquisition and lay the foundation for further critical prevention strategies in males.

Plasma cytokine biomarkers in African patients with HIV-associated Kaposi sarcoma

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BACKGROUND

Kaposi sarcoma (KS) is the commonest malignancy associated with HIV in sub-Saharan Africa, and outcome of this condition remains poor, especially in resource-limited areas. The aetiological agent, Kaposi sarcoma herpes virus, encodes several genes that enhance cytokine production, which is hypothesised to contribute to disease pathogenesis. The purpose of this study is to evaluate the prognostic value and clinical correlation of plasma cytokines within a randomized controlled study of treatment naïve patients with HIV-associated KS.

METHODS

Cytokine biomarker assays were conducted in banked bio-specimens from patients with HIV-associated KS from the South African KAART trial; a prospective, randomised, 112-person trial where patients received antiretroviral therapy alone or in combination with chemotherapy. Bead-based Milliplex MAP multiplex technology was used to determine IL-1b, IL-1ra, IL-2, IL-4, IL-5, IL-6, IL-7, Il-8, IL-9, IL-10, IL-12p70, Il-13, IL-15, IL-17, IL-21,CXCL13,basic FGF, eotaxin, G-CSF, GMCSF, IFNg, IP-10, MCP-1, MIP-1a, MIP-1b, PDGF-BB, RANTES, TNFa, VEGF and sCD40 levels in plasma samples of participants at baseline. Evaluation of cytokine levels with clinical response (Kruskal Wallis test), quality of life parameters (Spearman rank correlation) and as a predictor of mortality and KS-IRIS (Kaplan-Meier survival curves/log-rank testing) will be done.

RESULTS

Analyses of select inflammatory cytokines expressed in African patients with HIV-associated KS will be characterised. Elevated cytokines may suggest a contribution of immune activation to disease pathogenesis. Select cytokine biomarkers may identify high-risk individuals that may benefit from early KS specific therapy.

CONCLUSION

HIV-associated KS remains a clinical challenge in Africa, and improved therapies, especially those appropriate for resource-poor regions are needed. Personalized medicine hinges on the improved classification of patients. Select immune biomarkers may have implications for the development of novel approaches to risk stratifying patients and may inform immune modulatory therapeutic approaches to high-risk HIV-associated KS.

Hair cortisol as a biomarker of stress and resilience in females

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BACKGROUND

Hair cortisol is increasingly used as a biomarker of stress; however, limited research exists regarding the relationship between hair cortisol levels and resilience. Additionally, the determinants of hair cortisol levels have not been examined in sufficiently diverse settings.

OBJECTIVES

Our objectives were to identify the basic determinants of hair cortisol levels in a sample of mixed ancestry adults and to investigate whether hair cortisol levels were associated with measures of self-perceived stress and resilience.

METHODS

Our sample comprised 164 females (mean age 46.5 years, SD = 15.0) included as control participants in a cross-sectional study (SHARED ROOTS), conducted in Cape Town, South Africa from May 2014 until June 2017. We examined which socio-demographic, hair related, clinical and behavioural factors were associated with hair cortisol levels in linear regression models. Furthermore, the relationship between self-perceived stress, measured with the Perceived Stress Scale (PSS) and resilience, measured with the Connor-Davidson Resilience Scale (CD-RISC), and hair cortisol levels were also examined.

RESULTS

Hair cortisol levels (Mdn 4.4 pg/ml; IQR 2.8; 11.4) were significantly ($p < 0.05$) associated with hair product use, duration of sun exposure, duration of sample storage and current breastfeeding. Hair cortisol levels were not significantly associated with PSS scores (adj ß = -0.014, $p = 0.867$), but were inversely associated with CD-RISC scores (adj ß = -0.166, $p = 0.032$).

CONCLUSIONS

Hair cortisol levels were higher in relation to breastfeeding and hair product use. Levels were significantly lower in relation to increased sun exposure and duration of sample storage. Our results suggest hair cortisol levels may be a biomarker of resilience to stress, rather than perceived stress. Further research utilising hair cortisol in more diverse settings and including constructs related to resilience, will improve our understanding of hair cortisol levels as a biomarker of stress.

Infant lung function at age one year after admission for RSV infection: A case control study

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BACKGROUND

Respiratory Syncytial Virus (RSV) infection is the most common cause of acute lower respiratory tract infection (aLRTI) in children younger than age five years. While RSV aLRTI mortality is relatively low, the global impact of RSV hospitalisation has shifted towards the long-term sequelae associated with RSV aLRTI in early life.

METHODS

We performed tidal breathing flow-volume loops and SF6 multiple-breath washout in children at age one year, who were previously hospitalised for RSV aLRTI (cases; n=83) and compared them with healthy non-hospitalised controls (n=92) during natural sleep as per the European Respiratory Society/American Thoracic Society guidelines.

RESULTS

There were no differences in the reported history of parental or siblings diagnosed with asthma by a doctor; environmental tobacco smoke exposure; method of infant feeding; overcrowding and crèche attendance between cases and controls. Cases had more exposure to household pets ($p=0.046$). A larger proportion of cases reported any wheeze ($p<0.001$), nocturnal cough when well ($p=0.003$), hospitalisation for subsequent wheezing episodes ($p<0.001$) or recurrent aLRTI ($p<0.001$). Similarly, a larger proportion of cases had an increased respiratory rate ($p=0.004$), lower oxygen saturation ($p=0.03$) and lower tidal volumes ($p=0.002$). The lung clearance index was significantly increased in cases [7.7 (IQR 6.0-11.0)] compared to controls [7.1 (IQR 5.3-12.8)] ($p=0.007$).

CONCLUSION

Infants hospitalised with RSV aLRTI in infancy had more respiratory sequelae at one year of age compared to controls. Additionally, these infants had more ventilation inhomogeneity and an increased work of breathing. Longer follow-up of these cases is required to evaluate the impact of RSV aLRTI on respiratory trajectories.

A prospective study of the epidemiology and immunological basis of epidermal necrolysis-associated depression

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BACKGROUND

There are limited data on the epidemiology of severe cutaneous adverse drug reactions such as epidermal necrolysis (EN), which includes Stevens-Johnson syndrome and toxic epidermal necrolysis. These limited data extend to co-morbid mental health disorders in EN. In this study, we aim to establish the epidemiology of EN in Cape Town, South Africa. Specific objectives are to confirm the increased prevalence of depression in EN that is sustained beyond the acute stage in some patients; determine the associations between pro-inflammatory cytokines and depression score in EN; determine utility of longitudinal hair cortisol concentration levels as a marker of stress in EN and a predictor of depression; and determine the impact of cutaneous body image (CBI) of EN in participants with EN.

METHODS

This prospective, longitudinal study comprises 38 eligible participants with the exposure of EN and 152 unexposed comparison groups without EN or any other skin disease. They will be matched for sex, HIV-status at t0 = baseline, t1 = six weeks and t2 = six months. The unexposed comparison groups are 76 hospitalised participants and 76 non-hospitalised participants without EN or any other medical disease. The analysis will be conducted using Stata 15 (StataCorp, College Station, Texas, USA).

RESULTS

The study is in progress.

CONCLUSION

We aim to provide robust epidemiological data that will influence the holistic management of patients with EN. Also, to provide a novel finding of data that might indicate a possible correlation between EN, higher depression scores and higher CBI scores in an immunological basis. Following from this, to help practitioners assess the risk of depression following EN proactive methods or tools and strategies can be developed.

PROGRAMME ADMINISTRATOR

Ms Jorene Naidoo

Haplotype structure of solute carrier (SLC) promoters in the Xhosa population of South Africa

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BACKGROUND

Single nucleotide polymorphisms (SNPs) within regulatory elements such as the promoter regions of SLC22A2 and SLC47A2 have been shown to contribute to the variable response of type 2 diabetes mellitus treatment(s). These membrane transporter genes are responsible for the absorption, distribution and excretion of various endogenous and exogenous substrates. Genetic polymorphisms in promoter regions have been shown to influence gene expression and thereby alter the uptake and clearance of drugs such as metformin and other anti-diabetic medication. The objective of this study was to determine the promoter haplotype structures of SLC22A2 and SLC47A2 in the Xhosa population of South Africa and to predict potential transcription factor binding sites (TFBS) in the promoter regions of these genes via *in-silico* analysis.

METHODS

DNA was extracted from buccal swabs using a standard salt lysis method. The promoter regions of the selected genes were sequenced to identify the various haplotypes present in the study population. *In-silico* confirmation of cis-binding elements to predict potential TFBS were performed using the TFBS predictor program PROMO (ALGGEN).

RESULTS

Seven SNPs, i.e. rs150063153, rs59695691, rs572296424, rs55920607, rs113150889, rs60249401 and a novel SNP were identified within the SLC22A2 promoter region. Furthermore, five SNPs, i.e. rs59939658, rs60994312, rs115376067, rs11656096 and rs7213388 were identified within the SLC47A2 promoter region. The haplotype structure(s) of each gene was characterized in the indigenous Xhosa population of South Africa. Furthermore, *in-silico* promoter maps were generated for each of the selected genes using the online TF binding site predictor PROMO (ALGGEN).

CONCLUSION

We determined the haplotype structures of SLC22A2 and SLC47A2 in the Xhosa population. Potential TFBS in each gene was identified using *in-silico* analysis. *In-vitro* analysis of the effects that the identified promoter haplotypes may have on promoter activity will be investigated.

The effects of indigenous South African plant extracts (*Cotyledon orbiculata* and Haplotype structure of solute carrier (SLC) promoters in the Xhosa population of South Africa

***Tulbaghia. Violacea)* on triple negative breast cancer cells**

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BACKGROUND

Triple-negative breast cancer (TNBC) is characterised by the lack of receptors for oestrogen, progesterone, and human epidermal growth factor 2. In South Africa, TNBC primarily affects younger black females. This aggressive cancer has high relapse and mortality rates. The lack of hormone receptors renders current therapies ineffective. In this study, we aimed to evaluate the ability of extracts from two indigenous South African plants, *Tulbaghia violacea and Cotyledon orbiculata* on TNBC cell lines in vitro.

METHODS

Aqueous and methanol extracts from both plants will be tested for cytotoxic activity against TNBC and normal breast cell lines. Active compounds will be purified from crude extracts of *C. orbiculata and T. violacea* which have cytotoxic or inhibitory effects on TNBC cells. Lead compounds will be selected based on their IC50 profiles. The effect of plant extracts on cancer-related processes, including cell adhesion, cell invasion and migration will be investigated. Changes in the miRNA profile of normal breast cells and TNBC cells treated with plant extracts will be determined using next-generation sequencing and validated using RT-PCR. Bioinformatic

tools will be used to identify aberrant gene networks and associated signalling pathways.

RESULTS

Aqueous and methanol soluble extracts were successfully prepared. These extracts showed cytotoxic activity against the MDA-MB-231 cells. The IC50 of the crude extracts was established using Alamar and trypan Blue cell viability assays. The IC50 for *T. violacea* extracts was 70 µg/mL for water soluble and 110 µg/mL for methanol soluble. The IC50 determined for *C. orbiculate* was 68 µg/mL for water soluble and 102 µg/mL for methanol soluble.

CONCLUSION

The crude plant extracts from both species have cytotoxic effects against the TNBC cell line and could contain potential lead compounds for the development of new drug therapies. Further purification and characterisation of these compounds are underway.

Molecular characterization of proteins involved in iron-sulphur cluster assembly in mycobacteria

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BACKGROUND

Mycobacterium tuberculosis (M.tb) remains one of the world's deadliest pathogens. The ability of *M.tb* to survive within the host is poorly understood, and efforts to elucidate these mechanisms of survival are paramount in the fight against this disease. Iron-sulphur (Fe-S) clusters are ubiquitous cofactors that are required for the maturation of various proteins, many of which are involved in essential biological processes. Multiprotein complexes are required for the *in-vivo* assembly of Fe-S clusters, and the SUF system, encoded by the *Rv1460-Rv1461-Rv1462-Rv1463-csd-Rv1465-Rv1466* operon in *M.tb*, is thought to be the major Fe-S cluster assembly machinery in this organism. This process is poorly understood in mycobacteria. Thus, it is currently unclear if proteins outside of this operon are involved in Fe-S cluster assembly. We aim to identify novel proteins involved in Fe-S cluster assembly in mycobacteria.

METHOD

Protein-protein interactions (PPIs) will be identified using immunoprecipitation, followed by mass spectrometry-based proteomics. Potential interactions will be validated using bimolecular fluorescence complementation (BiFC).

RESULTS

All modified *Mycobacterium bovis* strains have been generated and inducible protein expression achieved. FLAG-tag mediated immunoprecipitation was successful. FLAG-tag cleavage is being optimized for the final sample set before mass spectrometry analysis. The BiFC construct was designed, synthesized and transformed into *Mycobacterium smegmatis*. Visible fluorescence was observed in the positive control. To our knowledge, BiFC has not yet been applied in mycobacteria for the detection of PPIs.

CONCLUSION

This work will establish the methodology for identifying novel PPIs in mycobacteria, laying the foundation for elucidating the process of Fe-S cluster assembly in mycobacteria.

Biomarkers to predict TB treatment response

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BACKGROUND

Tuberculosis (TB) is an infectious disease caused primarily by infection with Mycobacterium tuberculosis (Mtb). Dendritic cells, macrophages, neutrophils and natural killer cells recognize Mtb through various pattern recognition receptors initiating innate defence mechanisms such as phagocytosis, autophagy, apoptosis and inflammasome activation. A major defence against TB is the cellular immune responses mediated by T-cells and macrophages. The ability of Mtb to evade immune-mediated responses involve strategies that interfere with innate and adaptive immunity.

METHODS

In this study, we aimed to identify biomarkers that predict an effective early response to TB treatment by evaluating the differences in plasma cytokine abundance between two groups of individuals. They were either able to clear drug-tolerant within the first two weeks of treatment (fast responders), and those wherein these organisms numbers persisted during treatment (slow responders). We used a Luminex Bead Array Multiplex Immunoassay to quantify cytokines and chemokines in plasma from these two groups. GraphPad Prism 5 was used to perform statistical analyses. Differences between the groups were evaluated by the Mann-Whitney U test, and $p<0.05$ was considered statistically significant.

RESULTS

The pro-inflammatory cytokines (TNF-α, IFN-γ, IL-18 and IL-23) were significantly elevated in the fast responder group compared to the slow responders, during the early days of treatment, while the anti-inflammatory cytokine IL-10 was significantly higher in the slow responder group ($p<0.05$). We hypothesize that pro-inflammatory cytokines promote up-regulation of adaptive immune response facilitating the clearance of the bacterial infection, while in contrast Th2 cytokines such as IL-10, which inhibit these pro-inflammatory cytokines, support survival of the bacterium.

CONCLUSION

The dichotomy in the Th1 and Th2 responses could be used to monitor the effectiveness of TB treatment, thereby also identifying individuals who have a higher risk of disease relapse. Unique cytokine signatures could help elucidate immune responses that are protective against Mtb.

***Lessertia frutescens* and *Echinacea purpurea* effects the bioavailability and metabolism of ethinylestradiol-based contraceptives**

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BACKGROUND

Lessertia frutescens and *Echinacea purpurea* extracts are commonly used as herbal immune boosters. Immune boosters are generally used by immune-compromised individuals, including HIV patients. Previous findings suggested that these extracts interact with cytochrome P450 enzymes, efflux proteins, and drug transporters. Therefore, we aim to investigate whether the co-use of *Lessertia frutescens* or *Echinacea purpurea* influences the metabolism 17α-ethinylestradiol (EE)-based and its efficacy as an oral contraceptive.

METHODS

To assess the effect of herbal extracts on the intestinal bioavailability of EE and its pharmacologically active metabolites (17α-ethinylestradiol-3-O-sulfate (EES) and 17α-ethinylestradiol-3-O-glucuronide (EEG)), a Caco-2 cell model was used. Human liver microsomes and human S9 liver fractions were used to evaluate the effect of *Lessertia frutescens* or *Echinacea purpurea* on EE metabolism. The effect on mRNA expression on the relevant major cytochrome P450 enzymes, efflux proteins, and drug transporters was also assessed using a C3A liver-cell model.

RESULTS

The efflux ratio of EES was increased by the addition of *Lessertia frutescens* or *Echinacea purpurea* extracts (63.56, 47.92) and the reverse was observed for EEG with a decreased efflux ratio (6.9, 0.8) respectively, in Caco-2 cells. Human liver microsomes and S9 fractions revealed

an increase in the clearance (0.42 ± 0.033, 0.06 ± 0.02) of EE in the presence of both extracts. These results were further confirmed by induction experiments, which demonstrated increased gene expression of a fundamental efflux protein (ABCB1 (2.53±0.49, 1.56±0,11)) and the drug transporter (SLCO1B3 (5.19±0.04, 8.45±0.28)) in C3A cells.

CONCLUSION

Co-use of *Lessertia frutescens* or *Echinacea purpurea* extracts may lead to herb-drug interactions, altering the efficacy of EE-based oral contraceptives and potentially leading to contraceptive failure.

Impact of salt induced hypertension on captive-bred Vervet monkeys *(Chlorocebus aethiops)*

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BACKGROUND

Hypertension has a multifactorial nature, which is caused by mutual interactions between genetic, epigenetic and environmental factors (stress and diet). There is currently no identifiable cause for primary hypertension. However, excess dietary salt intake has been reported to contribute predominantly to hypertension. This elevated blood pressure (BP) together with high sodium intake is associated with increased cardiovascular events and mortality irrespective of basal BP levels. Since Mendelian genetics contribute broadly to the development of hypertension, identification of genetic variants related to BP regulation remains crucial and may reveal new therapeutic drug targets.

METHODS

In this study, 16 adult Vervet monkeys were selected for genotyping and salt-sensitivity testing using dietary salt (1.5-2 g/day). Blood samples were collected for genotyping, gene expression, biochemistry, and lipogram analysis. Genes associated with salt-sensitivity were prioritized [angiotensin-1-converting enzyme (*ACE*), angiotensinogen (*AGT*), cytochrome P450 family 3 subfamily A member 5 (*CYP3A5*), G protein-coupled receptor kinase 4 (*GRK4*), and solute carrier family 4 member 5 (*SLC4A5*)] and phenotypic traits such as body weight and BP were also measured.

RESULTS

Thus far, the animal intervention is ongoing, and preliminary genotyping results indicated five missense mutations in *GRK4* (Q196R and S414N), *CYP3A5* (A8V, S116N) and *SLC4A5* (L649F) as well as two single nucleotide polymorphisms (SNPs) (R65L and A142V) in *GRK4*.

