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Theme 1 / Tema 1

***Health Systems Strengthening/
Gesondheidsisteme Versterking***

ORAL PRESENTATIONS / REFERATE

ABSTRACT NUMBER / ABSTRAKNOMMER: 1

Where There Is No Orthopaedic Surgeon: A WhatsApp mHealth Platform To Support Fracture Management By Non-Specialists in South Africa

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Introduction: Traumatic fractures are common in sub-Saharan Africa (SSA), a region with a shortfall of orthopedic surgeons, and can result in morbidity if not appropriately treated. WhatsApp is an encrypted smartphone application with 1.5 billion users in 180 countries and ubiquitous in SSA. The objective of this study was to assess a mHealth platform to support fracture management by non-orthopedic surgeons in Cape Town, South Africa. Methods: A WhatsApp Orthopedic Referral Group (ORG), was created between non-orthopedic doctors (NON-ORTHO) from community health clinics (CHCs) and orthopedic surgeons and residents (ORTHO) from a first-level hospital to manage traumatic fractures. NON-ORTHO posted cases on ORG and advice was provided by ORTHO. Trauma fracture data from January 1-June 30, 2018 were analyzed and outcomes included response time, management advice, and treatment outcome. Results: 72 NON-ORTHO doctors posted 731 cases of traumatic fractures to the 5-member ORTHO team. Six hundred and sixty-one (90%) cases were responded to within an hour. Three hundred and fifty-four (48%) were successfully treated by NON-ORTHO at CHCs, 288 (39%) were treated by ORTHO at the first-level hospital and 89 (12%) were directly referred to an orthopedic subspecialist at the third-level academic hospital. Conclusion: South Africa has a paucity of orthopedic surgeons but a high burden of traumatic fractures. ORG provided a free telementoring platform for non-orthopedic surgeons to successfully manage trauma fracture cases at CHCs. This type of mHealth platform can be applied to other resource-limited settings if disease burden is high and specialists are scarce.

ABSTRACT NUMBER / ABSTRAKNOMMER: 2

Two Hour Surgical Access in South Africa: A Useful Indicator in a Middle-Income Country?

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Background: The Lancet Commission on Global Surgery recommends that 80% of a country's population should be able to access a facility that provides essential surgical care within 2 hours. The objectives were to identify the proportion of South African public hospitals with potential surgical capacity and the proportion of South Africans living within two hours of these facilities. Methods: All public national, tertiary, regional, and district hospitals in the country were identified. Potential surgical district hospitals (S-DHs) were defined as district hospitals with a potential surgical provider, a functional operating theatre, and the provision of at least one caesarean section annually. The proportion of the population with two hour access was estimated using service area methods. Results: Ninety-nine percent of the population had two-hour access to any public hospital. This coverage decreased to 86% if only S-DH were included. Only 57% of the district hospitals had potential surgical capacity. Conclusion: Two-hour access to any public hospital in South Africa was high; however, this is likely an overestimation because physical proximity does not equal access. For a given population, the minimum resources needed for quality surgical delivery should be identified. The actual surgical capacity of South African district hospitals needs to be urgently assessed in order to scale up essential surgical care.

ABSTRACT NUMBER / ABSTRAKNOMMER: 3

The Western Cape District Health Systems Strategy

Hassan Mahomed (Stellenbosch University and Western Cape Government: Health), David Pienaar (Western Cape Government: Health), Giovanni Perez (Western Cape Government: Health), Renette Crous (Western Cape Government: Health), Krish Vallabhjee (Western Cape Government: Health), Keith Cloete (Western Cape Government: Health)*

The district health system is an approach to health system organisation promoted mainly in low and middle income countries by the World Health Organisation. The Western Cape Government: Health has put together a vision for health care towards 2030. In the context of a number of national health systems reform initiatives such as the re-engineering of primary health care and the national health insurance (NHI), the Province embarked on a process of developing a district health systems strategy. A review of the health system and policies that informed the approach, as well the health system strengthening process and methods will be presented. A range of national and provincial policy documents and health system appraisals were reviewed and an approach to the future development of the district health system was developed, over the period 2017-2018. The Province has a functional district health system but it has many challenges and is operating in an increasingly fiscally constrained environment. In the context of a management efficiency and alignment project, the operational effectiveness of the district health system will be improved. The key levers of a population focus, a people centred service design approach, effective use of health information including optimising the use of information technology, strengthening of people development within well designed governance arrangements, will be utilised to drive a modernised district health system. Community oriented primary care (COPC) is seen as the main mechanism of achieving optimal health of the population by strengthening prevention and health promotion including intersectoral collaboration efforts through Whole of Society Approaches (WOSA) where multiple government departments support service delivery and development where improved health is a clearly defined by product.