CONCLUSION

Since mutations in these genes have been associated with salt-sensitivity in humans, especially *GRK4* SNPs (R65L and A142V), it can only be postulated that they may have the same impact in the mutated Vervet monkeys. However, these findings can only be confirmed when dietary salt intervention and gene expression have been completed.

IL-4i1 regulates macrophage mediated immune responses to acute *Mycobacterium tuberculosis* infection

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BACKGROUND

Tuberculosis (TB), caused by *Mycobacterium tuberculosis (Mtb)* is the leading infectious disease epidemic that claims over 1.6 million lives, while 10 million fell ill in 2017. Understanding the complex host-pathogen interaction may help find new drug targets for TB therapy. This interaction may then lead to host-directed therapies (HDT) for TB. IL-4i1 was among the candidate genes that were upregulated in IL-4/IL-13 alternatively activated macrophages during *Mtb* infection in our genome-wide CAGE transcriptional analysis. IL-4i1 is a secreted L-amino oxidase which converts Phenylalanine into phenylpyruvate releasing toxic products ammonia and hydrogen peroxide. The enzymatic activity was previously reported to in turn cause immunosuppression of effector T-cells by directly inhibiting polarization, proliferation and function of T-cells. These data suggested that IL-4i1 is involved in immune-regulatory mechanisms and may be implicated in immune evasion mechanisms by *Mtb*.

METHODS

To determine the functional role of IL-4i1 during *Mtb* infection, IL-4i1-deficient mice and wild-type (WT) littermate controls were infected with *Mtb* H37Rv and hyper-virulent HN878 *Mtb* strain. IL-4i1 deficient mice were highly resistant to both strains at 21 days post-infection and at 12 days post-infection during HN878 *Mtb* infection.

RESULTS

Resistance to *Mtb* infection was denoted by a significant reduction of bacterial loads, reduced inflammation, reduced tissue iNOS expression, and reduced recruitment of interstitial macrophages, in IL-4i1-/- mice compared to WT. Pro-inflammatory cytokines were reduced,

however not significant. Interestingly there was a significant increase in nitric oxide production in infected IL-4i1-/-tissues. At 12 days post-infection, IL-4i1-/- showed increased in M1-like macrophages that correlated with increased pro-inflammatory cytokines and chemokines when compared to WT.

CONCLUSION

These data suggested that IL-4i1 regulates macrophage-mediated inflammatory responses during acute *Mtb* infection, thus showing potential as an immunomodulatory target for TB HDT therapy.

Systematic review on plant-based diet in relation to cardiovascular disease risk in Africa

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BACKGROUND

Cardiovascular disease (CVD) is the leading cause of deaths globally, with increasing rates being reported in sub-Saharan Africa (SSA). Studies are needed to investigate lifestyle risk factors associated with CVD in Africa and implement prevention and control strategies. Evidence is limited on the effects of a plant-based diet (PBD) in Africa. However, high-income countries have highlighted the benefits of PBD in lowering CVD risk.

METHODS

The relationship of PBD with CVD risk in SSA will be investigated by reviewing studies from Africa. A systematic review will be performed to investigate published studies and identify gaps in the literature on PBD studies previously conducted in Africa. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) frameworks will be followed to identify studies on PBD and CVD risk in Africa. A comprehensive search of the literature will be conducted in electronic databases; PubMed, Scopus and EMBASE. Utilizing a search strategy with keywords derived from the project title and medical subject headings (MeSH) terminology will identify eligible articles for the systematic review and meta-analysis. Studies on PBD and CVD risk will be included irrespective of the study design and year of publication, because of the scarcity of data on PBD in Africa. All eligible studies should examine the associations of PBD with outcome measures concerning cardiometabolic risk profile or significant reductions in the incidence of CVD in adult study populations. Appropriate meta-analysis will combine results to assess heterogeneity, publication biases, and implement relevant robust sensitivity analyses. P-values <0.05 will be statistically significant.

RESULTS

Not applicable.

CONCLUSION

This systematic review will be the first to investigate the associations of PBD with CVD risk in African populations. Therefore, it will provide insight on the lifestyle drivers of CVD in Africa.

The design and implementation of a patient-centred therapeutic exercise and sport intervention for young people with substance-use disorders in treatment settings: improving behavioural health and quality of life in South Africa

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BACKGROUND

Youth substance use and abuse is a public health epidemic of concern in South Africa, affecting physical, mental and psychological development. Young people are increasingly becoming exposed to substance use stressors within an environment that poses an increased risk for detrimental effects on health and overall psychological well-being. The result is an increased demand on substance use treatment services. Additionally, physical activity posits to benefit physical and mental health, specifically in reducing depressive symptoms, anxiety and substance use. Thus, the adoption of exercise and sport during substance use treatment may assist with providing a solution to successful treatment episodes for substance use problems, and a reduction in readmission to substance use treatment centres. The aim of this research study is to design and measure the feasibility, applicability and acceptability of a patient-centred therapeutic exercise and sport intervention for young people admitted to specialist treatment centres in South Africa. Furthermore, we will evaluate the impact of exercise and sport on treatment outcomes related to behavioural health and overall quality of life.

METHODS

In this research study, we will adopt a mixed methods sequential transformative research design for inquiry. Following a systematic review, a feasibility study and a pilot cluster randomized controlled trial will serve as the data collection mechanisms. We will assess the feasibility, applicability, and acceptability of introducing patient-centred therapeutic exercise and sport interventions for young people, who are undergoing in-patient substance-use treatment for substance-use disorders.

RESULTS & CONCLUSIONS

Currently, no results and conclusions are available.

Inter-individual genetic variation and the development of uncontrolled hypertension in patients with concomitant type 2 diabetes mellitus in Eastern Cape South Africa

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BACKGROUND

Accumulative evidence shows that resistant hypertension (RHTN) has now become a leading cardiovascular risk factor, with 1.13 billion individuals affected globally. While data exist on individuals of European descent, currently, there is a scarcity of data on the African population, particularly the role inter-individual genetic variation plays in RHTN. Our aim of the study is to identify genetic variants responsible for the observed inter-individual variability in response to antihypertensive drugs in patients residing in Mthatha, Eastern Cape.

METHODS

To accomplish this aim, we will employ an *in-silico* prediction method for identifying a single nucleotide polymorphism (SNP) associated with the development of RHTN using publicly available databases (PubMed, Scopus, Web of Science, African Journal Online, PharmGKB). Results obtained will then be used to generate a MassARRAY assay. Additionally, buccal swabs will be collected, and DNA extracted from RHTN patients (n=200), and their age-matched controls (n=200), whereafter, it will be genotyped and analysed using the MassARRAY system. Genetic variants will then be evaluated and grouped to establish a common haplotype. Afterwards, serum will be collected to determine the pharmacokinetic profile of specific hypertensive drugs for each haplotype using Tandem Liquid Chromatography-Mass Spectrometry. This profile will then be compared to haplotypes of selected genes to establish a genetic profile that could be used by clinicians to predict to which antihypertensive drug the individual will most likely respond.

RESULTS

Currently, databases are being screened for SNPs of interest. To date, approximately n=100 buccal swabs and serum samples have been collected. Results obtained thus far showed that patients presented with increased triglycerides, total cholesterol, and D-dimers, with decreased high-density lipoprotein, all of which are risk factors for cardiovascular dysfunctions.

CONCLUSION

Results obtained from this study may guide dose adjustments for individuals with RHTN.

Dietary diversity, food choices and nutritional status of adults at risk of Diabetes Mellitus type II, residing in resource poor communities around Cape Town

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BACKGROUND

Dietary diversity (DD) is associated with a healthy diet, and dietary diversity scores (DDS) are widely used as proxy-indicators for the micronutrient adequacy of the diet. However, it has also been reported that a greater DD may be associated with a higher intake of unhealthy foods, higher energy intake, and overweight and obesity in adults. Inappropriate application, lack of standardization and validation of DDS tools in research studies, have yielded confounding results. More evidence is needed regarding the association between DD and the healthiness of a diet, weight status and the prevention of non-communicable diseases, including diabetes mellitus type II. We will determine the relationship between DD and food choices, nutritional status, blood pressure, fasting blood glucose, glucose tolerance and blood cholesterol concentrations in at-risk diabetes mellitus type II adults.

METHODS

In this cross-sectional descriptive study, we will use existing baseline screening data from the South African Diabetes Prevention Programme study. Black and mixed-ancestry adults (n=700), aged 25-65 years were recruited from sixteen low-socioeconomic communities around Cape Town. Data collection included administration of a questionnaire with questions on frequency of intake of specified foods to determine food choices, anthropometric and blood pressure measurements, a blood sample to measure cholesterol and glucose, and an oral glucose tolerance test. Participants were screened for diabetes mellitus type II; high-risk participants with impaired fasting glycaemia (6.1-7.0 mmol/L) and impaired glucose tolerance (7.8-11.1 mmol/L) were identified. The minimum dietary diversity for women score will be calculated based on 24-hour dietary recalls. Descriptive data analysis will be done using the statistical software package IBM SPSS version 25. Chi-square tests will be performed to test the association of categorical variables. Univariate and multivariate logistic regression will be used to determine associations between DDS and variables of interest.

RESULTS & CONCLUSION

Not applicable.

Differentiation in high glucose increases lipid accumulation, lipolysis and oxidative stress 3T3-L1 adipocytes

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Obesity is considered one of the greatest health challenges of the 21st century, which increases the risk of developing chronic metabolic diseases such as type 2 diabetes, cardiovascular disease and certain types of cancers. The pathogenic mechanisms underlying obesity are not yet fully elucidated, although several lines of evidence suggest that adipocyte hypertrophy leads to inflammation, oxidative stress and metabolic disease. The 3T3-L1 adipocyte cell model is commonly used for obesity studies, although it is uncertain whether culture conditions mimic human obesity. Thus, the aim of this study is to establish an experimental model of adipocyte hypertrophy, inflammation and oxidative stress in 3T3-L1 adipocytes.

METHODS

3T3-L1 pre-adipocytes were differentiated in media containing 5.5, 25 or 33 mM glucose for 14 days. Cell viability, lipid accumulation, lipolysis, oxidative stress and inflammation were assessed by measuring mitochondrial dehydrogenase activity, Oil red O staining, Glycerol release, 2', 7'-dichlorfluorescein-diacetate fluorescent staining to measure reactive oxygen species and enzyme-linked immunosorbent assays to measure MCP-1 expression, respectively after zero, seven, and 14 days differentiation

RESULTS

The length of differentiation and glucose concentration affected lipid accumulation, lipolysis and oxidative stress. 3T3-L1 adipocytes differentiated for 14 days in 33 mM glucose accumulated more lipids and had increased lipolysis and oxidative stress compared to adipocytes differentiated for seven days in lower glucose concentrations. Cell viability and the MCP-1 pro-inflammatory cytokine secretion were not affected.

CONCLUSION

We showed that 3T3-L1 pre-adipocytes differentiated in high glucose concentrations for 14 days offer potential as an experimental model that mimics human obesity and for screening anti-obesity therapeutics. Currently, the expression of genes involved in lipid metabolism, inflammation and oxidative stress are being assessed using Quantitative Real-Time Polymerase Chain Reaction to characterise the experimental model. Future work involves assessing whether rooibos, honeybush and their bioactive polyphenols, ameliorates lipid accumulation, inflammation and oxidative stress in this experimental model.

Effects of rooibos phenolic compounds on the gut microbiota of Vervet monkeys (Chlorocebus pygerythrus)

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BACKGROUND

The development of metabolic diseases is accompanied by changes in gut microbiota phenotype, including a decrease in beneficial bacteria and an increase in pernicious bacteria. Western diet (high sugar high-fat diet), a sedentary lifestyle and altered gut microbiota diversity have been associated with an increased risk in developing metabolic diseases such as type 2 diabetes and obesity. In this research, we aimed to investigate the effect of a C-glycoside-dihydrochalcone, aspalathin, found uniquely in rooibos spp., on gut microbiota. Specifically, shifts in the microbiota bacterial phenotype induced by aspalathin were evaluated.

METHODS

Six Vervet monkeys (Chlorocebus pygerythrus) n=6, (3 on a high-fat diet and 3 on control diet) were used. Stool samples were collected from the Primate Unit and Delft Animal Centre (PUDAC) of the South African Medical Research Council. The stool samples were cultured in the presence of the unfermented Afriplex GRT extract or aspalathin using an anaerobic Speedy Breedy culturing system for 10 hours at 37°C in an anaerobic conditioned media chamber. Bacterial DNA samples were then extracted from the cultures, and the purified DNA was sent for metagenomic analysis using next-generation Ion Torrent sequencing.

RESULTS

The components of gut microbiota from these monkeys were examined to determine the effects of rooibos extract on microbiota, and the shifts in gut bacterial microbial communities were determined using bacterial metabarcoding by 16S rRNA gene Ion torrent amplicon sequencing. Preliminary results indicated that GRT and aspalathin enhanced the relative abundance of beneficial butyrate-producing bacteria such as Bifidobacterium adolescentis and Eubacterium spp. that were altered by the high-fat diet.

CONCLUSION

Based on the data observed, it is concluded that GRT and aspalathin could have beneficial prebiotics effects on gut microbiota diversity.

The association of Single Nucleotide Polymorphisms with the anti-hypertensive drug hydrochlorothiazide among indigenous South African Zulu patients

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BACKGROUND

The prevalence of hypertension is increasing at an alarming rate, particularly in urban dwelling populations. Furthermore, hypertension is a major risk factor for type 2 diabetes mellitus, atherosclerotic cardiovascular disease, heart failure and microvascular complications. Although a wide array of anti-hypertensive drugs are commercially available, it has been shown that response towards treatment is variable and serious adverse reactions are known to have occurred. Additionally, single nucleotide polymorphisms (SNPs) have been implicated in the pharmacokinetics and pharmacodynamics of pharmaceutical drugs. In this project, we aim to evaluate the association between nine known variants and treatment response towards hydrochlorothiazide among indigenous South African Zulu patients.

METHODS

A total of 70 DNA samples were collected from consenting patients with hypertension belonging to the indigenous South African Zulu population. DNA was extracted using a standardised salt lysis method. The nine SNPs were genotyped using the MassARRAY®System from Agena Bioscience™ and analysed using Medcalc statistical software. Associations between alleles and response to medication were measured using odds ratios, 95% confidence interval and p-value, where $p<0.05$ was deemed significant.

RESULTS

Nine SNPs were evaluated for association with the anti-hypertensive drug hydrochlorothiazide, where 2 (rs2230345 and rs4961) were demonstrated to be of statistical significance. SNP rs4961 ($p=0,01$) showed a marginal association with a lower response to hydrochlorothiazide treatment. Therefore, no treatment outcome could be drawn. Although SNP rs2230345 was mostly detected in uncontrolled patients, it is generally associated with better response to treatment.

CONCLUSION

These are preliminary results demonstrating the association between nine selected SNPs and hypertension control among patients taking hydrochlorothiazide as a primary drug.

Whole-genome Transposon Mutagenesis to elucidate the genetic requirements for vitamin B12 biosynthesis and assimilation in Mycobacteria

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BACKGROUND

Comparative genomics analyses have suggested that an altered capacity for cobalamin biosynthesis might represent a critical step in the evolution of the pathogenic *Mycobacterium tuberculosis* complex strains from an environmental ancestor. However, resolving the full gene complement involved in the complex, multi-step pathways for co-enzyme B_{12} biosynthesis, assimilation, and salvage in different mycobacterial species is enormously challenging. To address this problem, we have adopted a genome-scale approach to yield detailed genetic maps of de novo vitamin B_{12} biosynthesis and salvage in two representative species – *M. tuberculosis*, an obligate human pathogen and cause of tuberculosis and *M. smegmatis*, a non-pathogenic saprophyte.

METHODS

A combination of whole-genome transposon (Tn) mutagenesis and next-generation sequencing (Tn-seq) was applied in *M. smegmatis ΔmetE*, a gene-deletion mutant in which the B_{12}-independent methionine synthase has been inactivated, thus rendering the B_{12}-dependent isoform, MetH, essential for viability. Following growth of the *metE* mutant in rich laboratory medium, genomic DNA was extracted, amplified by PCR, and subjected to high-throughput sequencing to quantify all Tn junctions. Subsequently, the library was cultivated in a defined minimal medium to enable identification of conditionally essential genes.

RESULTS

A *ΔmetE* library of 400,000 Tn insertion mutants (cfu/ml) was generated. Of the predicted 6,716 genes in the *M. smegmatis* genome, 213 genes were identified as essential for growth on LB agar while 356, 301, and 337 genes were identified as essential in unsupplemented, B12-supplemented and cobalt-supplemented Sauton's minimal medium, respectively.

CONCLUSION

The *metE* library represents a valuable repository of Tn insertion mutants for genome-wide conditional essentiality analyses in defined minimal media. These studies are underway and will enable the first validated elucidation of the full vitamin B_{12} gene repertoire in mycobacteria.

Progress in the development of small protein biosignature-based tests for the diagnosis of TB disease

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BACKGROUND

The development of non-sputum-based point-of-care tests is a high priority in the fight against tuberculosis (TB). Previous studies identified various host blood biomarker signatures of up to seven proteins, which showed potential as tools for the diagnosis of active TB. There is a need to validate these protein signatures and identify the most useful candidate biomarkers which could be developed further into point-of-care tests.

METHODS

We recruited adults presenting with symptoms suggestive of pulmonary TB at primary healthcare clinics in six African countries. Using the Luminex technology, we measured the levels of 20 previously identified host biomarkers in serum samples from study participants and assessed the accuracy of combinations between the biomarkers in the diagnosis of TB.

RESULTS

Out of 1004 study participants included in the study, 278 (27.69%) were diagnosed with TB and 199 (19.82%) were HIV infected. The previously identified 7-marker biosignature continued to perform well. However, we identified a smaller protein biosignature comprising three analyse (NCAM, CRP and I-309) which diagnosed TB in all study participants with an area under the receiver operator curve (AUC) of 0.901 (95% CI 0.707-0.928) corresponding to a sensitivity of 92.8% and a specificity of 70.7%. When participants were stratified according to HIV-infection status, the small signature diagnosed TB in HIV-uninfected participants with an AUC of 0.902 (95% CI 0.774-0.926) and an AUC 0.897 (95% CI 0.709-0.933) in HIV-infected participants.

CONCLUSION

We have identified a small three-protein signature in specimens from multiple African countries, with potential in the diagnosis of TB disease. Our findings hold promise for the development of point-of-care triage test as the biosignature meets the World Health Organization Target Product Profile minimum requirements for such a test.