ABSTRACT NUMBER / ABSTRAKNOMMER: 4

The quality of feedback from outpatient departments at referral hospitals to the primary care providers in the Western Cape: A descriptive survey

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Introduction Coordinating care for patients as part of an ongoing relationship is one of the key characteristics of effective primary care. Family physicians in the Western Cape formed a network to enable them to perform practical research on key questions from clinical practice. The initial question selected by the network focused on evaluating the quality of feedback from outpatient departments at referral hospitals to primary care providers in the Western Cape. Methods A descriptive survey combined quantitative data collected from the medical records with quantitative and qualitative data collected from the patient by questionnaire. Fifteen family physicians were expected to collect data on 30 consecutive patients each, who had attended outpatient appointments in the last 3-months, to give a sample size of 450 patients. Data was collected on the quality of the referral and feedback as well as the patients' viewpoint on the referral. Quantitative data was analysed in SPSS and qualitative data from open questions was analysed thematically. Results Seven family physicians submitted data on 141 patients (41% male, 59% female, 46% metropolitan, 54% rural). Referrals were to district (18%), regional (28%) and tertiary hospitals (51%). Referral letters were predominantly biomedical with less information about the patient's medical history, context or perspective. Written feedback was available in 57% of patients. In 32% of patients doctors spent time obtaining feedback and the patient was the main source of information in 53% of cases. Many patients did not know what the hospital doctor

thought was wrong (36%), did not know what treatment was recommended (27%) or the results of tests (33%) and procedures (29%). Conclusion Primary care providers struggle to coordinate care for their patients when it is difficult to obtain reliable feedback on specialist consultations at referral hospitals. Communication between primary care providers and hospital outpatients needs to be improved.

ABSTRACT NUMBER / ABSTRAKNOMMER: 5

Opportunities and challenges for occupational TB screening: Insights from a qualitative study of healthcare workers at Tygerberg Hospital

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BACKGROUND Healthcare workers (HWs) have at least twice the risk of latent tuberculosis infection (LTBI) compared to the general population. However, occupational health systems in high-incidence countries are often overburdened and, despite the growing emphasis on LTBI treatment in high-risk populations, data on HWs in high-incidence countries are scarce. We conducted a qualitative study to determine HW perspectives related to occupational TB screening at Tygerberg Hospital, Cape Town, South Africa. **METHODS** We conducted fourteen in-depth interviews with junior and senior nurse and physician stakeholders, as part of a study evaluating the correlation between rebreathed air exposure and HW acquisition of LTBI. Using an inductive approach, we performed open coding to identify emergent themes and selective coding to identify relevant text citations. We analyzed themes using the COM-B (capability, opportunity, motivation → behaviour change) framework. **RESULTS** Six emergent themes were analyzed according to COM-B domains. Within Capability, the themes were responsibility, which included HWs considering the relative importance of their own actions versus the hospital's policies to protect HWs from TB transmission, and the strong duty of care that made them sometimes forget to protect themselves while remaining conscious of the need to reduce transmission risk to patients. Within Opportunity, although all HWs identified a high risk of TB transmission due to unsuspected TB and recognized gaps in TB infection control (IC) measures, almost none had undergone workplace TB screening. Regarding Motivation, all HWs recognized the need for TB screening, including LTBI, and almost all were willing to consider LTBI treatment, particularly if re-exposure risk could be reduced. **DISCUSSION** All stakeholders identified the high risk of occupational TB and the need for TB screening. While the majority were willing to consider LTBI treatment, an occupational health intervention to implement screening should be accompanied by strengthening TB-IC in order to reduce the risk of exposure.

ABSTRACT NUMBER / ABSTRAKNOMMER: 6

Factors perceived to contribute to the establishment and success of start-up businesses by young adults in Kayamandi

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Unemployment is one of South Africa's largest social challenges, especially among the youth and within communities characterised by low socio-economic circumstances. Being unemployed thus puts an individual at risk of experiencing occupational injustice, which may also affect the individual's health, well-being and quality of life. Within the field of occupational therapy, unemployment is a concern, as

being able to work forms an integral part of an individual's life. Occupational therapy can empower individuals to acquire work and become self-sustainable, through promoting independence.

The aim of this qualitative study was to identify the factors perceived by young adults to have contributed to their successful start-up businesses within Kayamandi, a community characterised by low socio-economic circumstances. A collective case study, drawing on the narrative tradition, was used to gain in-depth information about these factors from the five participants between the ages of 18 and 35 years. The factors perceived by the participants were divided into three themes: factors internal to the business owners and their immediate environment, factors that portray interactions between the business owners and the environment, and factors external to the business and out of the business owners' control. These findings may aid in providing information to individuals aspiring to start their own businesses, professionals creating curricula for education and training, as well as government initiatives or organisations funding entrepreneurs. Therefore, empowering young entrepreneurs in similar circumstances and assisting in job creation in South Africa..

ABSTRACT NUMBER / ABSTRAKNOMMER: 7

Doctor as change agent (DRACA): Refining a sustainable interprofessional teaching module to develop the competencies of becoming an agent of change in the community

Maria van Zyl (University of Stellenbosch), Maryke Geldenhuys (University of Stellenbosch), Sydney Carstens (University of Stellenbosch)*

The DRACA module is in its 5th year of implementation in the undergraduate medical curriculum at Stellenbosch University and it is important to continuously re-evaluate and refine the curriculum content and presentation thereof. In doing so we aim to investigate whether it is possible to present an innovative collaborative curriculum, in a sustainable and cost-effective way in order to develop future healthcare practitioners who feel competent to act as leaders and who can advocate for- and facilitate change in the communities in which they function. The objectives of the study was to: 1. Evaluate the impact that the module had on students' commitment and perceived competence of becoming change agents 2. Evaluate the workshops presented to students 3. Explore the collaboration between the different departments from the University of Stellenbosch during the development and presentation of the module A mixed method research methodology was used. All 4th year MBChB students from Stellenbosch University was invited to voluntarily complete an online questionnaire at the commencement and at the end of the DRACA module. The students were also asked to voluntarily complete anonymous online feedback at the end of each workshop presented during the module. Voluntary Focus Group interviews were conducted with the faculty members from all contributing departments to evaluate the process of Interprofessional Collaboration during the development, implementation and evaluation of the DRACA module. The results shows that after completion of the module students' commitment as well as their perceived competency level to serve as a change agent, had increased. The students felt that the workshops and the personal development plan that they developed during this module assisted them with the development of the competencies needed to serve as a change agent. They appreciated the fact that field experts presented the different workshops.

ABSTRACT NUMBER / ABSTRAKNOMMER: 8

Affordances of funding for innovation and research in learning and teaching (FIRLT) for enhancing scholarship in health professions education (HPE)

Lakshini McNamee

Introduction: Funding schemes are widely employed as a strategy to develop teaching and learning in Higher Education. The Fund for Innovation and Research into Learning and Teaching (FIRLT) was established in 2005 at Stellenbosch University (SU), to support innovative and scholarly academic endeavours, aligned with the Learning and Teaching Policy of SU. Since the inception of the fund, the Faculty of Medicine and Health Sciences (FMHS) has received the highest number of awards and been awarded more funding overall. However, there is currently a gap in the literature pertaining to the actual process by which funding leads to personal and professional development of academics.