The effect of Beta Secretase Inhibitor and Rooibos treatment on C57BLKS db/db mice

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BACKGROUND

Amylin, a pancreatic ß-cell peptide hormone, plays a crucial role in glucose homeostasis; however, it aggregates to form islet amyloid, a characteristic feature in aged type 2 diabetics (T2D). ß-secretase (BACE), is involved in the cleavage of pre-amylin and the formation of toxic ß-amyloid. Chemical and potential plant-based (GRT™) inhibition of BACE may present as novel T2D treatment(s). In this study, we aimed to determine the impact of a chemical BACE inhibitor and GRT™ in C57BLKS mice.

METHODS

There were two phases of 10 and 16 weeks, respectively. Lean (db+) and obese (db/db) C57BLKS mice were divided into five groups (n=8): Control (vehicle equivalent/day), Pioglitazone (15 mg/kg/day), BACE inhibitor (30 µM/kg/day), GRT-1 (74 mg/kg/day), GRT-2 (740 mg/kg/day). Body weight (BW), food intake and glucose tolerance were monitored in both phases. At termination, pancreata and blood were collected for analysis.

RESULTS

The treatments had no measurable effects in lean mice. However, in obese mice, we observed the following. In Phase 1, GRT treatment decreased the BW compared to the pioglitazone group (193% ± 8.67 and 163.3% ± 3.94 vs 238% ± 7.48, $p<0.05$, respectively), and glucose tolerance in the BACE inhibitor and GRT-1 groups was improved (2412 ± 121.0 vs 2970 ± 95.62 and 2544 ± 105.6 vs 2970 ± 95.62, $p<0.05$). In phase 2, BACE inhibitor and GRT-1 treatments increased BW compared to the control (252.6% ± 16.61 and 235.9% ± 9.56 vs 189% ± 5.18, $p<0.05$, respectively), while only pioglitazone significantly was able to improve glucose tolerance (1884± 296.0 vs 3238 ± 260.1, $p<0.05$).

CONCLUSION

GRT treatment was seen to have glucose modulatory effects in the C57BLKS db/db mice, without concomitant weight gain, as seen in the BACE inhibitor and pioglitazone-treated groups. Further biochemical and histological analysis is needed to elucidate mechanisms of action.

Validation process of a vaccine hesitancy measuring tool in the Western Cape

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BACKGROUND

The World Health Organization has identified vaccine hesitancy as one of the top ten threats to global health in 2019. Defined as the delay in acceptance or refusal of vaccination despite the availability of vaccination services, it contributes to low vaccine coverage, which leads to outbreaks of vaccine-preventable diseases. The need for a valid, context-specific measurement tool to investigate vaccine hesitancy in our population is of utmost importance.

METHODS

This cross-sectional, descriptive study consists of two phases, an evidence synthesis phase and a primary study phase. Phase one involves a scoping review of existing vaccine hesitancy measurement tools, preceded by a duly registered and published a-priori protocol. The second phase will utilise a mixed-method research methodology to adapt and validate a Vaccine Hesitancy measuring tool. This phase consists of a qualitative arm involving semi-structured key informants interviews of point-of-care vaccinators, and a qualitative arm comprising household surveys completed by eligible participants living in the neighbourhood of the purposively selected health facilities. The estimated sample size for the study is 20 point-of-care vaccinators drawn from purposively selected health facilities, and 1000 eligible parents in household surveys.

RESULTS

The study obtained ethics clearance in March 2019 from Stellenbosch University's Human Research Ethics Committee. The a-priori protocol of the scoping review is ready for submission for publication. It is envisaged that by the time this abstract will be presented the protocol and the full scoping review will have been submitted.

CONCLUSION

We anticipate that the scoping review and the validation study will contribute immensely to the existing body of knowledge on vaccine hesitancy on the local and global scale. The validated tool will be valuable in reducing the knowledge deficit in addressing vaccine hesitancy in the Western Cape Province and similar settings.

Targeted depletion of RibF, a putative bifunctional FAD synthetase/ flavokinase in *Mycobacterium smegmatis*

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BACKGROUND

Tuberculosis (TB) is the number one killer by an infectious disease globally. In South Africa, there were approximately 22,000 TB deaths in 2017. There is consequently an urgent need to develop novel TB drugs and shorter regimens, an imperative which demands the identification of new drug targets in essential mycobacterial pathways. To that end, we have undertaken a functional characterization of *ribF*, an essential gene in the riboflavin (RF) biosynthetic pathway. Given RFs role as a core component of the essential flavin cofactors, flavin mononucleotide (FMN) and flavin adenine dinucleotide (FAD), we hypothesized that silencing *ribF* would disrupt the function of all *Mycobacterium tuberculosis* flavoproteins, crippling numerous essential processes within the bacillus.

METHODS

Applying CRISPRi-mediated transcriptional repression, we generated an anhydrotetracycline (ATc)-inducible *ribF* hypomorph of *M. smegmatis*, a commonly used mycobacterial model strain. Quantitative PCR (qPCR) was used to confirm the decrease in *ribF* transcript levels following ATc treatment. Live-cell imaging allowed an investigation of cell morphological alterations as a consequence of RibF depletion and liquid chromatography-mass spectrometry provided insights into its impact on selected RF pathway metabolites. Drug susceptibility testing was also used to investigate the impact of *ribF* depletion on susceptibility to antimycobacterial agents with distinct mechanisms of action.

RESULTS

Consistent with other organisms, *ribF* was essential for *in-vitro* growth of *M. smegmatis* and depletion of *ribF* was bacteriostatic. In targeted metabolomics analyses, the depletion of ribF was associated with accumulation of RF, suggesting that the failure of this precursor to being converted to FMN and FAD was the cause of observed cell growth inhibition. The downregulation of *ribF* also conferred enhanced susceptibility to the known cell wall-targeting agent, vancomycin, and experimental FAD synthetase inhibitors.

CONCLUSION

These data support the inferred essentiality of *ribF* in mycobacteria, suggesting its potential as a new target for TB drug discovery.

Prevention of Doxorubicin-induced cardiotoxicity by *Nonhlaceae sanguine*: A mechanistic study

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BACKGROUND

Doxorubicin (Dox), a highly potent chemotherapeutic drug, has contributed to the significant increase in the 5–15-year survival rate of most cancer-patient outcomes. Unfortunately, as its use became widespread, the therapeutic index of Dox significantly decreased because of the incidence of a dose-dependent cardiotoxic side effect. To reduce the burden of Dox-induced cardiotoxicity, we propose to investigate the cardioprotective effect of flavonoids and extracts isolated from *Nonhlaceae sanguine* an adjunct to the current chemotherapeutic regimen.

METHODS

To assess the cardioprotective potential of *N. sanguine*, H9c2 cardiomyocytes were treated with either Dox (2 µM) or co-treated with flavonoids, NS-1 (1 µM), NS-2.4 (1 µM) and NS-7 (1 µM), or extracts, B1 (1 µg/mL) and B2 (1 µg/mL), for six days. Subsequently, cellular metabolic activity, oxidative stress, mitochondrial depolarization and apoptosis were assessed.

RESULTS

Data from this study demonstrated that the flavonoids and extracts of *N. sanguine* significantly ($p < 0.05$) improved mitochondrial membrane potential while decreasing Dox-induced oxidative stress and apoptosis in H9c2 cells. Moreover, except for B2, metabolic activity was also significantly ($p < 0.05$) increased by the various treatments. Interestingly, the co-treatments did not decrease the efficacy of Dox treatment on MCF-7 human breast cancer cells.

CONCLUSION

We demonstrated that flavonoids and extracts of *N. sanguine* can attenuate the cardiotoxic effect of Dox on H9c2 cells without impairing the chemotherapeutic effect of Dox.

Breaching the barrier: targeting cell wall enzymes of Mycobacterium tuberculosis for development of novel TB drugs

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BACKGROUND

Mycobacterium tuberculosis, the causative agent of Tuberculosis, assembles a complex cell wall containing cross-linked peptidoglycan (PG), which plays an important role in the maintenance of cell wall integrity and tolerance of environmental stresses. PG cross-linking by penicillin-binding proteins requires prior modifications of PG precursors. These modifications include amidation of the D-glutamate residue found in PG, which is carried out by the enzyme complex, MurT-GatD, the function of which remains unexplored in mycobacteria. We targeted MurT and GatD with the hypothesis that inhibition of the activity of MurT-GatD would cause increased sensitivity to antibiotics and cause rapid cell death.

METHODS

Gene deletion and regulation techniques such as Allelic exchange mutagenesis and CRISPR interference were used to assess the essentiality of MurT-GatD for mycobacterial growth. Fluorescent D-amino acids and Fluorescent PG stem peptide mimic with amidation modifications were used to assess PG biosynthesis dynamics in mycobacterial cells during growth. Fluorescent protein tags were used to assess the localization of MurT-GFP and mRFP-GatD during cell growth. Time-lapse and atomic force microscopy were used to assess the growth and cell wall structure of mycobacterial cells depleted of MurT and GatD, respectively.

RESULTS

Through time-lapse microscopy, we show that MurT-GFP co-localizes with mRFP-GatD at major sites of cell wall biosynthesis. Time-lapse microscopic analysis of MurT-GFP localization in Fluorescent D-amino acid (FDAA) – labelled mycobacterial cells shows that MurT-GFP co-localizes with maturing PG, forming part of a cytoplasmic side-wall PG biosynthesis complex. CRISPRi dCas9 mediated genetic depletion of MurT and GatD in mycobacteria results in reduced PG cross-linking, increased cell wall permeability, cessation of cell growth and increased sensitivity to glycopeptide and beta-lactam antibiotics.

CONCLUSION

Our observations indicate that the MurT-GatD enzyme complex plays a decisive role for PG polymerization and identify this complex as a novel antibiotic target for inhibition of PG assembly in mycobacteria.

How children make meaning of sexual trauma

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BACKGROUND

South Africa is reported as having one of the highest incidences of child victimisation in the form of sexual violence and assault worldwide, with forty per cent of all reported rapes in the country having been perpetrated on children. Using Afrocentric and child-centric perspectives, the overarching aim of this study was to understand how children make meaning of sexual violence-related trauma. The perspective of this study is in response to the call for an African-centred psychology which I seek to contribute to addressing questions concerning the need for a decolonised psychology. Insights from these perspectives will enable the development of context-sensitive interventions directed at children exposed to poly-victimisation and who have experienced complex trauma.

METHODS

Non-probability purposive sampling was used to recruit 9–11-years-old children who have experienced sexual violence in Cape Town. With the aids of different play techniques, data were collected through life-story research using a qualitative narrative approach. African-centred narrative analysis was then used to analyse narratives. The chosen methods upheld social and ethical obligations for protecting children from harm.

RESULTS

Preliminary findings show that children make sense of sexual trauma through their perceived responsibilities towards the self and others, interpretations of the behaviours they are exposed to, experience of their environments, expectations of care and understandings of justice.

CONCLUSION

The findings of the study demonstrated that children are experts on their lives who can contribute valuable knowledge and unique insights on matters that concern them. The study is significant in that it shows that there are no universal laws for how children make meaning of sexual trauma and as such, approaches to mental health need to be developmentally and contextually situated. This study is therefore in alignment with Sustainable Development Goals 3, 5 and 7, which focus on inclusive mental health across all contexts as a historical turning point.

Beneficial effect of isoorientin in insulin-resistant adipocytes

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BACKGROUND

Obesity is a major causal factor for the development of insulin resistance, a key feature of type 2 diabetes. Currently, various mechanisms are explored to understand and ameliorate obesity-linked complications. Because of its fats buffering potential, the process of 'browning' white adipose tissue has become one of the integral therapeutic targets to combat obesity and its associated complications. Rooibos has been shown to exhibit anti-obesity and anti-diabetic properties, however, less is known about its major polyphenols such as isoorientin. We aim to investigate the beneficial effect of isoorientin on ameliorating obesity-a complications, explore its effect on browning of fat, mitochondrial function, insulin resistance, and lipid metabolism.

METHODS

The optimal dose of isoorientin was determined by exposing 3T3-L1 adipocytes to various doses of isoorientin (0.1–100 μM) for 4 hours. Subsequently, glucose uptake and MTT [3-(4,5-Dimethylthiazol-2-yl)-2,5-Diphenyltetrazolium Bromide] assays were performed. Adipocytes were exposed to 0.75 mM palmitate for 24 hours to induce mitochondrial dysfunction and insulin resistance. Subsequently, adipocytes were treated with isoorientin (10 μM) and positive controls such as CL316243 a selective ?3-adrenoceptor agonist (1 μM), pioglitazone an antidiabetic-drug (10 μM), and compound C, an adenosine 5? monophosphate-activated protein kinase inhibitor (10 μM) for 4 hours. Then glucose uptake, adenosine triphosphate (ATP) production, MTT activity, Oil Red O, glycerol release and inflammatory markers were investigated to understand the role of isoorientin in modulating obesity-linked complications.

RESULTS

Isoorientin dose-dependently enhanced glucose uptake, mitochondrial activity and ATP production. Palmitate showed to induce insulin resistance and mitochondrial dysfunction as determined by reduced glucose uptake, ATP production, mitochondrial activity, glycerol release, and enhanced lipid accumulation, which were ameliorated by isoorientin.

CONCLUSION

Our data support the beneficial effects of isoorientin in modulating obesity-linked complications under insulin-resistant condition. However, the molecular mechanisms involved in this process need to be investigated.

BONGANI MAYOSI NATIONAL HEALTH SCHOLARSHIP PROGRAMME (BM - NHSP)

PROGRAMME ADMINISTRATOR

Ms Colleen Van Wyk

Supervision system of WBOT in the Ngaka Modiri Molema District, North West Province

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BACKGROUND

The Ward-Based Outreach Teams (WBOT) programme constitutes South Africa's national community health workers (CHW) programme. Many challenges that CHWs face, point to the need for supervision systems that not only monitor performance but also provide moral and other forms of support. In this study, we aimed to contribute towards aligning effective supervision strategies with improved implementation of support and supervision processes in the WBOT programme and inform thinking on national CHW programmes more generally.

METHODS

This qualitative study included in-depth interviews and focus group discussions in the Ngaka Modiri Molema District. We used a semi-structured interview guide with open-ended questions to elicit factors facilitating and constraining the current supervision system for the one-on-one interviews and focus group discussions. Participants included WBOT, operational, middle and provincial managers.

RESULTS

Preliminary results show that weaknesses in the health system affect the supervision of WBOT. Other barriers include workload and unequal power relationships at primary health care facilities. Some of the facilitating factors include effective communication, trust relationships and commitment at all levels of the health system.

CONCLUSION

Designing appropriate strategies for supportive supervision is key to strengthening the WBOT programme. The interrelationship between trust and supervision is significant in strengthening supportive supervision.

Impact of Resilience on Depression in Mothers Exposed to Intimate Partner Violence or Trauma: Findings from a South African Birth Cohort

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BACKGROUND

Rates of intimate partner violence (IPV) and childhood trauma in South Africa are some of the highest globally and linked to negative mental health outcomes, including depression. Particularly in the postnatal period, this can lead to negative child behavioural and mental health outcomes as well as adversely affect parenting practices. However, few studies have investigated the impact of resilience to trauma or violence on maternal depression, particularly in high-risk communities such as South Africa. We aimed to investigate the impact of IPV and maternal childhood trauma on maternal depression three years postnatally and whether maternal resilience mediated this relationship.

METHODS

This study was nested in the Drakenstein Child Health Study, a longitudinal birth cohort. Maternal IPV (emotional, physical and sexual) was measured at two years, depression at three years and maternal resilience at two and a half years. Structural equation models were used to investigate associations between IPV or childhood trauma and maternal depression. Maternal resilience was examined as a possible mediator.

RESULTS

In 909 mothers, the prevalence of depression (12%), IPV (17%) and childhood trauma (34%) was high. After controlling for key socio-economic variables (maternal education, income and ancestry), IPV and childhood trauma were significantly associated with maternal depression. Resilience mediated the relationship between recent IPV and depression but did not mediate the relationship between childhood trauma and depression.

CONCLUSION

In high-risk communities such as South Africa, it is critical to gain an improved understanding of relationships between maternal trauma or IPV and depression. Programmes that aim to support mothers and improve resilience may provide an important opportunity to address the adverse mental health outcomes associated with IPV exposure in high-risk communities.

Preliminary Findings: Psychological Impacts of Environmental Degradation Vhembe District, Limpopo Province

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BACKGROUND

Natural ecologies worldwide are unraveling at an unprecedented scale. The United Nation's Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services' pre-release summary of the Global Assessment Report (2019) states that three-quarters of land-based ecologies have been degraded by humans is mainly attributable to land conversions. South Africa has not been immune to deforestation as a result of mass land conversions, yet the psychological impacts on host communities are largely unknown and understudied.

METHODS

The preliminary findings presented are part of a multiple case study that aims to explore and describe the psychological impacts of environmental degradation in three South African case studies. The psychological impacts of environmental degradation, mainly as a result of deforestation, from the first case study in Vhembe District, Limpopo Province, will be presented. Several focus groups and individual interviews were conducted between May and July 2019 as part of data collection. Nvivo mixed-method data analysis software was used to perform the thematic analysis.

RESULTS

Deforestation and associated land dispossession were identified as main traumatic events that have had negative psychological implications for individuals and communities. Solastalgia, psychological distress caused by environmental degradation, was expressed by participants. Associated symptoms include sadness, hopelessness, helplessness, anxiety, and despair. Furthermore, deforestation and land dispossession have had profound psychological impacts on broader cultural identity and contributed to the loss of traditional knowledge systems.

CONCLUSION

The findings demonstrate that environmental degradation does have negative implications for mental health, nature-person relations, as well as a personal and cultural identity. Policy recommendations and suggestions for future research will be provided as part of the presentation.

Novel proteomic biomarkers for acral lentiginous melanoma

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BACKGROUND

Acral lentiginous melanoma (ALM) is a subtype of melanoma affecting acral skin (e.g. palm of hands, sole of feet) and is more prevalent in men of African descent. ALM is typically detected at a late stage resulting in a poor prognosis and survival rate. Because oncogenic mutations in melanoma occur within known signalling pathways, previous studies have shown that targeted therapies are capable of inhibiting these. Successful targeting of BRAF-V600E has produced significant clinical responses in patients with advanced nodular melanoma. By targeting BRAF inhibitors, the overall survival of patients with advanced melanoma was significantly improved by 63%. For ALM, this was not true, as it is known to have sporadic BRAF mutations. Given it accounts for less than 10% of melanoma cases and because ALM is poorly understood, very little has been reported on this topic. Our aim is to use proteomic technologies to detect differential protein expression in ALM. This may allow us to identify potential proteomic biomarkers that can serve as specific (i.e. effective and safer) targets for therapy and monitoring disease progression.