Objectives: This study aimed to explore the affordances (action possibilities) created through FIRLT awards for staff to progress along journeys of Scholarship of Teaching and Learning (SoTL). The main objective of the study was insight into the nature of affordances for professional development as experienced by educators and researchers. Methodology: Qualitative data were generated in face-to-face individual interviews with 12 staff members from various disciplines at the FMHS who had received FIRLT funding between 2012 – 2016. The data were audio-recorded, transcribed verbatim and thematic content analysis was conducted using manual coding methods. Ethical approval for the study was obtained from the Health Research Ethics Committee of Stellenbosch University HREC Reference #: N18/07/072. Results and conclusion: Five broad themes were inductively developed from the data, namely, 'Stimulus potential', 'Recognition & validation', 'Developmental agenda', 'Growth/progression as scholars' and 'Identities as academics'. There were some challenges experienced, not with the funding scheme, but due to personal and contextual issues that constrained progress. Overall the funding was highly valued for the scholarly development enabled in individuals, collaborative teams and the institution.

ABSTRACT NUMBER / ABSTRAKNOMMER: 9

Using Student Response Systems (clickers) in an isiXhosa Communication Course

Linda Mhlabeni (Stellenbosch University)

In multilingual countries, proficiency in more than one language can benefit individuals and society. Many universities with medical faculties promote multilingualism by offering additional languages. Stellenbosch University's Faculty of Medicine and Health Sciences offers an isiXhosa Clinical Communication (XCC) course as part of some undergraduate modules. This study explores use of clickers for XCC offering. The research questions are: •How do students engage with the Student Response Systems (clickers) in an isiXhosa Clinical Communication course in Higher Education settings? •To what extent can the use of clickers enhance students' clinical communicative competence in isiXhosa as an additional language? •Are the students' isiXhosa acquisition abilities augmented by the classroom use of Student Response Systems? The participants were 51 female first year students. They answered multiple choice questions (MCQs), using their mobile phones as clickers. The researcher observed participants from the moment they started answering MCQs until the post-test classroom discussions had ended. The students' responses were polled and displayed in histograms. Additional data were collected by a post-intervention questionnaire, focus group discussions and staff interviews. The key findings of the study were anonymity, immediate feedback that seemed to enhance content consolidation, student self-assessment and constructive peer comparison. It also found that use of clickers could enhance student-lecturer engagement to augment clinical communicative competence. Additionally, it found that the use of students' personal mobile devices, rather than commercial clickers, contributed to success enjoyment and of the intervention. This research prompts a narrative for use of technology to present indigenous languages spoken by marginalised communities who primarily visit public clinical sites. Also, effective use of clickers could replace infrastructural resources in impoverished under-resourced areas. A lesson learnt would be consideration of clickers to be incorporated in the pedagogy from the onset, for maximal benefit rather than used as a teaching intervention enhancement resource.

ABSTRACT NUMBER / ABSTRAKNOMMER: 10

Process Evaluation of Reform and Renewal of the MB,ChB Programme at the Faculty of Medicine and Health Sciences

Mariette Volschenk (Stellenbosch University), Ilse Meyer (Stellenbosch University), Julia Blitz (Stellenbosch University), Liezl Smit (Stellenbosch University), Susan van Schalkwyk (Stellenbosch University), Justine Geiger (Stellenbosch University), Ben van Heerden (Stellenbosch University)*

In response to global calls for the transformation of health professions education, as well as national health and education system developments, the Faculty of Medicine and Health Sciences (FMHS) has launched various initiatives over the past number of years to incorporate key imperatives for curriculum

reform into the current MB,ChB curriculum. Despite significant changes, the incorporation of these crucial additions into an existing curriculum that is already experiencing volume and content overload proved to be a challenging endeavour. Thus, when Stellenbosch University launched an institution-wide process of holistic programme renewal in 2017, the FMHS utilised the opportunity to embark on a comprehensive and innovative renewal of the MB,ChB curriculum, with a view to equip graduates with the competencies needed to effectively deliver 21st-century healthcare in increasingly complex contexts. A process evaluation study is currently in progress to inform our understanding of how relevant process interventions employed during the pre-implementation phase facilitated the intended curriculum change. It was envisaged that the findings would provide useful insights into why the curriculum development process succeeded, failed, or had unintended consequences, as well as how it could be optimised during subsequent phases of the renewal project. Data generation consisted of a review of documents pertaining to the pre-implementation phase, as well as unstructured individual interviews exploring key role players' perceptions and experiences of the curriculum renewal process to date. Data were thematically analysed by members of the research team. Initial findings suggest that, although many of the role players felt overwhelmed by the rapid speed at which curriculum renewal has progressed, the collaborative team approach that characterised the process provided them with a sense of empowerment. Other identified themes illustrate the importance of change management, faculty development and curriculum mapping, as well as barriers and enablers to active involvement during a curriculum renewal process.