METHODS

A preliminary *in-vitro* approach, using four different cell lines, viz, two melanoma cell lines (UCT-Mel-1 and A373), one fibroblast cell line (HT1080) and one keratinocyte cell line (HaCat) will be used. This will be followed by using formalin-fixed paraffin-embedded tissue blocks of ALM, nodular melanoma and superficial spreading melanoma. A label-free shotgun proteomic workflow including laser capture microdissection, MALDI-TOF, FTIR and LCMS-MS will be employed to identify differentially expressed protein biomarkers of ALM. Qualitative and quantitative bio-informatic tools will be used for multivariate statistical analysis. We will conduct STRING functional pathway analysis to determine enrichment for various biological processes.

RESULTS & CONCLUSION

N/A.

Long-term effects of unintended pregnancy on antiretroviral therapy outcomes among South African women living with HIV

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BACKGROUND

Unintended pregnancies are common among women living with HIV, but there are no data on their long-term impact on treatment outcomes. In a cohort of women initiating antiretroviral therapy (ART) during pregnancy, we examined the association between the intendedness of the current pregnancy, measured antenatally, and elevated viral load up to five years postpartum.

METHODS

Women were enrolled at entry into antenatal care and were followed at repeated study measurement visits separate from routine care. At enrolment, women completed the London Measure of Unplanned Pregnancy. Using mixed effects models, we examined the impact of the intendedness of the pregnancy (planned versus each of unplanned or ambivalent, respectively) on viral load ≥50 copies/mL across postpartum study visits.

RESULTS

Overall, 459 women were followed for a median of 43 months postpartum, contributing 2535 viral load measures (median per woman: 6). Ambivalent and unplanned pregnancy were commonly reported (20% and 60%, respectively), and the proportion of women with elevated viral load increased over time (16% at six weeks to 43% by 36-60 months postpartum). Compared to those reporting a planned pregnancy, elevated viral load was more common among women reporting an unplanned pregnancy [odds ratio (OR): 2.87; 95% confidence interval (CI): 1.46-5.64], with a trend towards a higher odds among those reporting ambivalence (OR: 2.19; 95% CI: 0.97-4.82); associations persisted after adjustment for a wide range of demographic, clinical and psychosocial factors.

CONCLUSION

These novel data suggest that unplanned pregnancy may be a prevalent and persistent predictor of poor ART outcomes among women initiating ART during pregnancy. Pregnancy planning needs to be incorporated into routine care for all women living with HIV, and women who report that they did not intend their pregnancy may require specific attention from counselling and support interventions.

Feasibility and acceptability of a clinician monitored PTSD Coach Online intervention: A pilot randomised control trial in a low-resource setting

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BACKGROUND

Posttraumatic stress disorder (PTSD) is a prevalent and impairing mental health condition in the general population. A general treatment of choice for PTSD is prolonged exposure therapy (PET) as numerous randomised control trials and meta-analyses have demonstrated its efficacy in reducing symptoms of acute and chronic PTSD when compared to other therapeutic strategies. Unfortunately, few clinicians are trained in conducting PET, and many have negative perceptions about this treatment. Therefore, creative alternatives are required to a) make services more accessible, and b) make services more efficient. Mobile health provides an alternative to service delivery, considering the increasing rate of access to the internet. The mobile health application, 'PTSD Coach Online', is one of the treatment alternatives for PTSD accessible in the absence of a psychologist or other psychiatric services. To our knowledge, this is the first time PTSD Coach Online (PCO) is tested in a low-resource setting such as South Africa. For that reason, we conducted a pilot study to assess whether study procedures (e.g. recruitment) are feasible, to evaluate the appropriateness of the selected assessment battery, and to review the utility of the PCO platform in the current setting.

METHODS

Ten participants meeting the study criteria were randomised to one of the two intervention arms, i.e. PCO or enhanced treatment as usual (e-TAU). Participants were evaluated at three time points (baseline, after four weeks and post-intervention at eight weeks) using clinician-administered diagnostic assessment and self-report measures.

RESULTS

The results of the pilot study will be discussed pending the outcome of the analysis in August 2019.

CONCLUSION

In previous studies, PCO was found to be a feasible and acceptable intervention. Findings of this study will be compared to those of other studies.

A prospective longitudinal study of the impact of ante- and postnatal maternal mental health on the neuro-developmental trajectories of children during the first 18 months

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BACKGROUND

Mental health disorders are one of the non-communicable diseases that contribute the most to the overall global burden of disease. Worldwide about 10% of pregnant women and 13% of those who have given birth experience some type of a mental health disorder. In low- and middle-income countries, ante- and postnatal mental disorders are even higher. A growing body of evidence from high-income countries links ante- and postnatal maternal mental health disorders with adverse effects on different aspects of infant neurodevelopment in the cognitive, behavioural and psychomotor domains. The World Health Organization found that there is an extensive lack of awareness about maternal mental health and its impact on child development in resource-constrained, low- and middle-income countries.

METHODS

The present study is a prospective longitudinal cohort design with repeated measures in which pregnant women are followed from the 1st trimester of pregnancy until their child is 18 months old. We plan to investigate the effect of antenatal and postnatal exposure to maternal mental health disorders on the early neurodevelopmental outcome of infants at 12-15 weeks post-term as well as at 6 and 18 months of age. The study sample will be recruited from the catchment area of the northern suburbs of Cape Town. Pregnant mothers and their babies (n=200) attending Stikland Hospital's Maternal Mental Health Clinic will be eligible for inclusion in the study.

RESULTS

N/A.

CONCLUSION

Mothers and children from lower socio-economic areas in the Western Cape are disproportionately exposed to multiple and cumulative socio-economic and environmental risk factors which may compromise the child's development. This study will be the first to evaluate the effect of ante- and postnatal maternal mental health disorders on different aspects of neurodevelopmental trajectories (i.e. cognitive, fine and gross motor, and language) in young children in the Western Cape, South Africa.

Monoclonal antibody production against *Mycobacterium tuberculosis* curli pili

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BACKGROUND

Tuberculosis (TB) remains the single most significant infectious disease killer in South Africa. New diagnostic tools and biomarkers are required to provide early diagnosis of TB. *Mycobacterium tuberculosis* curli pili (MTP), an adhesin encoded by the mtp gene, has been identified as a potential therapeutic and diagnostic target for *Mycobacterium tuberculosis* complex (MTBC) pathogens because of their fundamental functions in microbial pathogenesis. MTP was shown to play a significant role in biofilm production, and the adhesion and invasion of A549 pulmonary epithelial cells and THP-1 macrophages. The development of monoclonal antibodies (MAbs) specific for MTP that may be used in a point of care (POC) test is described in this study.

METHODS

Mice were immunised with two synthetic multimeric peptide immunogens (MTP1 and MTP2) derived from MTP. An enzyme-linked immunosorbent assay (ELISA) was developed to determine the best responding mice to the immunogen. The mice splenocytes were isolated, followed by fusion of B cells with myeloma cells using standard hybridoma technology for MAb development.

RESULTS

ELISA screening of the supernatant culture medium of MTP2 hybridomas resulted in the identification of clones, BA1-AB11, BA1-AF2, BA1-AE3 and CE6, which secrete antibodies against MTP. Using indirect ELISA, we evaluated and confirmed the specificity of the identified hybridoma clones (BA1-AB11, BA1-AF2 and BA1-AE3).

CONCLUSION

We will assess the resultant anti-MTP MAbs for their ability to detect MTP. The successful production of anti-MTP MAbs will permit their use in the design of an immunochromatographic lateral flow assay as a POC test for the diagnosis of TB. The MAbs can be used in immunolocalisation studies, as blocking antibodies in adhesion/invasion assays, or in anti-TB testing of curlicides or pilicides.

Designing research for individualisation

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BACKGROUND

There is an increasing trend within intervention research toward personalised or adaptive treatments, especially within the fields of cancer, alternative medicine, and psychology. However, the methodology that should be used with this type of research has yet to be clearly defined, and many studies still rely on conventional non-individualised methods. As such, there is a clear need to improve research methodology in this area.

METHODS

In this paper, we make use of the results from a previous scoping review of the literature focusing on the designs and analyses used to account for individualisation together with additional relevant literature. We discuss the advantages and disadvantages of different designs, identify the challenges faced within individualised research and provide solutions to address these challenges. A framework for designing and analysing individualised intervention research is also offered.

RESULTS

While the best design will vary based on the nature of the specific study, a few options emerge, such as the master protocol trials and Bayesian statistics. Master protocol trials are used to evaluate multiple hypotheses within a study by conducting concurrent sub-studies. These trials are generally classified as basket, umbrella, or platform trials, each of which has specific advantages for individualised interventions. On the analysis side, Bayesian statistics present an alternative approach to interpreting and analysing data. This alternative approach provides more intuitive results and can answer the complex questions found in individualised research with more clarity.

CONCLUSION

In this paper, we discuss the different designs and analyses that can be used when conceptualising individualised intervention research and offer a framework for designing intervention research. The recommendations given in this paper will assist prospective researchers in designing better and more intuitive individualised research.

Patient cost of accessing HIV/TB healthcare services in rural KwaZulu-Natal

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BACKGROUND

Data on HIV/TB patient costs is are essential to inform policies and interventions that will address the high costs incurred by affected households. The CAPRISA 013 (CAP013) trial is a cluster randomised controlled trial to determine the efficacy of quality improvement (QI) in facilitating integrated TB and HIV services in KwaZulu-Natal's rural clinics. In this sub-study of CAP013, we aim to establish whether the implementation of a structured QI intervention for TB/HIV services impacts patients' direct and indirect cost of healthcare access in these clinics.

METHODS

Over a two-month post-CAP013 period, we interviewed patients using qualitative and quantitative web-based, questionnaires comprising closed-ended questions in the KCD and Ugu districts of KwaZulu-Natal. Two interviewers were deployed in each district to interview 278 patients: 69 co-infected, 164 HIV-positive, and 45 TB-infected over 20 clinics. Patients were questioned about demographic and economic circumstances including the nature and number of clinic visits. Data collected from the interview process were automatically uploaded and stored in the Lime Survey database and subsequently analysed using the SPSS statistical analysis package.

RESULTS

None yet - to be finalised by October 2019.

CONCLUSION

This study has demonstrated the impact of a quality improvement approach on HIV/TB patient costs. The results of this study quantify the increase/decrease in direct and indirect costs borne by HIV/TB households and may guide policy-makers in their decision to upscale this intervention nationally when aiming to decrease such costs for patients.

Misuse of codeine in South Africa: A multifaceted study of the nature and extent of the problem and methodological considerations

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BACKGROUND

Codeine is the most commonly consumed opiate worldwide and is used for the symptomatic relief of mild to moderate pain or cough. In South Africa, the misuse/abuse of codeine-containing medicines is understudied, and there is no system of recording or monitoring over-the-counter or prescription medicines purchased at various pharmacies and retail stores. A gap exists within this system since no information on patterns of use in the general population is provided. Thus, the need and importance to explore codeine misuse at a broader level.

METHODS

Quantitative and qualitative research methods were used, to allow assessment of the magnitude and frequency of codeine misuse, and to explore the meaning and understanding of codeine misuse. Data were collected from persons seeking treatment for substance abuse at specialist drug treatment centres across South Africa; STATA/SAS packages were used for data analysis. In-depth semi-structured interviews were conducted with 18 codeine users in specialist treatment centres in Cape Town; N-Vivo statistical package was used to analyse data. Data from a national household survey (SADHS) was also used to determine the extent of use/misuse and harms related to non-medical use of codeine in the general population.

RESULTS

Of the 37 631 patients seen at specialist substance abuse treatment centres between January 2014 and December 2015, 856 (2.3%) reported misuse of medicines that contain codeine, as primary or secondary substance of abuse. During this period, most patients who reported misuse of codeine were male (72.7%); identified as white (37.9%), had tertiary education (20.1% vs 12.7%), were employed (41.6% vs 26.2%), were treated at inpatient centres (64.8% vs 35.2%) and were older; with average age 32.2 years (SD=12.4). In the SADHS, women and men, 15 years and older, reported similar use of codeine-containing medicines in the past 12 months (14% and 13%, respectively).

CONCLUSION

Forthcoming

Introducing an arteriovenous fistula pre-cannulation assessment care-bundle to reduce complications in patients with an arteriovenous fistula on haemodialysis

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BACKGROUND

The prevalence of diabetes in sub-Saharan countries is a specific concern, with 9.4 million people living with diabetes in Africa, which is expected to increase to 12.7 million by 2025. Thus, an estimated 6–16% of the sub-Saharan population will be diagnosed with diabetic nephropathy resulting in end-stage kidney disease (ESKD) and requiring renal replacement therapy. In South Africa, for a patient to gain access to treatment on a renal replacement programme, a selection committee reviews each case. Patients diagnosed with ESKD receiving dialysis therapy are at an increased risk of infection because of open vascular access, which is regarded as their lifeline during dialysis therapy. The early detection of arteriovenous fistulae (AVF) complications can benefit the patient because of early diagnosis and treatment. Therefore, it is critically important for staff working in dialysis units to detect AVF complications before initiation of haemodialysis to prevent infection, which may lead to death or prolonged stay in hospitals.

METHODS

To design, develop and pilot-test a prototype AVF pre-cannulation assessment care-bundle (intervention) within a haemodialysis Unit in the Western Cape. This study fits the intervention research model and follows the first four of the six phases of intervention as described by Rothman and Thomas in 1994. Descriptive and inferential statistical analysis will be performed.

RESULTS

The study has been approved by the ethics committee of Stellenbosch University (project reference number #0552; ethics ref.no. #S17/07/112). Data collection is currently in progress and will hopefully be completed in September 2019. Thesis submission January 2020.

CONCLUSION

By detecting infection from the AVF very early, or determining the incidence of complications relating to AVF failure and infection, we anticipate reducing these complications in patients on haemodialysis in the long-term.

Mental health system costs, resources and constraints in South Africa: a national survey and case study for universal health coverage

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BACKGROUND

The inclusion of mental health in the Sustainable Development Goals represents a global commitment from national governments to place mental health among their priorities for investment. Low- and middle-income countries (LMIC), such as South Africa, contemplating mental health system scale-up embedded into broader universal health coverage reforms, require detailed and locally-derived estimates on existing mental health system resources and constraints. The absence of these data has limited scale-up efforts to address the burden of mental disorders in most LMIC.

METHODS

We conducted a national survey to quantify public health system expenditure on mental health, evaluate the constraints of the South African mental health system and demonstrate methods for this task for other LMIC.

RESULTS

We found that South Africa's public mental health expenditure represented 5.0%of the total public health budget (provincial range: 2.1% to 7.7%). Inpatient care represented 86% of mental healthcare expenditure, with nearly half of the total expenditure on mental health occurring at psychiatric hospital-level. Almost one quarter (24%) of mental health inpatients are readmitted to hospital within three months of discharge, costing the public health system 18.2% of the total mental health expenditure. Crude estimates indicate that only 0.89% and 7.35% of the uninsured population of South Africa requiring care received some form of public inpatient and outpatient mental health care, respectively during the 2016/17-study period. Further, mental health human resource availability, infrastructure and medication supply are significant constraints to the realization of the country's progressive mental health legislation.

CONCLUSION

For the first time, this study offers a nationally representative reflection of the state of mental health spending and elucidates inefficiencies and constraints emanating from existing mental health investments in South Africa. With this information, the government now has a baseline for which a rational process for planning system reforms can be initiated.

HIV treatment and blood pressure in adolescents and young adults from a hospital-based HIV-treatment cohort

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BACKGROUND

HIV-infected children and young adults on combination antiretroviral therapy (cART) are at risk of developing cardiovascular diseases caused by a combination of the effects of HIV infection and exposure to cART. We sought to investigate the incidence of elevated blood pressure (EBP) and to describe associated factors in 10–18-year-olds on cART for longer than two years.

METHODS

Retrospective cohort data were extracted from a database. At least two readings were used from the cohort based on an initial normal BP reading and classified into normal, pre-HBP and EBP using the Fourth Report from the National High Blood Pressure Program. Kaplan Meier survival curves were used in addition to Cox proportional hazard regression Models. Variables suspected of contributing to HBP used in the analysis included weight, height, body mass index, duration on ART, CD4 cell count and viral load.

RESULTS

From the database, 338 participants were included in the analysis. Overall, the incidence of elevated systolic BP was 4.1% (1.6%–9.7%) per year from the follow-up time of 1–5 years. The incidence of elevated diastolic BP was also 4% per year (0%–9.7%) in the same period. Survival curves showed that between 0–4 years on cART, males and females had similar BP trajectories. Between 5 and 15+ years there was a downward slope in the gradients of the curves which corresponded to an increase in the incidence of EBP after the eight years on cART. Female sex, increasing weight and increasing height were risk factors for EBP (P=0.01 for all).

CONCLUSION

Incidence of EBP was not higher than rates in HIV-negative populations, 10.4% (Birth-to-Twenty population). Identifying and monitoring adolescents and young adults on cART at risk of EBP are important to prevent HBP from developing into hypertension in later life.

Hospitalisation in Perinatally HIV-infected adolescents on antiretroviral therapy in South Africa: A prospective study

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BACKGROUND

Little is known about hospitalisation in perinatally HIV-infected (PHIV+) African adolescents who started antiretroviral therapy (ART) relatively early. We examined the incidence and causes of hospitalisation in participants enrolled in the Cape Town Adolescent Antiretroviral Cohort (CTAAC).

METHODS

PHIV+ children and adolescents who were clinically stable on ART for at least six months, aged 9-14 years and attending one of seven public sector ART services and HIV-negative (HIV-) age-matched children and adolescents were enrolled CTAAC. Data collected from July 2013 through October 2018 were analysed. Descriptive statistics and time to event analysis were used to describe causes and incidence of hospitalisations. Hospitalisation events were obtained from a provincial database.

RESULTS

Five-hundred and fifteen PHIV+ and 109 HIV- participants had a median follow up of 4.4 years (IQR:4.0-4.7). At enrolment PHIV+ had a median duration of ART of 7.6 years (IQR:4.6-9.2) and >75% had a viral load <50 copies/ml. The crude incidence of any hospitalisation event was 6.5 (95%CI: 5.6-7.7) and 2.2 (95%CI:1.2-4.0) events per 100- person years, p<0.01 in PHIV+ and HIV- adolescents respectively. The cumulative incidence of hospitalisation over the study period was 27.4% (95%CI: 23.7-31.6) and 9.1% (95%CI: 5.0-16.3), p=<0.01 in HIV+ and HIV- participants. One hundred and forty-nine hospitalisation events were experienced by 91 HIV+ participants. Age, sex, body mass index and CD4 count at study enrolment and age at ART initiation did not differ between PHIV+ participants who were hospitalised versus those who were not. However, the number of participants with a viral load <50 copies/ml was lower in those who were hospitalised versus those who were not (60 (65.9%) vs 333 (78.7%), p=0.01). The median duration of hospitalisation was two days (IQR: 1-6), and the maximum duration was 116 days.

CONCLUSION

PHIV+ adolescents on ART have a high incidence of hospitalisation.

In vivo and _in vitro_ studies to investigate the role of autophagy in human tuberculosis

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BACKGROUND

Mycobacterium tuberculosis (M.tb) is one of the world's most successful human pathogens that has infected ~2 billion people worldwide. The success of *M.tb* rests upon its ability to manipulate intracellular membrane trafficking events in host macrophages and blocking maturation of the phagosome. New therapeutic interventions for tuberculosis (TB) are urgently required. Whether the induction of autophagy by metformin (MET) and nitazoxanide can promote *M.tb* stasis remains unclear. The objective of this study was to determine whether the induction of autophagy will facilitate *M.tb* stasis/killing in human alveolar and monocyte-derived macrophages. Therefore we recruited persons with varying degrees of susceptibility to TB.

METHODS

Blood and or broncho-alveolar lavage (BAL) fluid were obtained from participants with presumed latent TB infection, presumed sterilising immunity, and previous and recurrent TB. Expression of LC3II protein, the marker of autophagy from peripheral blood monocyte cells, monocyte-derived macrophages and BAL cells were quantified by western blot and confocal microscopy. Cell cultures were treated *in vitro* with MET, nitazoxanide and starvation media in the presence or absence of bafilomycin. Some of the participants received bronchoscopic-instilled BCG with follow-up bronchoscopy at day three; autophagic proteins (LC3II) were measured pre- and post-treatment in the presence and absence of bafilomycin.

RESULTS

MET and starvation was a potent inducer of autophagy in BAL cells ($p=0.0008$ compared to no MET n=22) and for starvation ($p=0.0004$ compared to control n=19). *In vivo*, BCG was an inducer of autophagy ($p=0.0005$ compared to saline control n=13).

CONCLUSION

These preliminary results demonstrate that MET, starvation and BCG induced autophagy in alveolar cells. These findings have implications for new host-directed therapies. The next step is to determine if the relevant pathways influence mycobacterial survival *in vitro*.

Impact of ART adherence and retention interventions on viral load and vertical transmission during pregnancy and breastfeeding, a simulation model

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BACKGROUND

Antiretroviral therapy (ART) is an important intervention for the prevention of mother-to-child transmission (MTCT) and with effective adherence and retention in care, ART can reduce the risk of vertical HIV transmission to below 5%. However, in 2016, an estimated 160 000 children became HIV positive, almost all through MTCT. Supporting effective adherence and improving retention in care can further reduce paediatric infections. We will investigate the potential impact of effective adherence and retention in care interventions on MTCT rates and other outcomes.

METHODS

Estimates of the effectiveness of ART adherence and retention interventions in pregnant and breastfeeding women were sourced through a systematic literature review. Duration, the proportion of women receiving the intervention, and any measure of intervention effectiveness were extracted and used to parameterise the simulation model. Potential interventions are evaluated using an individual adherence and viral load (VL) simulation model in pregnant women entering antenatal care. The model generates weekly ART adherence and individual VL trajectories from conception to two years postpartum. Model outputs include the number of interventions, change in cumulative viraemia experienced, change in MTCT rate and are compared between modelled populations with and without effective adherence and retention interventions applied.

RESULTS

A total of twelve articles were found with appropriate estimates for parameter extraction. Interventions included enhanced adherence counselling, male partner support, cash incentives and reminders through text messaging. Most studies were prospective cohort studies or randomised trials and used self-reported estimates of ART adherence. The estimated effectiveness of ART adherence in these studies ranged from 25% effective to non-effective. The simulation models' results are not available yet.

CONCLUSION

This work will provide the first empirical evidence estimating population impact of current or future effective interventions directed towards ART adherence or retention in HIV care in pregnant and breastfeeding women.

Measuring what youth in Africa value in public policy evaluation: A mixed-methods study on wellbeing among youth living with and without HIV in sub-Saharan Africa

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BACKGROUND

The purpose of my PhD is to contribute to knowledge on the measurement of youth wellbeing, particularly for youth living with HIV in sub-Saharan Africa (SSA). Improving youth wellbeing is an important social and economic policy goal. However, data on locally relevant measures and the wellbeing effects of policies on youth in SSA are scarce.

METHODS

Drawing on wellbeing theories such as the self-determination theory, I used systematic review and qualitative research methods to understand how wellbeing is constructed and experienced among youth in SSA. I am applying these findings in impact evaluation to understand the causal effects of South Africa's HIV policy on youth wellbeing, using econometric techniques.

RESULTS

Data analysis in progress.

CONCLUSION

Improving youth wellbeing remains high on the Sustainable Development Goals agenda. My research will contribute towards knowledge of culturally relevant youth wellbeing measures for policy evaluations in SSA. Moreover, it will help understand the broader welfare effects of a public HIV policy on youth in South Africa. This policy could inform investment decisions.

Evidence on factors influencing contraceptive use and sexual behaviour in South Africa: A systematic scoping review

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BACKGROUND

Contraceptive use and sexual health behaviour remain a prominent public health concern in South Africa. Despite many government interventions, unplanned pregnancies, the number of abortions and maternal mortality remain relatively high. Because of high pregnancy levels and the stigma associated with the termination of pregnancy, more women turn to unsafe and illegal abortions negating the risks involved.

METHODS

We conducted a scoping review guided by Arksey and O'Malley's scoping review framework. We searched for eligible literature from peer-reviewed articles and grey literature in this study. Searches for articles were done on the following databases: PubMed/MEDLINE, American Doctoral Dissertations via EBSCO host, UCTD and SA ePublications via SABINET Online and World Cat Dissertations, Theses via OCLC and Google Scholar. We also searched for SAMRC and HSRC databases. Policies and guidelines on contraceptive use and sexual behaviour were searched on the WHO and government websites and statistics institutions. Studies published from January 1990–March 2018 were included. The PCC framework was used to determine the eligibility of the research question. PRISMA chart was used to report the screening of results. The MMAT and ACCODS tools were used to determine the quality of these studies.

RESULTS

We identified 51 articles through our search criteria; five were retrieved from other sources. Only 21 studies met our inclusion criteria and were included in the quality assessment stage. We found that knowledge and availability of a contraceptive method, length of a relationship, sexual debut, age difference, long waiting hours, and nurse's attitudes towards HIV-positive or younger clients are associated with contraceptive or sexual behaviour.

CONCLUSION

Factors influencing contraceptive use and sexual behaviour were common across different provinces and settings in South Africa. Scoping review studies on the factors influencing contraceptive use and sexual behaviour need to be extended to focus on the high-risk populations.

The role of surveillance systems in the epidemiology of tuberculosis in South Africa

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BACKGROUND

In 2015, South Africa was among six countries reported to have had the highest Tuberculosis (TB) disease burden in the world, with an estimated incidence of 454 000 cases of active TB. The estimated mortality rate was 46 per 100 000 for those infected with TB, while co-infection with the human immunodeficiency virus was 133 per 100 000 South Africans. South Africa still falls below its targets of 85% cure rate among the new smear-positive cases initiated on treatment and a case detection rate of at least 70%. The surveillance of diseases in the country is weak, thereby contributing to the failure of achieving the set targets. Accurate surveillance data are crucial for the planning and evaluation of TB control programmes.

METHODS

We will use deterministic and probabilistic approaches to link TB data sets, descriptive epidemiological and inferential analysis utilising these linked data sets, hot spot mapping for TB cases and TB mortality along with reviewing government policy and procedure documentation.

RESULTS

Preliminary results have revealed poor data quality, for example, lack of completeness of the data sources. Furthermore, the envisaged findings are that there is a lack of concordance of TB data sets. In South Africa, there are TB hot spots and antiretroviral therapy has had an impact on TB mortality.

CONCLUSION

We envisage the results will inform the development of TB policy guidelines as well as improve the TB surveillance system in South Africa.

The role of antigen presenting cells and T cells in mice infected with CNS-TB

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BACKGROUND

Tuberculosis (TB) is primarily a pulmonary infection caused by *Mycobacterium tuberculosis (Mtb)*. TB remains a global health challenge with a quarter of the global population infected. Central nervous system tuberculosis (CNS-TB) is a severe form of TB that accounts for 1% of all TB cases. CNS-TB mainly affects children and immunocompromised adults and is associated with high morbidity and mortality. While TB modifies immune responses in the CNS, mechanisms and specific cell types targeted for invasion are mostly unknown. For this study, we investigated the role of antigen presenting cells and T cells during CNS-TB.

METHODS

C57BL/6 mice were intracerebrally infected with BCG, H37Rv *Mtb* and saline then euthanized at different time intervals and organs collected. Single-cell suspensions were generated from brains and cervical lymph nodes (CLNs) for flow cytometric analysis.

RESULTS

Histology detected acid-fast bacteria and inflammatory responses in the brain ventricles and meninges. Bacterial burdens in the brain peaked at day 14, then significantly decreased at day 28 and dissemination to spleens and lungs occurred. Infiltrating macrophages and microglia which provide innate defence against infection sustained activated profiles in *Mtb*- and BCG-infected mice. Conventional dendritic cells (DCs) were preferentially recruited to the brain and drained into CLNs during CNS-TB, these DCs expressed CD86 and produced high amounts of IL-1beta (which protects against TB) with medium IFNgamma and IL-12. Higher amounts of activated CD4+ T cells infiltrated the brain than CD8+ T cells, a similar trend observed in CLNs. Tbet was upregulated and moderate FoxP3 levels observed at day 14. CD4 T cells produced high levels of TGFbeta and medium IFNgamma.

CONCLUSION

CNS-TB was regulated to limit potential pathology damage and DCs contributed to inducing regulated Th1 immunity. DCs played significant roles in innate and adaptive immunity during CNS-TB and can be targeted for strategic therapeutic intervention.

Predicting patient outcomes in the South African pharmacovigilance study using joint modelling

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BACKGROUND

Adverse reactions to antiretroviral drugs (ARV) and loss to follow-up in ARV monitoring remain a significant public health concern worldwide. A variety of methods have been used to analyse data from longitudinal studies, but obtaining efficient predictions of future patient outcomes given past information is still difficult. Joint models and their estimation are now routinely understood and implemented, but the prediction is less understood, and its use in ARV studies is rare. The study will help in planning treatment requirements, patients at risk will be identified on time, their treatment will be modified on time, and the best choice of treatment will be devised. Developing and validating an algorithm to be used by doctors will be of direct relevance to public health, the World Health Organization and the Department of Health.

METHODS

We used longitudinal data from a cohort study of HIV-infected patients, age ≥15 years, who were on ARV from 2006 to 2018 within a structured ARV Pharmacovigilance Centre based at the Sefako Makgatho Health Sciences University. Joint modelling will be extended to four outcomes at a time. These are two longitudinal outcomes measured at each clinic visit, i.e. CD4 cell counts, which is continuous and 'adverse drug reactions,' which is binary; and two time-to-event outcomes being the time to 'loss-to-follow-up' defined as missing one visit, and the time to ARV switch. The explanatory variables will include age, sex, number of previous drug switches and previously missed visit. STATA version 14 and other statistical programs will be used for data analysis.

RESULTS

None.

CONCLUSION

Designing and implementing prognosis tools that allow for a large set of measured characteristics to predict a patient's medical condition can help doctors devise optimal treatment plans according to the specific characteristics of the subject.

Can biomarkers in scalp hair identify patients at risk of a heart attack?

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BACKGROUND

Acute myocardial infarction (MI) accounts for 15 million deaths/year worldwide. Despite reported associations between psychosocial stress and MI, there is a paucity of data confirming that stress predates, and potentially contributes to MI. Biomarkers for stress (cortisol, dehydroepiandrosterone, matrix metalloprotein-9), alcohol use (ethyl glucuronide) and those associated with an increased risk of MI (high-density lipoprotein cholesterol, triglycerides, glucose) can potentially be measured in hair. With 1 cm hair length equivalent to one-month growth, segments of hair can be used to extrapolate levels of biomarkers that predate stress. This procedure can help identify at-risk patients and potentially offer an opportunity to prevent MI.

METHODS

This programme is designed to compare levels of biomarkers in at least 9 cm scalp hair between acute MI patients and age-matched healthy controls. We will collect hair 3-5 days after an MI versus controls, comparing 1) psychosocial stress, and correlate levels with validated stress questionnaires; 2) alcohol intake also correlated with a validated questionnaire; and 3) Increased risk of MI, and correlate hair and blood lipids, hair glycation and HbA1c in 3-cm hair segment biomarker. These biomarker levels from 3-cm hair segments would predate MI by three months. This pilot study will comprise 80 MI patients and 240 age-matched healthy controls. Cases are patients admitted at Groote Schuur Hospital and neighbouring cardiology wards, and controls are people visiting hospitals with no history of ischaemic heart disease. Biomarker levels will be measured using emerging mass spectrometric techniques (GC-MS/MS, LC-MS/MS) as well as thin layer chromatography coupled to flame ionization detector, enzyme-linked immunosorbent assay, and Fourier-transform infrared spectroscopy. Data would be analysed using STATA15 and SIMCA software.

RESULTS & CONCLUSION

Not applicable.

The economic burden of depression co-morbidity with chronic disease and its association with utilisation, adherence and quality of life: A baseline analysis

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BACKGROUND

This study is a baseline analysis of the economic burden of depression and chronic disease co-morbidity in underserved patients. The associations between increased depression and economic burden, utilisation of services, medication adherence, and health-related quality of life (HRQoL) will be examined.

METHODS

We conducted facility-based interviews with patients enrolled in the randomised control trial, Project MIND. Twelve-hundred chronic patients (600 with HIV and 600 with diabetes) at risk of depression and alcohol use disorders were recruited across 24 primary healthcare facilities in the Western Cape Province. In the behavioural questionnaire, patients reported on their socio-demographic and economic characteristics, health status, utilisation of services, medication adherence and HRQoL. Depression was measured using the Centre for Epidemiological Studies Depression scale. An asset-based measure for socio-economic status will be developed using Multiple Correspondence Analysis of household and individual variables. Economic risk of health-induced social drift will be described by the burden of direct costs of illness (out-of-pocket payments (OOP)) and the productivity losses associated with illness. To further assess economic risk, the indicator of catastrophic healthcare expenditure will compare OOP health expenditures to total household expenditures against a common threshold. Associations between the depression variable, economic outcomes, healthcare utilisation, medication adherence and HRQoL (EQ-5D scores), will be investigated using logistic regression analysis.

RESULTS

Results will highlight the economic burden of depression co-morbidity by chronic disease type, and the association between increased intensity of mental illness and economic status, service utilisation, medication adherence and HRQoL.

CONCLUSION

This empirical evidence on the economic burden carried by co-morbid mentally ill patients may inform policy around the structure of financial protection for this underserved group. Thus, contributing to the NHI policy dialogue by highlighting particular policy levers that may have a significant impact on the economic well-being and quality of life of mental health patients.

Synthesis and characterization of N-Acetylcysteine-loaded PLGA nanofibers as a neuro-scaffold

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BACKGROUND

Traumatic brain injury often results in irreversible damage to the patient. To date, there are no therapies that have translated to clinical practice for traumatic brain injury (TBI). N-Acetylcysteine (NAC) has potential as an antioxidant and neuroprotective pharmacological candidate. However, the drug suffers low bioavailability. Nanofibers have the potential as scaffolding and drug delivery systems for soft tissue application. This research seeks to fabricate and characterise NAC-loaded PLGA nanofibers for the potential as a stable drug-eluting scaffolding system.

METHODS

The nanofibers were prepared using the via blend electrospinning technique. The fibres were characterised by scanning electron microscopy, XRD, DSC, TGA, FTIR, water contact angle measurement and tensile testing. The drug entrapment, loading, and release were characterised with the aid of UV/Vis spectroscopy.

RESULTS

Interconnected porous nanostructures with nanofiber diameters ranged from 90-370 nm. The Tg of the NAC/PLGA nanofibers was above the physiological temperature of 37°C. DSC and XRD suggest that the drug is in a disordered crystalline phase of dispersion throughout the PLGA polymer matrix. Drug entrapment efficacy was obtained at 84%, and drug loading was obtained at 28%. A biphasic drug release profile with an initial 13.9% cumulative percentage release was achieved within the first eight hours.

CONCLUSION

This work focused on the approach that can be used in fabricating nanofibers capable of delivering antioxidant drug NAC to the brain. Morphology, physicochemical and physicomechanical characterisation of the nanofibers attest to their stability and ability to mimic nanoscale extracellular matrix feature. The biphasic release profile of the drug was observed as a result of the efficient encapsulation of the drug. Thus, the drug will be present for a prolonged period to induce effect even at a later stage where conventional treatments are limited to induce a therapeutic effect.

Pulmonary rehabilitation for people with Tuberculosis in a high HIV-positive setting: A pilot randomised control trial

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BACKGROUND

Even though pulmonary impairment is evident post-TB cure, uptake of these findings into clinical practice has been slow. Pulmonary rehabilitation or any other additional care to address poor lung function or impaired functional ability arising from decreased lung function post TB is meagre in the South African context. We will assess the effectiveness of a pulmonary rehabilitation programme on outcomes related to lung function, functional capacity, and quality of life for people receiving TB therapy.

METHODS

A pilot, randomised, single-blinded, pre-test-post-test design was used. The trial is designed to assess the superiority of the experimental intervention over the standard of care in a pilot randomised controlled trial. The intervention group participated in two-weekly pulmonary rehabilitation sessions, which were exercised-based for 12 weeks. Data regarding lung function (FEV1, FVC and FEV1/FVC), functional capacity (three-minute step test) and quality of life questionnaires (EQ-5D and SGRQ) were collected at enrolment, halfway through the intervention and on completion of the 12 weeks for the intervention and control arm.

RESULTS

Fifty-eight participants enrolled in the study, 29 in the intervention group (IG) and 29 in the control group (CG). Preliminary results showed similar clinical and socio-demographic characteristics for each group. Participants were predominantly male, HIV positive and unemployed. Males were older than their female counterparts in the IG and CG (median age: males 39 years (IG) vs 34 years (CG); females 36 years (IG) vs 31 years (CG). In the IG and CG participants had at least one prior TB episode to current treatment, with only one participant reporting three previous TB episodes in the IG. The analysis is ongoing.

CONCLUSION

Not able to draw conclusions yet.

Exploring the perspectives of health service providers on applying mental health policy and interventions for school-children in the Western Cape, South Africa

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BACKGROUND

Mental health is recognised as a critical public health issue globally, yet child and adolescent mental health receive low priority in low- and middle-income countries, including South Africa. Mental health disorders are ranked high in their contribution to the burden of disease in South Africa, but services to children and adolescents with mental health needs are inadequate. The needs of older children and adolescents in particular are largely unmet, despite a growing concern about mental health issues in this group. Schools, where children and adolescents spend a large part of their lives, are potential sites through which child and adolescent mental health (CAMH) can be promoted. Despite the presence of a national CAMH policy and specific mental health service provisioning in the Integrated School Health policy, this aspect remains neglected.