ABSTRACT NUMBER / ABSTRAKNOMMER: 11

Investigating the skills needed by new doctors in Rural Hospitals

Ian Couper (Ukwanda Centre for Rural Health, Stellenbosch University), Oliver Johnson (Health Service & Population Research Department, King's College London), James Barnacle (West Middlesex Hospital, Isleworth, London)*

Introduction: Many doctors recruited to work in rural hospitals have insufficient generalist skills for the extended range of practice required. The Ukwanda Centre for Rural Health is developing a Postgraduate Diploma in Rural Medicine, with the aim of preparing doctors for such work. Initial impetus for this came from Africa Health Placements (AHP), which recruits doctors from abroad to work in rural hospitals in Africa. Many such doctors feel insufficiently skilled and complete courses in Tropical Medicine in the UK or the Netherlands, which often do not adequately prepare them for situations in Africa. To understand better the needs of rural hospitals receiving such doctors, a survey was conducted to determine the skills needed and assist in drawing up specific aspects of the planned PG Diploma curriculum. The aim of the study was thus to determine the skills gap for overseas-trained doctors (OTDs) working in rural district hospitals in South Africa. Methods: Nine rural hospitals in the Eastern Cape, KwaZulu-Natal and Mpumalanga were selected as hospitals where AHP placed foreign doctors. An online survey was developed regarding the key skills required when working rurally and where the weaknesses in these skills were for foreign doctors, as well as general questions related to the proposed curriculum. The clinical manager and any OTDs placed by AHP working in each hospital were invited to complete the survey. Results: Surveys were completed by 5 clinical managers and 19 OTDs. The top clinical skills identified in relation to specific disciplinary domains will be presented, as well as the top 5 overall clinical skills selected by respondents. Responses regarding non-clinical skills and the most important gaps will be described. Conclusions: Consistency amongst respondents clearly indicates the important skills focus areas. This study provides useful further direction for planning of the PG Diploma programme.

ABSTRACT NUMBER / ABSTRAKNOMMER: 12

Teaching Empathy in an undergraduate medical curriculum

Elize Archer (Stellenbosch University), Ilse Meyer (Stellenbosch University)*

Introduction Empathy plays a key role in effective communication between doctors and their patients as it positively impacts patient outcomes. Acknowledging that empathy is about more than an attitude,

there are some skills that we believe can be taught to students to behave in an empathic manner. Following a scoping review of educational interventions to enhance empathy, a variety of interventions, such as, a didactic session, standardized patient (SP) case scenarios, listening exercise, a practical perspective-taking exercise, a meditation and self-compassion exercise as well as a reflection session was incorporated in the 3rd year Undergraduate medical curriculum, as part of the clinical skills module. The aim of the study was to evaluate the newly implemented teaching sessions. Methods This study followed a qualitative research approach, with an interpretivist paradigm. Data were collected from three focus group discussions with students. The data were deductively analysed and four themes related to the specific educational interventions then emerged. Results Students found the sessions challenging, but exciting, valued the feedback, the focused attention of small group work and expressed the efficacy of the various interventions. While the students valued the sessions with the simulated patients, new challenges arose, such as, adequate training of SP's, as well as the provision of feedback. Some students verbalised that they were so inspired that they immediately applied their new skills during clinical practice. Conclusion The students confirmed that the various interventions complimented one another well and were relevant and valuable opportunities to enhance empathy. They highlighted the need for reinforcement in future. Therefore, lecturers need to ensure that a variety of teaching and learning strategies are longitudinally incorporated into an undergraduate medical curriculum. While it seems as if these interventions were successful, follow-up research is needed to establish if students apply the skills taught in clinical settings.