METHODS

In this study, we explore the perspectives of key service providers on CAMH in schools in the Western Cape Province of South Africa, as part of a larger PhD study which examines CAMH policy and provisioning in all nine provinces. We will employ an exploratory qualitative approach and will conduct a secondary analysis on interviews conducted with a sample of health service providers on their perspectives about mental health provisioning for school-going children and adolescents. Additionally, a review of relevant policy documents will be conducted. A thematic analysis approach will be used to identify key themes from the documents and interviews. These will be coded manually, analysed and interpreted to identify the issues of interest. Ethics approval will be sought from the University of Cape Town Human Research and Ethics Committee.

RESULTS

Study in progress, no results yet.

CONCLUSION

The results of this study are aimed at strengthening CAMH in South Africa.

The role of *Mycobacterium tuberculosis* L,D-transpeptidase in TB pathogenesis

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BACKGROUND

There is an urgent need for new diagnosis, treatment and prevention strategies, for tuberculosis (TB) to effectively reduce the global disease burden. Understanding the pathogenesis of TB is crucial to identify biomarkers and targets for the development of novel diagnostic tests and therapeutic strategies. L,D-transpeptidase (Ldt) encoded by Rv0309, is proposed to be an adhesin because of its ability to bind with laminin and fibronectin receptors of epithelial cells. A previous study has shown that the deletion of Rv0309 resulted in reduced growth kinetics, changes in cellular morphology and a reduction in the ability to form biofilms. In the proposed study, we aim to assess the role of *M. tuberculosis* Ldt *in-vitro* in adhesion, invasion and bacterial replication as well as on the regulation of other adhesin genes.

METHODS

The *M. tuberculosis* Rv0309 gene knockout mutant complemented and wild type V9124 strains have been confirmed by respective PCRs such as Hyg PCR, LL-uptag PCR, Kan PCR, Rv0309 complementation PCR and whole gene PCR. Differential gene expression among the strains and the effect of gene deletion on the regulation of other adhesin genes will be assessed by qRT-PCR. Adhesion and invasion will be investigated in A549 epithelial cell and THP-1 macrophage infection models. Host cell toxicity/viability, apoptosis and necrosis will be evaluated using commercial kits.

RESULTS

The respective PCRs successfully confirmed the *M. tuberculosis* Rv0309 gene knockout mutant and complemented strains, while the Hyg and LL-uptag PCRs confirmed the ΔRv0309 mutant. Kan, Rv0309 complementation and whole-gene PCR confirmed successful complementation.

CONCLUSION

The significance of this study is that if Ldt is shown to play an essential role in the TB pathogenesis, it may be a suitable biomarker that can be targeted for the design of new therapeutic agents, including immunotherapeutics.

Understanding violence within protest: A case-study of the Rhodes Must Fall movement at the University of Cape Town (2015–2016)

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BACKGROUND

South Africa is regarded as one of the most violent countries in the world, although little has been understood regarding how violence manifests and of what it may be an expression. A question potentially arising is: what are the actions, processes and practices that manifest violence in the South African context? Protest often described as violence, is an increasing socio-historical phenomenon in this country. Protest actions are witnessed as marches, demonstrations and pickets, and recognized as communicating socio-economic and political grievances. 'Violence', mentioned within protest, often refers to direct actions taken in the form of blockades, destruction of property, arson and confrontations with law-enforcement officers. This focus on destructive, direct action taken by protestors ignores and potentially occludes relevant processes and practices that may inform or accompany this action. Little research has been done to understand violence in the context of protest, including how and why these two phenomena occur in and of each other, particularly in the Post-Apartheid context. The case of the Rhodes Must Fall (RMF) protests at the University of Cape Town, provides an opportunity to describe and analyse violence as witnessed within protest, allowing tangible and invisible forms of violence to be exposed and investigated.

METHODS

The manifestation and expression of violence during the RMF (UCT) 2015–2016 will be described and explained. This study will be conducted using a qualitative research design, informed by either a critical or decolonial perspective methodology. I will adopt a case study methodology, incorporating narrative inquiry methods. Data sources include; narrative interviews, physical artefacts, documents, observation, and relevant archives. Case study and narrative analysis techniques will be used to analyse the findings.

RESULTS & CONCLUSION

N/A.

Using maternity case records to obtain birth data for estimation purposes: Documenting methodological challenges

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BACKGROUND

Information on births, routinely collected using hospital birth records have the potential to provide a rich source of data and an alternative source to complement existing sources. Limitation of such information is that it is recorded for promoting patient care and not research and remains mostly manual. We describe the experience of manually abstracting birth data from hospital records in a study on the feasibility of using these records to estimate the number of births between 2014 and 2016 in Mpumalanga and Gauteng.

METHODS

A data abstraction form (DAF) and manual were designed. The format of the DAF was based on the maternal case record (MCR). After a pilot study, twentyeight abstractors were trained to abstract data from MCRs. A total of four hospitals and six Community Health Centres (CHC) were visited in Mpumalanga and Gauteng. Quality assurance was conducted at the end of each day by the lead researcher and feedback given to abstractors for corrections.

RESULTS

Observed deficiencies emanating from MCRs included ineligible handwriting, inconsistent use of acronyms and unusual abbreviations for medical terminology. Compared to hospitals, MCRs at CHC were mostly incomplete. Data sources other than MCRs seemed more exhaustive but excluded essential information needed for birth estimation. Preliminary results show varying levels of completeness of recorded data in hospital birth records. Maternal age, reported on two different pages was inconsistent in 79% of cases notwithstanding being captured in the same facility and was missing for 19% of cases. Mother's ID number was missing in 56% cases, and invalid for15% of cases. Address could not be established in 16% of cases, and sex of the new-born was missing in 21% cases.

CONCLUSION

The completion of MCRs at two to three different facilities impact the quality of data. Storage management systems vary across facilities.

Overweight and obesity trends in South African women of childbearing age: 1998 to 2017

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BACKGROUND

Globally, the prevalence of overweight and obesity in adults is increasing, contributing substantially to deaths and disability from non-communicable diseases (NCDs). In South Africa (SA), also, overweight and obesity remain a significant public health challenge. Most of the research on overweight and obesity among women largely generalise without focusing, specifically among those in their childbearing years who are at risk of obesity-related maternal and child health problems. In this study, we assessed the pattern and trends in the prevalence of overweight and obesity from 1998 to 2017 in non-pregnant women, aged 15 to 49 years (WCBA), in SA.

METHODS

The 1998 and 2016 SA Demographic and Health Surveys, and 2008, 2010/2011, 2012, 2014/2015 and 2017 waves of the National Income Dynamics Survey, which collected anthropometric and sociodemographic information were used in this study. Data were analysed using descriptive statistics and trend analyses.

RESULTS

Between 1998 and 2017, the prevalence of overweight among WCBA increased from 51.3% to 60.0% and obesity from 24.7% to 35.2%. The urban-rural disparity in overweight and obesity decreased steadily over time. There was an increasing trend over time in the prevalence of overweight and/or obesity observed in those older, having at least secondary education, and from lower socioeconomic groups. A significant increasing trend over time in the prevalence of overweight and obesity was also observed in black African women, although among other population groups, there is no statistically significant change seen.

CONCLUSION

Increasing overweight and obesity trends in SA WCBA require urgent public health attention. Apart from direct interventions, routine surveillance among the vulnerable population groups identified in this research is critical. Also, the effective implementation of the Strategic Plan for the Prevention and Control of NCDs is essential. Further research is needed to investigate the contextual determinants of overweight and obesity in the sub-populations.

Cancer mortality in South Africa (1997 – 2016): Adopting temporal, spatial and health economic modelling approaches

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BACKGROUND

Cancer occupies a place close to the top in most countries in the hierarchy of causes of death. In South Africa, an increasing life expectancy results in a rise of chronic diseases such as cancer. The cancer mortality trends, distribution and cost-effectiveness for cancer treatment methods have never been well-investigated in a South African population at ward level. This research plans to provide the geographical distribution of cancer mortality to understand cancer mortality associated risk factors better as well as cost effectiveness for cancer interventions in South Africa. The costs for cancer treatments have increased exponentially in South Africa, and medical aid limits are increasingly unable to pay for older-generation therapies and more targeted interventions. Through this study, we will help the stakeholders to allocate the funding to cancer treatments using the available budget more efficient.

METHODS

The study design will be a multiple cross-sectional, nested case-control study and cost-effectiveness analysis. For trend analyses, scatter plots of age-standardised rates against the year of death will be plotted. To assess linear trends in the age-standardised mortality rates, we will fit the regression models. For time series analyses, AutoRegressive Moving-Average models will be used to determine the trend parameter estimates and also for prediction. We will use Moran's I spatial autocorrelation coefficient to identify significant cancer mortality geographic areas. The preliminary univariate regressions and multivariable Bayesian spatial modelling will be used to develop the relative risk model. The Markov models will be used to assess the cost-effectiveness of cancer treatment methods.

RESULTS

NA.

CONCLUSION

The classification, targeting and quantification of factors contributing to ward-level cancer mortality, will make a positive contribution to more focused public health interventions in South Africa. Many other developing countries that share similarities with South Africa will also benefit.

Epigenetic alterations associated with childhood trauma and adult mental health outcomes: A systematic review

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BACKGROUND

Multiple, chronic and repeated trauma exposure in childhood is associated with adverse mental health outcomes in adulthood. In this paper, we synthesise the literature on epigenetic modifications in childhood trauma (CT) and the mediating effects of differential epigenetic mechanisms on the association between CT and the later onset of psychiatric disorders.

METHODS

We reviewed the literature until March 2018 in four databases, PubMed, Web of Science, EBSCOhost and SCOPUS. Non-human studies were excluded. All studies investigating CT exposure in healthy adults (18 years and older) and adults with psychiatric disorders were included.

RESULTS

Thirty-six publications were included. For mood disorders, methylation of the glucocorticoid receptor NR3C1 gene, specifically at the NGFI-A binding site in exon 1F, and correlation with CT was a robust finding. In several studies, differential methylation of SLC6A4, BDNF, OXTR and FKBP5 in association with CT was documented. Common pathways identified included neuronal functioning and maintenance, immune and inflammatory processes, chromatin and histone modification, and transcription factor binding.

CONCLUSION

A variety of epigenetic mediators that lie on a common pathway between CT and psychiatric disorders have been identified, although longitudinal studies and consistency in methodological approach are needed to disentangle cause and effect associations.

Good treatment outcomes in children with extensively drug-resistant tuberculosis: a systematic review and individual patient meta-analysis

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BACKGROUND

Extensively drug-resistant (XDR) tuberculosis (TB), caused by *Mycobacterium tuberculosis* resistant to rifampicin, isoniazid, a fluoroquinolone and second-line injectable drug, is associated with extremely poor treatment outcomes in adults. Although >1000 paediatric XDR-TB cases are estimated annually worldwide, there are limited data on paediatric XDR-TB treatment.

METHODS

As part of a global systematic review and individual patient data meta-analysis of children with multidrug-resistant TB, commissioned by the World Health Organization, we reviewed the presentation, treatment and outcome of children aged < 15 years with XDR-TB. Published and unpublished data were included from prospective and retrospective cohorts between 1999 and 2013.

RESULTS

We identified 37 children with a median age of 11 years (interquartile range [IQR]: 6-13.1). All cases were bacteriologically confirmed. Thirty-two (87%) children had pulmonary TB and 20/31 (65%) had severe TB on chest radiograph. Among the 29 with known HIV status, seven (24%) were HIV-infected. The median treatment duration for children who completed treatment was 7.0 months (IQR: 6.0-8.2) for the intensive, and 12.2 months (IQR: 10.0-16.2) for the continuation phase. The most commonly used drugs were a second-line injectable, fluoroquinolone, cycloserine/terizidone, ethionamide/prothionamide and para-amino salicylic acid. No children received bedaquiline or delamanid, as the study preceded their availability. Thirty (81%) children had favourable treatment outcomes. Four (11%) children died, one (3%) failed treatment and 2 (5%) were lost to follow-up during treatment.

CONCLUSIONS

We describe the first globally aggregated cohort of children with XDR-TB, recognising this is a selected group of confirmed XDR-TB with limited data on some parameters. We demonstrate a high proportion of favourable treatment outcomes prior to the use of novel TB drugs, with mortality markedly lower than in adults. Regimens and the duration of treatment varied considerably. Improved reporting of XDR-TB along with an evaluation of shorter, effective and safe new regimens in children is required.

The lived experience of South African adolescents living in a low resource environment who have attempted suicide

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BACKGROUND

Despite the public health concern posed by suicide, we do not understand the reasons South African adolescents give for their suicide attempts and the meanings they attribute to their behaviour. Although the association between risk factors and suicidal behaviour has been explored in quantitative research, there is a need for context-sensitive qualitative studies to examine the situated meaning of suicidal behaviour and the socio-cultural context in which it occurs. In this study, we aim to describe the lived experiences and expressed support needs of adolescents, who have attempted suicide living in low resource communities.

METHODS

In-depth semi-structured interviews were conducted with ten adolescents who had attempted suicide and were residing in either Mitchell's Plain or Khayelitsha. All interviews were transcribed and analysed in Atlas.ti using Interpretative Phenomenological Analysis. The adolescents also took photographs illustrating their experience, and these were analysed alongside the transcribed interviews.

RESULTS

The adolescents framed their suicide attempts as occurring within relational contexts. The themes of "the fragmented family" and "belonging versus isolation: the importance of peers" encompassed experiences of invalidation and isolation, which the adolescents described as linked to their suicide attempts. Adolescents also described how their suicidal behaviour occurred within the context of "a dangerous world", highlighting threats to their physical and psychological wellbeing, through abuse, rape or bullying. The difficulties of inpatient hospitalisation were described by "the struggle for autonomy". Suicide was regarded as an "escape and solution to problems".

CONCLUSION

Suicide attempts cannot be reduced to a purely psychiatric problem. Prevention needs to involve many domains and cannot be the sole responsibility of the health care system. Safer environments and improved relationships with parents and peers, leading to a sense of belonging and validation, seem vital to reducing the prevalence of adolescent suicide.

Mouse and human macrophages upregulate MX1 and MX2 genes upon infection with mycobacteria

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BACKGROUND

The disease-causing agent, Mycobacterium tuberculosis, survives inside human macrophages. However, non-pathogenic mycobacteria do not survive inside healthy host cells. Comparing the host response between infection with pathogenic and non-pathogenic mycobacteria might reveal important determinants (molecules) that are involved in Mycobacterium's intracellular survival strategy. Previously, we observed through RNA-Seq data that mouse macrophages express RNA molecules at different levels when comparing infection between pathogenic (Mycobacterium tuberculosis H37Rv and clinical isolate R179) and non-pathogenic mycobacteria (Mycobacterium smegmatis and bovis BCG).

METHODS

Human macrophages (THP-1 cells) will be infected with the same strains as used for the RNA-Seq analysis. Small interfering RNA (siRNA) molecules which interfere with gene expression will then be added to the macrophages. Lastly, gene expression of MX1 (MX Dynamin Like GTPase 1) and MX2 through qPCR and intracellular survival through colony forming units will be performed.

RESULTS

The RNA-Seq data show that for the gene expression of Mx1 and Mx2, excessive fold changes occurred upon infection with mycobacteria and the qPCR results confirm this for mouse macrophages. Preliminary data show a decreased expression of MX genes after their knockdown. MX1 and MX2 play roles in cytokine signalling and antiviral responses. Higher expression levels are observed in the pathogenic compared to the non-pathogenic strains. Interfering with the role of these genes by changing their expression levels could probably influence the intracellular survival of mycobacteria.

CONCLUSION

Among the many molecules that mycobacteria manipulate for its intracellular survival, MX1 and MX2 could be among the list. Knowing how the interference of their expression levels influences the intracellular health of mycobacteria could potentially pave the way to a new therapy for tuberculosis.

Effect of an educational intervention on knowledge and perceived quality of life among diabetes patients of Centres for Diabetes and Endocrinology in North-West Province and Gauteng Province

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BACKGROUND

Diabetes mellitus is the second most prevalent underlying cause of death in South Africa. Holistic patient education, including the bio-psycho-social dimensions of health, is essential for diabetes management and self-care. A needs analysis indicated gaps in patient education at a Centre for Diabetes and Endocrinology (CDE) in North-West Province (NWP). In response, an educational intervention was developed as part of a quality improvement project. The study was executed at two CDEs [NWP and Gauteng Province (GP)].

METHODS

We determined the effect of an educational intervention on knowledge and perceived quality of life (QoL) among diabetes patients. This interventional, pre-post-retention design included quantitative and qualitative data. Sixty-five voluntary diabetes patients provided written informed consent and were divided into intervention groups (NWP: n=9; GP: n=15) and control groups (NWP: n=9; GP: n=32). Intervention groups were exposed to the educational intervention (one-day participatory workshop, focussing on bio-psycho-social dimensions of health towards diabetes management). A knowledge questionnaire and reflection were administered pre- and post-intervention, and a QoL questionnaire at pre-intervention. All measurements were repeated after six months (GP outstanding). Inferential statistics and thematic analysis were used to analyse data.

RESULTS

Data from CDE, NWP showed a mean knowledge increase of 31.9% post-intervention. Most individual questions yielded medium-to-large effect sizes (practical significance). Statistically significant improvements were evident in the following categories: exercise ($p=0.0380$), acute complications ($p=0.014$), cardiovascular disease risks ($p=0.010$), testing ($p=0.041$), medication ($p=0.014$). Pre-post data from CDE, GP is currently being analysed. Perceived QoL improved post-intervention. Participants indicated that the intervention assisted them to better manage their diabetes.

CONCLUSION

Although practical significance was established by medium-to-large effect sizes, the sample for CDE, NWP was small, hence findings cannot be extrapolated. We anticipate similar effects at CDE, GP. Future implementation of the workshop might contribute to improved management and self-care for patients at CDEs.

Cannabis use and hippocampal subfield volumes in males with first episode schizophrenia and healthy controls

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BACKGROUND

Schizophrenia and cannabis use are both associated with structural brain changes. The hippocampus is a region of particular interest because of its role in memory and select cognitive functions, impairment of which is a core feature of schizophrenia and has also been observed in substance abuse. In this study, we aimed to explore the effects of cannabis use on hippocampal subfield volumes in male first-episode schizophrenia spectrum disorder patients and matched controls.

METHODS

This cross-sectional, case-control study included 63 patients and 58 controls scanned on 3T MRI scanners, with hippocampal segmentation performed using recently validated Freesurfer v6.0 software. Urine toxicology screening was done on the day of the MRI scan.