ABSTRACT NUMBER / ABSTRAKNOMMER: 13

Responsive curricula for healthcare professionals

Cecelia Jacobs (CHPE), Susan Van Schalkwyk (CHPE), Julia Blitz (FMHS), Mariette Volschenk (CHPE)*

An imperative for exploring a more responsive curriculum framework for healthcare professionals has been established in previous work in the field of Health Professions Education (HPE). This calls for curricula to be more relevant to the social contexts in which they are located. This study hopes to respond to these calls by exploring the development and application of responsive curricula for healthcare professionals across two purposively selected programmes in the FMHS at SU, the MBChB and Physiotherapy programmes. The study explores the range of understandings that HPE teachers bring as they interpret the principles underpinning their HPE curricula. Curriculum coherence requires that those HPE teachers implementing a particular programme of study have a shared set of understandings regarding the broad principles upon which the curriculum is built. A disconnect between the intentions of curriculum designers and the understandings that HPE teachers bring, could have serious implications for the translation of such principles into the teaching practices of HPE teachers and the learning opportunities for future healthcare professionals. It is this problem that the study seeks to investigate. The research questions are framed as: • How do the participating HPE teachers understand the broad principles upon which their curriculum is built? • How are these understandings translated into innovative teaching practices which take their students beyond the biomedical model in HPE? The data collection process is in progress and includes focus group sessions and individual interviews with programme co-ordinators, module leads and HPE teachers, as well as the analysis of programme and module curriculum documentation for the two programmes. A preliminary analysis of the initial focus group sessions will be shared. Participants expressed a range of understandings of how their programmes and modules were responsive and relevant to the social context. These will be discussed in detail in the oral presentation.

ABSTRACT NUMBER / ABSTRAKNOMMER: 14

Ageing Well: Using Clinical Placements to Develop and Occupation-based, Needs-led Service in South Africa

Nicola Plastow (Stellenbosch University)

Context: Older people living in retirement communities and care homes in South Africa have very limited access to occupational therapy services (Plastow et al, In preparation). Role emerging placements,

based on service-learning and logic models, are one way to extend services to vulnerable and underserved people in our context (Bester and Kloppers, 2016). Description of Practice Development: We established a community-based occupational therapy service in one retirement community in Somerset West, South Africa. Four students were placed at the retirement village for 6-weeks each over one academic year. A four-stage service development model included 1) a situational analysis to identify the community's needs and collaboratively prioritise actions, 2) in-depth assessment and planning, using the Model of Human Occupation (Kielhofner, 2002) as an informing theory, 3) implementation of three projects, and 4) evaluation. Projects included 'Health Talks', establishment of the 'Heritage Carers' Support Group', and 'Building Relationships' with socially isolated residents. Evaluation and Impact: This service development project identified differences in quality of life (WHOQOL-AGE) and occupational performance (OSA-SF) between active residents, and those identified as 'at risk'. We identified an innovative method of assessing the outcome of health promotion talks. The Carer Well-being and Support Questionnaire (CSW) and OSA-SF were feasible tools for evaluation in this context. A 'Driving Cessation' intervention is planned for 2019. Impact: This project shows that community-university partnerships can play an important role in establishing sustainable and innovative occupational therapy services within a resource-constrained environment.

ABSTRACT NUMBER / ABSTRAKNOMMER: 15

Reasons for non-attendance in outpatients who do not attend follow-up Occupational Therapy and Physiotherapy appointments at the Western Cape Rehabilitation Centre

Zenobia Waja (Occupational Therapy), Aneeqah Brown (Occupational Therapy), Miche Jeffries (Occupational Therapy), Chandre Roberts (Occupational Therapy), Amirah Ramklass (Occupational Therapy)*