RESULTS

We used multivariate analysis of covariance (MANCOVA) with age and scan sequence as covariates, with subsequent analysis of variance (ANOVA) to test the effects of diagnosis and cannabis use status on individual hippocampal subfields. We found a diagnosis by cannabis use interaction effect in the subiculum (F=7,832; p=0,006), with smaller volumes observed in the cannabis non-using patients than the cannabis using patients, and smaller volumes in the cannabis using controls than the cannabis non-using controls.

CONCLUSION

The larger subiculum volume in cannabis-using patients compared to cannabis non-using patients was unexpected and raises important questions regarding the pathophysiology of schizophrenia and the role of cannabis use therein.

Investigating the anti-cancer properties of Dodonaea viscosa, a medicinal plant used by Cape Bush doctors

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BACKGROUND

Cancer is a global disease, and in South Africa, the high HIV prevalence is a compounding factor with a sharp increase in HIV-associated cancers, including Burkitt lymphoma (BL), observed within certain communities. Increasingly, cancer patients are resorting to using traditional medicines (TM) for various reasons, including the harmful side effects associated with chemotherapy. While conventional treatments are thoroughly researched and tested before approval for clinical use, alternative treatments are not. Although labelled "natural", TM may not necessarily be beneficial to patients and may interfere with conventional treatment if used concurrently.

METHODS

In this research project, we evaluated the anti-cancer properties of Dodonaea viscosa (DV), a TM widely prescribed by Cape Bush doctors in the Western Cape. We investigated the DV extract's ability to induce apoptosis (Annexin V, Caspase3/7 assay and Western Blotting), inhibit cellular proliferation (BrDU incorporation assay) and viability (WST-1 assay) in BL cells.

RESULTS

Using WST-1 cell viability assays, we show that the DV aqueous extract was able to potently and preferentially inhibit the growth of BL cells compared to normal cells. This finding was supported by BrDU incorporation assay showing significantly reduced proliferation of extract-treated cancer cells compared to non-cancerous cells. Using a caspase3/7 activity assay, we show that DV extract led to apoptosis, which was corroborated using western blotting and Annexin V assays. Additionally, treated cancer cells displayed several morphological characteristics typical of those undergoing apoptosis, as shown by microscopy, while normal cells were left mostly unaffected.

CONCLUSION

From the results, it is clear that DV extract preferentially kills cancer cells, while having minimal effects on normal cells, by inducing apoptosis through the caspase pathways. Our future work will focus on elucidating which upstream stress and apoptotic pathway(s) are activated by the extract as well as confirming anti-cancer effects in vivo using an immunocompromised mouse model.

Adaptation to living with HIV as a chronic illness and patient self-management: A scoping review

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BACKGROUND

A substantial body of literature exists that describes the experience of adapting to living with a chronic illness and the impact this has on patient outcomes and overall self-management. Very few studies, however, focus on HIV as a chronic illness nor assess the impact on HIV outcomes. Even fewer studies explore these phenomena in low- or middle-income countries contexts with a high burden of HIV. A scoping review will be conducted with the following research questions, (1) what empirical work exists of adaptation to living with HIV as a chronic illness, (2) what constructs, models or frameworks have been employed to describe and explain the experience, (3) what tools exist to measure these constructs, and (4) what HIV-related patient outcomes or self-management aspects have been considered?

METHODS

We will conduct a comprehensive literature search using databases such as PubMed, CINAHL Plus, and EMBASE: Excerpta Medica, SocINDEX or ProQuest and a structured grey literature search. To assure quality, two team members will screen articles and extract the data.

RESULTS

We will present the results according to the preferred reporting items for systematic reviews and meta-Analyses (PRISMA) or the Preferred Reporting Items for Systematic reviews and MetaAnalyses extension for Scoping Reviews (PRISMA-ScR) Checklist format and also displayed according to the research question they address.

CONCLUSION

The review will serve to clarify working definitions and conceptual boundaries of the *HIV illness identity* concept. This is initial phase in conducting research is aimed at exploring the relationship between HIV illness identity and antiretroviral therapy adherence, while also assessing the potential mediating role of household HIV competence in an HIV-positive, treatment-naive adult population. Results will be disseminated via presentations at conferences and publications.

The role of extracellular matrix on oesophageal squamous cell carcinoma drug response

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BACKGROUND

The tumour microenvironment plays a crucial role in determining the initiation, progression and the response of cancer cells to chemotherapeutic drugs. The extracellular matrix (ECM) provides both mechanical and biochemical support for cellular adhesion and migration and acts as a conduit for extracellular cues via its interaction with cell surface receptors. The upregulation of many ECM proteins is associated with cancer and the development of chemoresistance. We aim to evaluate the effect of ECM components on the response of oesophageal cancer cells to anticancer drugs.

METHODS

3D cell-derived ECMs and oesophageal cancer cell lines were used as a model to investigate the effect of ECMs on the response of oesophageal cancer cell lines to chemotherapeutic agents. Immunohistochemical and qRT-PCR evaluation of ECM proteins and integrin gene expression was done on OSCC biopsies. Oesophageal cancer cell lines were cultured on decellularised ECMs and treated with chemotherapeutic drugs or 0.1% DMSO (control) for 24 hours. Cell proliferation, cell cycle progression, colony formation, apoptosis and migration assays were used as our study endpoints.

RESULTS

The expression of ECM proteins significantly increased in OSCC samples compared to the corresponding normal tissue. Decellularised ECMs abrogated the effect of drugs on cancer cell cycling, proliferation and reduced drug-induced apoptosis by 20–60% of those plated on plastic. The mitogen-activated protein kinase-extracellular signal-regulated kinase and PI3K/Akt signalling pathways were upregulated in the presence of the ECMs. Our data show that the addition of chemotherapeutic drugs to cells plated on collagen- and fibronectin-deficient ECMs synergistically increased cancer cell sensitivity to drugs by 30–50%, and reduced colony formation and cancer cell migration.

CONCLUSION

We show that ECM proteins play a key role in the response of cancer cells to chemotherapeutic agents and suggest that targeting of ECM proteins may be an effective therapeutic intervention against chemoresistant tumours.

Understanding and defining blood biomarkers of subclinical tuberculosis and their relationship to inflammation at the site of disease

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BACKGROUND

Tuberculosis (TB) remains one of the leading causes of death globally, and with the steep rise in drug resistance (DR), is becoming increasingly difficult to manage. Contacts of DR-TB are at high risk of infection thus, the WHO recommends that this cohort be screened and treated to minimise the chance of developing active TB disease. Currently no methods are available for diagnosing subclinical TB, where risk of progression to active disease is high, but before people become contagious. Hence, there is a need for quick and accurate subclinical TB diagnostic methods, of which whole-blood biosignatures is one promising candidate. Determination of a subclinical TB biosignature can potentially be achieved by a combination of methods, such as position emission tomography-computed tomography (PET/CT), to detect sites of potential lung infection and the characterisation of cellular and molecular components of whole-blood and bronchoalveolar lavage (BAL).

OBJECTIVES

To identify blood biomarkers associated with the presence of subclinical *Mycobacterium tuberculosis (Mtb)* infection as defined by PET/CT and to determine whether BAL cells from lung lobes contralateral to the site of subclinical infection have distinct profiles which may reflect a signature of recent infection in the lung.

METHODS

Samples from participants with PET/CT scans consistent with subclinical TB and no TB as well as active TB controls will undergo whole-blood and BAL cellular mRNA transcriptome analysis. Serum and BAL fluid will be characterised by Luminex for a panel of inflammatory cytokines, chemokines, and growth factors. Circulating and BAL cell populations will be immunophenotyped. Systems biology approaches in whole-blood and BALF at baseline and 6-12 months will be used to identify a biosignature of subclinical TB in whole blood.

CONCLUSION

The primary outcome is expected to be a validated biosignature for recent infection or re-infection, that will be developed into a multiplex assay that could be used as an experimental endpoint and screening tool in experimental medicine studies.

Homocysteine, genetic variants and dietary predictors' cross-sectional associations with cardiovascular measures in a group of black South Africans

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BACKGROUND

Homocysteine (Hcy) is a risk factor for cardiovascular disease (CVD), however, mechanisms remain to be established. To this end, we associated Hcy and genetic determinants thereof with cardiovascular markers. Because Hcy has strong genetic and dietary determinants that interact, we also investigated whether gene-diet interactions modulate cardiovascular markers.

METHODS

We quantified cardiovascular markers, diet intake and Hcy (continuous and categorised) and genotyped five polymorphisms (n=1867). Correlations and general linear modelling allowed determination of relationships and gene-diet interactions*.

RESULTS

Hcy correlated positively with systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP), pulse pressure (PP), carotid intima-media thickness (cIMT), carotid-dorsalis pedis (cdPWV) and carotid-radial pulse wave velocity (crPWV) (all $p<0.03$). Over Hcy categories, SBP, DBP, MAP, carotid-femoral pulse wave velocity, cdPWV and crPWV increased (all $p<0.02$). cIMT increased with each addition of the MTR2756G variant ($p=0.04$). In hyperhomocysteinaemic (HHcy) participants (n=469), DBP associated positively with carbohydrate intake, but inversely in normal Hcy (nHcy) volunteers (n=1398) ($p=0.004$). The association between PP with omega-6 and fruit and vegetable intake were more pronounced in HHcy than nHcy individuals ($p=0.02$ and $p=0.04$, respectively). crPWV correlated stronger with alcohol intake in nHcy than HHcy ($p=0.02$) participants. crPWV inversely correlated with biotin intake only in HHcy individuals ($p=0.04$). DBP associated negatively with plant protein intake in MTHFR1298A carriers ($p^*=0.02$), but a prominent positive association was observed in MTHFR1298C carriers with an increasing omega-3 intake ($p^*=0.006$). PP rose precipitously with each MTHFR677T addition, with increasing pulses, nuts and seeds intake ($p^*=0.005$). crPWV negatively associated with alcohol intake in MTHFR677TT, but positively in major allele carriers ($p^*=0.02$).

CONCLUSION

Hcy seems to influence cardiovascular markers. Given the Hcy/CVD marker associations and various Hcy/gene-diet interactions relating to cardiovascular measures, manipulation of Hcy through the diet may be beneficial in improving cardiovascular outcomes, especially in genetically susceptible individuals.

Preliminary report of late effects of childhood cancer and treatment in a South African cohort

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BACKGROUND

Improvement of childhood cancer survival is one of the most impressive success stories of modern medical science. Childhood cancer survivors face potential significant late side effects from previous cancer and of treatment received. About 75% will develop at least one late effect, including psychosocial problems, second malignancies, renal or liver impairment, endocrinopathy, cardiomyopathy, infertility, hearing loss and neurological impairment. This study is the first to document late effects in a South African childhood cancer survivor cohort.

METHODS

Childhood cancer survivors (more than five years since diagnosis), treated at the Tygerberg paediatric oncology Unit (POU) (1983–2012), underwent a structured medical history and complete physical examination after the provision of parental informed consent and child assent. Medical records were reviewed to determine details of the cancer diagnosis, co-morbidities and treatment received, including surgery, radiotherapy and chemotherapy. Any clinical or other abnormalities detected were appropriately further investigated and managed. Special investigations, required for surveillance of late effects, were done by using the Children's Oncology Group Long-term follow-up guidelines version 4 of 2013. Late effects were graded using the Common Terminology Criteria for adverse events version 4.03 (June 2010). The Stellenbosch human ethics review committee provided ethics approval.

RESULTS

The results of the first 50 childhood cancer survivors will be analysed, and the interim results presented. The aim is to recruit at least 200 childhood cancer survivors.

CONCLUSION

At this stage, conclusions cannot yet be drawn, but the expectation is that at least a third will have a late effect, necessitating medical care.

PROGRAMME ADMINISTRATOR

Ms Colleen Van Wyk

Classifying gene expression data with mixture models

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BACKGROUND

The study of gene expression remains an active area of research as the understanding of genomics can be used to identify, diagnose and develop treatments for genetic diseases. The sequencing of cellular RNA is a modern alternative to microarray with many advantages, such as measuring gene expression data with no prior knowledge of the genome sequence. Mixtures of distributions will be considered to determine differentially expressed genes.

METHODS

A mixture modelling approach is an effective statistical tool in the study of gene expression data as it considers all genes and identifies latent clusters within the data. RNA-seq generates positive discrete counts, whereas microarray is measured as continuous intensity and for this reason, different component distributions are considered within the mixture models.

RESULTS

The Gaussian mixture model, which is a linear superposition of Gaussian components, is traditionally used with microarray data. With this method, clusters are identified with notable mean effect sizes, and genes which are differentially expressed will be categorised within the effect size cluster through posterior probabilities. A different mixture model needs to be considered to model RNA-seq as it provides the number of reads mapped to a particular gene

for all samples. Differentially expressed genes can be identified by comparing reads mapped to each gene for the treatment and control group in a finite mixture of Poisson model.

CONCLUSION

Since RNA-seq data are discrete counts and differ from data produced with microarrays, mixture modelling for RNA-seq needs to include a wider family of generalised linear models (GLM) and possible non-parametric approaches.

Statistical measures for multivariate spatial autocorrelation

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BACKGROUND

Bivariate spatial autocorrelation methods have been developed and successfully applied to bivariate health outcomes that are spatially correlated. However, spatial autocorrelation statistics measure for more than two possible correlated spatial health outcomes are not developed. Thus, the aim in this paper was to develop a multivariate spatial autocorrelation extension of the Moran's Index.

METHODS

To develop a multivariate spatial autocorrelation measure for the Moran's Index, a canonical correlation approach is proposed. Three spatially correlated multivariate normal datasets were simulated using a conditional distribution from Gaussian data. The new approach to multivariate spatial autocorrelation was applied to the data for three variables of a given simulated dataset. Monte Carlo simulation of the data with different spatial weights and sample sizes was done and evaluated based on the root-mean square error and bias. The method was then applied to three disease-related mortalities, i.e. cerebrovascular heart disease (CVA), ischaemic heart disease (IHD) and hypertensive heart disease (HHD).

RESULTS

Monte Carlo simulation of the data with different spatial weights and sample sizes confirms the appropriateness of the new method and its generalisability to univariate and multivariate approaches. Spatial dependency was found between CVA and IHD, and between CVA and HHD (p-value <0.05), but none between IHD and HHD (p-value >0.05). The multivariate spatial autocorrelation extension showed that CVA is spatially dependent on IHD and HHD, while high average mortality levels caused by HHD and CVA give rise to high mortality levels from IHD.

CONCLUSION

A new multivariate spatial autocorrelation method that is easy to use and interpret has been developed to detect multivariate spatial dependency. The effectiveness of the method has been established through some simulation studies and its usefulness was illustrated using cardiovascular mortality in South Africa. The method can easily be extended to more than three variables.

Modelling risk factors of diabetes in South Africa

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BACKGROUND

Diabetes is a metabolic disorder associated with high blood sugar or glucose levels attributable to the absence or insufficient production of insulin. The number of people with diabetes globally has risen from 108 million in 1980 to 442 million in 2014. Diabetes was the 2nd leading underlying cause of death in South Africa in 2016 and the number one leading underlying cause of death among females. We aimed to assess the prevalence of diabetes and pre-diabetes and investigate the associated risk factors in the South African population.

METHODS

We utilised data from the 2016 South African Demographic and Health Survey that sampled individuals aged 15 years and older had their glycated haemoglobin level tested. The potential risk factors considered comprised a range of demographic, socio-economic and anthropometric variables. Since the response outcome was non-diabetic, pre-diabetic or diabetic, the ordinal survey logistic regression model was fitted.

RESULTS

The observed prevalence of diabetes and pre-diabetes from the sampled and tested 6442 individuals was 21.9% and 66.6%, respectively. Of these, 24.7% of females and 17.2% of males were found to be diabetic. Similarly, 64.9% of females and 69.5% of males were pre-diabetic. Of those with a body mass index classified as overweight to severely obese, 30.2% are diabetic, and 62.0% were pre-diabetic. From the model fit, the variables significantly associated with diabetic status were gender, race, age, waist circumference, haemoglobin level, blood pressure and whether medication was being taken for hypertension, frequency of consuming fast foods and having had smoked the previous 24 hours.

CONCLUSION

Diabetes is a great concern in South Africa, however, it does not receive the attention it deserves with policymakers generally unaware of its current prevalence. These preliminary analyses indicate the need for advanced modelling to contribute to identifying diabetes risk factors for public awareness, medical prognosis and preventative intervention.

MULTILEVEL MODELLING FOR CROSS-CLASSIFICATION AND MULTIPLE MEMBERSHIP DATA IN PUBLIC HEALTH

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BACKGROUND

Applications of multilevel models cover many kinds of data that have a hierarchical or clustered structure. Examples of such data include repeated measurements in longitudinal studies and traditional clustered data. Multilevel models recognise the existence of such data hierarchies by allowing for residual components at each level in the hierarchy where the residual variance is partitioned into a between-level and a within-hospital component. The specific-level residuals represent unobserved level characteristics that affect subject outcomes at that level. The unobserved variables lead to a correlation between outcomes for subjects from the hierarchical level. However, in complex hierarchical data structures, data are obtained that are cross-classified and with multiple membership structures. For example, in assessing the effect of a hospital on patient outcomes, these could also be affected by the area where the patient originates. Both hospital and patient are at level two of the hierarchy, but they are not nested within each other, which is cross-classified data structure. On the other hand, if one looks at the hospital alone, a patient could have visited a number of the hospitals for the same disease, thus the eventual outcomes could have been affected by the effect of these hospitals. Several studies in biomedical sciences collect such data. This study's overall objective is to develop methodological and estimation techniques for modelling data, with extensions non-standard hierarchical structures including cross-classification and multiple memberships in public health.

METHODS

We will analyse data using a classical multilevel model, extending it to a cross-classified model. Further complexity will be introduced in the model by presenting multiple membership models. MLwiN, a statistical software package for fitting multilevel models, will be used.

RESULTS

None.

CONCLUSION

Developing methods and fitting them to truly non-standard hierarchal data improves estimation and offers a better understanding of the data.

Latent variable models for longitudinal outcomes from a parenting intervention study

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BACKGROUND

This study introduces a longitudinal analysis of the effectiveness of a parenting intervention programme. The Sinovuyo Caring Families Programme (SCFP) aimed to measure the intervention effect of a group-based parent skills training intervention for primary caregivers of children aged 2 to 9 years. Child-carer dyads (n=296) were divided into an intervention arm and a control arm. The intervention was conducted in two residential areas, Khayelitsha and Nyanga, in the Western Cape. Within a residential area, each participant was assigned to a group, each overseen by the same facilitator throughout the programme. Primary and secondary endpoints were collected through parental self-report questionnaires and observational assessments at baseline, immediately post-test and at 12-months follow-up. All process evaluation data were collected via qualitative interviews, focus groups and video recording programme sessions. My analysis will shed light on the success or not of the parenting intervention, with specific reference to whether child outcomes were mediated by changes in parenting behaviour.

METHODS

The aims and objectives of the research are, first, the use of structural equation modelling (SEM) to create latent variables that measure the constructs forming the responses in the study, as and then implementing SEM in a longitudinal setting. Second, to extend the SEM to look at whether child outcomes are mediated by change in parenting approaches.

RESULTS

NA.

CONCLUSION

The aim of this programme is to increase positive parenting practices and create a stronger, more trusting relationship between a primary caregiver and child. My analysis should explain how successful this low-cost parenting intervention will be and test if any intervention effects fade over time. Furthermore, the statistical methodology is transferable to other studies in the health sciences that use survey questionnaires to collect data on patient behaviour.

Joint modelling CD4 count and mortality in a cohort of patients initiated on HAART: A longitudinal study

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BACKGROUND

Longitudinally measured data and time-to-event data are often associated and are traditionally analysed separately. However, separate analyses may lead to inefficient or biased results for the time-to-event model. Therefore, to simultaneously incorporate all available information optimally, joint models should be used. The primary goal of this analysis was to use joint modelling to determine the effect of repeatedly measured CD4 counts on mortality.

METHODS

We undertook a retrospective review of medical records of the CAPRISA AIDS Treatment program (CAT) between June 2004 to December 2013. We conducted two sets of analysis using, (i) proportional hazards regression to assess the effect of baseline prognostic factors on mortality, and (ii) linear mixed models to assess the effect of baseline factors on the CD4 count evolution over time. These were followed by a joint model for both outcomes.

RESULTS

Of the 4014 patients initiated on ART, 1457 (36.30%) were men. The multivariable linear mixed effects model showed that the patient's gender (ß = 1.69, p<0.001), age (ß = 0.03, p=0.012), baseline log10 viral load (ß = 0.60, p<0.001) and baseline square root CD8 count (ß = 0.19, p<0.001) had significant influences on the evolution of the CD4 count over time. In the multivariable Cox-proportional hazard model, baseline $\log_{10}$ viral load (hazard ratio (HR): 1.51 (1.20-1.90), p=0.004), CD4:CD8 ratio (HR: 0.08 (0.02-0.30), p=0.002) and men (HR: 1.53 (1.09-2.14), p=0.013) had a significant effect on mortality. We found a significant association between the CD4 count and the risk for death (HR: 0.73 (0.68 0.77), p<0.001), with a higher CD4 count being associated with a lower risk of death in the joint model.

CONCLUSION

The CD4 count proved to be significantly associated with mortality after adjusting for potential confounders. Joint models were advantageous for answering multivariate questions simultaneously.

Semiparametric techniques for multilevel discrete survival data

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BACKGROUND

Semiparametric is a hybrid of the parametric and nonparametric ways to deal with development, fitting and validation of statistical techniques, and they are not widely used for discrete survival data. This study advances the application of the latest techniques for modelling discrete survival data, through a simulation study and an application to real-life data. Link functions have been blindly used in discrete survival models without considering the suitability, which is a critical issue since if a link function is inappropriate, the parameter estimation becomes affected.

METHODS

In this study, we seek to build a discrete multilevel survival model with flexible link functions and use the Pregibon goodness of link test to assess the suitability of the link function. Conventional variable selection methods, which are forward and backward-stepwise selection are frequently unstable, and cannot be recommended. Therefore, the current study will consider boosting and compare it with penalization techniques that enforce variable selection. We will build a discrete competing risks model using penalization techniques and construct a discrete multiple-spell model for data on breast cancer in this study.

RESULTS & CONCLUSION

N/A.

Joint modelling of longitudinal colony forming unit count and time-to-event data emanating from tuberculosis trials

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BACKGROUND

Since tuberculosis (TB) is one of the top ten diseases in Africa with the highest mortality rate, a crucial objective is to find the appropriate medication that can cure patients and prevent individuals from contracting this disease. Because this statistic remains poor, evidently there is a need for the development of new anti-TB drugs. In this study, we aim to perform a reanalysis of data collected from a recently published TB clinical trial that investigated the effectiveness of new anti-TB treatments.

METHODS

During the early weeks of the treatment for TB, trials of the early bactericidal activity treatments assess the rate of change in colony forming unit (CFU) count and time to positivity (TTP) collected from sputum of patients with pulmonary TB. The previously published dataset of interest analyses CFU count and TTP of patients over a treatment period of 56 days. These data will be used to perform joint Bayesian nonlinear mixed effects regression modelling of CFU count over time (longitudinal outcome 1), TTP over time (longitudinal outcome 2) and time to sputum culture conversion (time-to-event outcome). This model will accordingly be compared to the separate fit counterparts.

RESULTS & CONCLUSION

Not applicable.

Determinants of anaemia in women and men in South Africa: Application of Generalized Linear Mixed Models and Spatial statistics

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BACKGROUND

Anaemia remains a significant global public health concern when the prevalence is >20% in a given population, while >40% indicates a serious health hazard. The 2016 South African Demographic Health Survey (SADHS) showed that older men were more likely to be anaemic than younger ones, whereas women of reproductive age are more anaemic than older women. We aim to determine high-risk factors that affect women and men (≥15 years) across different populations in South Africa and apply spatial methods to generate maps at provincial level. This study would be mapping the spatial pattern of anaemia prevalence by the survey cluster and nine provinces.

METHOD

Data from the South African demographic and health survey (2016) will be used, with the response variable haemoglobin blood level, which is a key indicator for anaemia. The World Health Organization recommends specific haemoglobin levels below which an individual is specified as anaemic, that is, mild (10–11.9 g/dL), moderate (7–9.9 g/dL), and severe (<7 g/dL). We will also, look at the effects of explanatory variables on anaemia. Generalized linear mixed models will be applied as they provide a more flexible approach for analysing non-normal data in the presence of random effects. A multilevel analysis will be conducted, two multilevel models will be fitted, (1) logistic regression with a dichotomous response variable (anaemic vs not anaemic); and (2) ordinal logistic regression (severe, moderate, mild, not anaemic), the latter, will explain variation at individual level and cluster level. Spatial analysis will be performed

using the local Moran's I statistic to get an insight into the spatial clustering of anaemia in the nine provinces.

RESULTS

N/A.

CONCLUSION

Identified high-risk factors affecting women and men along with the mapped spatial pattern could inform policymakers to design programmes and strategies to reduce the prevalence of anaemia.

SAMRC RESEARCH CAPACITY DEVELOPMENT INITIATIVE (RCDI): POST-GRADUATE PROGRAMME

PROGRAMME ADMINISTRATOR

Ms Philistia Joshua

Integrative analysis of epigenetic modifications in a breast cancer cell line (MCF-7) treated with a bioactive extract of Bidens pilosa

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BACKGROUND

The global incidence of breast cancer has continued to increase over the years. Conventional cancer therapies, such as radiation, chemotherapy and surgery, are often undesirable as they result in side effects. Phytochemicals have proven to offer efficient alternatives to conventional medication for the treatment of many ailments and clarification of their mode of action is essential for their development as a potential regimen for cancer therapy.

METHODS

Six fractions of B. pilosa were assessed for their effects on cell viability in MCF-7 breast cancer cells using the MTT and mitochondrial membrane potential assays. Apoptosis was confirmed with Annexin V apoptosis assay. Changes in gene expression induced by the most bioactive fraction of B. pilosa were investigated using the RT2 Profiler PCR Array, and the expression of differentially expressed genes is currently being quantified by Western blot analysis. An assessment of their promoter methylation profiles using bisulfite pyrosequencing will follow as well as evaluation of global DNA methylation, telomerase activity and histone modification events in treated MCF-7 cells.

RESULTS

The chloroform fraction displayed the best cytotoxic activity, with a concentrationdependent apoptotic effect within 24 hours in the Annexin V apoptosis assay. PCR data showed a significant upregulation of 32 breast cancer-associated genes, while there was a downregulation of 27 genes after 24 hours. Repressed genes included the early onset of breast cancerrelated genes BRCA1, BRCA2 and CDH1.

CONCLUSION

Together, the results from DNA methylation analysis, telomerase activity and histone modification assays will reveal the extent to which B. pilosa alters the epigenetic fingerprint of breast cancer cells and the possible mode of action in cancer therapy.

Evaluation of anticancer activity of Momordica balsamina extracts and potential interactions with a conventional anticancer drug in colon cancer

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BACKGROUND

Plants and plant derivatives have been shown to play a vital role in preserving healthy human lives. Momordica species are consumed and traditionally used to treat various diseases and possess a wide variety of bioactive compounds with antitumour and antioxidant properties. Of this species, Momordica balsamina contains a wider spectrum of medicinal and nutritional values. Herbal medicines are taken concurrently with prescription drugs as they supposedly reduce toxicity and/or enhance therapeutic effects. However, some constituents from herbal medicines may affect pharmacokinetic profiles and reduce the efficacy of some therapeutic drugs, and as such, the use of medicinal plants as a collection of bioactive phytochemicals should be optimised.

METHODS

Phytochemical profile of the crude water and methanol extracts was determined using ThinLayer Chromatography. Flavonoids within the extracts were determined and quantified using HPLC-UV. Extracts were evaluated for cytotoxicity and effect on the efficacy of 5-Fluorouracil using viability and proliferation assays on colon HT-29 cancer cells. Apoptotic effect of extracts and efficacy on 5-Fluorouracil was analysed using the cell and nuclear morphology assay, Annexin-V assay and mode of apoptosis assessed using Caspase-8/-9 colorimetric assays.

RESULTS

The crude water extract was shown to possess more polar compounds than the methanol extract, which contained a higher variety of compounds. The crude water extract further showed higher ferric reducing power and higher amounts of phenolic compounds than the methanol extract. HPLC-UV detected luteolin in the crude water extract and apigenin in the methanol extract. Both extracts also contained significantly larger peaks of as yet unidentified compounds. The methanol extract further displayed significant toxicity, pro-apoptotic activities and additive effect on the efficacy of 5-Fluorouracil with an IC50 of 267 µg/ml.

CONCLUSION

Preliminary results suggest that the methanol extract showed better anticancer activities and potential additive effects with 5-Fluorouracil in this cell model in vitro.

The impact of genetic polymorphisms on the SLCO1B1 gene transcription factor binding sites on enalapril treatment outcome in hypertensive patients

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BACKGROUND

Hypertension is one of the most prevalent chronic conditions worldwide. In various studies, it has been shown that 30–40% of people undergoing anti-hypertensive therapy do not attain controlled blood pressure levels. Furthermore, serious adverse drugs reactions and poor efficacy may be associated with genetic polymorphisms found in drug transporter genes such as solute carrier organic anion transporter 1B1 (SLCO1B1). The impact of these genetic polymorphisms on the pharmacological outcome of the anti-hypertensive drug enalapril within populations of African origin remains largely understudied. Therefore, the aim of the study is to investigate the association between genetic polymorphisms at, or near, transcription factor binding sites in SLCO1B1 and promoter function, ultimately assessing the variation in response to enalapril therapy in indigenous South African populations.

METHODS

Consenting patients were recruited in the Limpopo, Eastern and Western Cape Provinces. DNA samples were collected in the form of buccal swabs and extracted using a standardised salt lysis method. The extracted DNA was sequenced at Inqaba Biotechnological Industries. SNP analysis was conducted using Bio-edit software and their impact on the transcription binding sites was analysed using algen promo v 3.1. Software.

RESULTS

Four SNPs rs11835045, rs73598368, rs71581973and rs372930030 and eight haplotypes were predicted in the promoter sequence of SLCO1B1. Three of predicted SNPs demonstrated the potential to alter transcription factor binding, however, SNP rs71581973 had no effect.

CONCLUSION

The results obtained from this study could be used to explain the variation in response observed in enalapril therapy. However, these results are preliminary and more samples will be investigated and analysed.

Phenotyping of Lewis and Secretor histo-blood group antigens from saliva of infants suffering from gastroenteritis

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BACKGROUND

Histo blood group antigens (HBGA) are carbohydrates found on the surface of mucosal epithelia, red blood cells and biological secretions. The expression of HBGA is regulated by *FUT2* (Secretor) and *FUT3* (Lewis) genes. As host genetic factors, HBGA are used as cell-receptors and are associated with susceptibility to various pathogens. In this study, we aimed to determine the Lewis and Secretor phenotypes of children suffering from gastroenteritis.

METHODS

Oral swabs were used to collect saliva from 380 subjects aged 0-60 months, of whom 48.7% females and 51.3% males suffered from diarrhoea during 2015–2017 (SMUREC/P/219/2015:PG). Lewis a, Lewis b, Lewis x, Lewis y, H type1, blood type A and B HBGA were tested with ELISA using specific monoclonal antibodies. Optical absorbance was read at 450 nm.

RESULTS

Secretor and non-secretor phenotypes were characterised in 78.7% and 21.3% of saliva, respectively. The Lewis antigen phenotyping was, 15.9% Lewis a+b-, 48.2% Lewis a+b+, 17.9% Lewis a-b+, 18.1% Lewis a-b-. Similar phenotyping was observed for the Lewis xy antigen. The distribution of blood groups was 23.2% type A, 8.4% type B, 2.1% type AB and 66.3% type O. There was no association of HBGA phenotypes to age and gender. However, the odds of being a non-blood type O are seven times more in secretors than non-secretors ($p<0.00$).

CONCLUSION

This study is the first in South Africa to characterise HBGA profiles in infants. We report a high proportion of non-secretor and Lewis a-b-/x-y- phenotype as compared globally. This phenotype is known to increase susceptibility to rotavirus P[6] and norovirus, which are enteric pathogens with a high burden of disease in Africa. The observed HBGA phenotypes in our study might be able to explain the susceptibility and trends of pathogens that interact with HBGA and showing differences in Africans as compared to other populations.

Investigating the uptake efficiency of Cisplatin within African-specific haplotypes of *OCT2*

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BACKGROUND

Organic cation transporter 2 (*OCT2*), the gene product of SLC22A2, is expressed within the kidney and facilitates the transport of endogenous substrates, xenobiotics and numerous clinically important drugs. Genetic variants that occur within SLC22A2, directly influence the degree of expression as well as the transporter efficiency. Cisplatin is primarily eliminated by *OCT2* and, therefore, it plays a crucial role in its distribution and excretion. Hence, single nucleotide polymorphisms (SNPs) which are found to be present within *OCT2* could significantly alter the efficacy and potentially result in the prevalence of adverse side effects of platinum-based chemotherapy.

METHOD

An ORF clone of human *OCT2* was purchased from Genscript and site-directed mutagenesis was employed to incorporate the desired SNPs to generate African-specific haplotypes of *OCT2* to elucidate the effects of these SNPs on the transporter expression and efficiency. The differential expression of *OCT2* was observed in HEK293 cells and following exposure to Cisplatin, functional analysis of *OCT2* was conducted and measured by inductively coupled plasma.

RESULTS

OCT2 ORF clone was transformed into Top10 competent cells and glycerol stocks were prepared. Of the previously identified SNPs, three were found to be present and were introduced using an adapted site-directed mutagenesis methodology and confirmed by sequencing. HEK293 cells were transfected with the reference haplotype and Geneticin was used to select for stable clones. The production of the empty vector was carried out by enzymatic digestion and confirmed via sequencing.

CONCLUSION

Africa possesses great genetic diversity because of the presence of various ethnic groups, which harbour unique genetic variants. This variation accounts for the inter-individual and inter-ethnic variation in drug response emphasizing the importance of incorporating precision medicine within the healthcare sector to circumvent the prevalence of adverse drug reactions, while simultaneously increasing the efficacy of these drugs without minimizing the therapeutic benefit.

SAMRC SCHOLARSHIP BENEFICIARIES WHO HAVE COMPLETED THEIR DEGREES (MASTERS/DOCTORATE) IN THE PAST 12 MONTHS: BY PROGRAMME

SAMRC CLINICIAN RESEARCHER M.D PHD DEVELOPMENT PROGRAMME

Name & Surname	Institution	Research Topic	Supervisor
Dr Carina Marsay	University of Witwatersrand	Antenatal depression screening and perinatal depression among women at Rahima Moussa Hospital	Prof Ugash Subramaney
Dr Charles Okwundu	University of Stellenbosch	Screening for severe hyperbilirubinemia in African newborn	Prof Charles Shey Wiysonge
Dr Elisabetta Walters	University of Stellenbosch	Non-invasive sampling strategies for the diagnosis of paediatric pulmonary tuberculosis	Prof Anneke C Hesseling
SAMRC INTERNSHIP SCHOLARSHIP PROGRAMME (ISP)			
Dr Claudia Ntsapi	University of Stellenbosch	The effects of nutrient depriviation on Macroautophagic flux and Chaperone-Mediated autophagy in a Model of Alzheimers's disease	Prof Ben Loos
Dr Stephanie Pitts-Muller	University of Stellenbosch	Genome-wide associations between human genotypes and mycobacterium tuberculosis clades causing disease	Dr Craig Kinnear

Name & Surname	Institution	Research Topic	Supervisor
BONGANI MAYOSI NATIONAL HEALTH SCHOLARSHIP PROGRAMME (BM-NHSP)			
Dr Karina Berner	University of Stellenbosch	Biomechanical Analysis of Specific Movement Impairments to Early Functional Decline in adults with HIV/AIDS	Prof Quinette Louw
Dr Jerome Wendoh Milimu	University of Cape Town	The influence of feeding on the gut microbiome and immunity in HIV exposed infants	Dr Heather Jaspan
Dr Leanne Jacob-Nzuzi	University of Stellenbosch	A model for the facilitation of school re-entry	Prof E Swart
Dr Zimbini Ogle	University of Stellenbosch	The Development of a Visual Screening Scale	Dr L Koen
Dr Nolubabalo Nqebelele	University of Witwatersrand	Genetics of hypertension-attributed chronic	Prof S Naicker
Dr Hlengiwe Gwebu	University of Kwa-Zulu Natal	A Comparative Study on the Application of Advanced Data Mining Techniques	Prof Chimunga
Ms Nokuzola Khomo	Walter Sisulu University	Factors within the hospital that contribute to delays in initiating treament for susceptible Tuberculosis in Addington hospital, KwazZulu-Natal,South Africa	Professor Benjamin Longo Mbenza
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Dr Tshifhiwa Magoro	University of Venda	The Impact of Hepatitis C virus and the role of Liver X receptor in microphage polarization in an HIV treatment cohort	Prof Bessong
Ms Nonkululeko Mchunu	University of Zululand	Potential interaction of honeybush and anti-diabetic drugs	Prof Kappo

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