Non-attendance of outpatient appointments is a major challenge for healthcare services worldwide. This study aimed at understanding and describing the reasons patients do not attend their scheduled outpatient follow up appointments in the South African context in order to assist Occupational Therapists and Physiotherapists to provide well run rehabilitation services at Western Cape Rehabilitation Centre (WCRC). Qualitative research using a constructivist approach with an exploratory and descriptive design was used in order to obtain rich information of participants lived experiences to aid in addressing the research aim and objectives. Purposive sampling was used, and data was obtained through face-to-face interviews consisting of open-ended questions. Findings revealed that the reason for non-attendance revolve mainly around external factors which are out of their control. It was identified that although participants were non-attenders, they were intrinsically motivated to attend appointments but external factors which they experienced led to them becoming non-attenders. Three themes emerged from the data namely: transportation, organizational procedures and social factors, which support the aim of the study. The themes emerged organically from the nature of the interviews. Researchers identified community mobility as the thread which was evident within each of the themes that emanated from the data collected. The findings show that there is not one clear reason for non-attendance but rather a culmination of numerous reasons relating to community mobility. The study describes how transportation is one of the main reasons for nonattendance due to accessibility and financial burdens as well as organisational procedures such as the scheduling and timing of appointments.

ABSTRACT NUMBER / ABSTRAKNOMMER: 16

Exploring caregiver experiences on accessing seating services in a Western Cape setting

Gwen-Lynn North (Western Cape Rehabilitation Centre), Dr Surona Visagie (Centre of Rehabilitation Studies), Dr Martha Geiger (Centre of Rehabilitation Studies)*

Purpose of the study: The aim of the study was to explore the experiences of carers of children with cerebral palsy (CP) (GMFCS IV/V), around the accessibility of advanced seating services at a tertiary health-care facility in the Western Cape. Methods: A qualitative, phenomenological research design with a social constructivist viewpoint was used. The study population consisted of 62 carers of children

with severe CP, of whom seven were purposively sampled. Data were collected through one-on-one, semi-structured interviews using broad open-ended questions. The interviews were audiotaped, transcribed verbatim and translated. A thematic analysis strategy with an inductive reasoning process was utilized. Findings: Carers experienced a great deal of stress around accessing the tertiary health-care facility for the seating appointment. Four themes were generated: (1) A Strenuous experience, (2) Transport, (3) The child and the buggy and (4) Facilitators to access. Conclusion: Carers still encountered barriers, such as transport, that limited access to the tertiary health-care facility to attend the advanced seating clinic. There is a need to improve the current public transport systems to be more inclusive for carers, their children with CP and their posture support wheelchair.

ABSTRACT NUMBER / ABSTRAKNOMMER: 17

Evaluating the performance of South African primary care: Cross-sectional descriptive survey

Graham Bresick (Division of Family Medicine, School of Public Health and Family Medicine, University of Cape Town), Klaus von Pressentin (Division of Family Medicine and Primary Care, Stellenbosch University), Bob Mash (Division of Family Medicine and Primary Care, Stellenbosch University)*

Introduction In 2018 governments again committed themselves to implement primary health care (PHC) in the Astana Declaration. South Africa has introduced a number of health reforms to strengthen PHC and enable universal health coverage (UHC). UHC requires access to quality primary care and progress needs to be measured. This study aimed to evaluate the quality of South African primary care using the Primary Care Assessment Tool (PCAT). **Methods** A descriptive cross-sectional survey used data derived from a previous analytical observational study. Data from 413 patients, 136 health workers and 55 managers were analysed from 30 community health centres across four provinces of South Africa. Scores were obtained for 10 key domains and an overall primary care score. Scores were compared in terms of respondents, provinces and monthly headcount. **Results** Patients rated first contact accessibility, ongoing care and community orientation as the poorest performing elements (<50% scoring as 'acceptable to good'); first contact utilization, informational coordination and family-centeredness as weaker elements (<66% scoring as 'acceptable to good'); and comprehensiveness, coordination, cultural competency and availability of the PHC team as stronger aspects of primary care (>=66% or more scoring as 'acceptable or good'). Managers and providers were generally much more positive about the performance of PHC. **Conclusion** Gaps exist between PHC users' experience of care and what PHC staff believe they provide. Priorities to strengthen South African primary care include improving access, informational and relational continuity of care, and ensuring the implementation of community orientated primary care. The PCAT is a useful tool to measure quality of primary care and progress with UHC.

POSTER PRESENTATIONS / PLAKKAATAANBIEDINGS

ABSTRACT NUMBER / ABSTRAKNOMMER: 18

A framework to facilitate the appointment of women nurses of colour to leadership positions in hospitals

Mariana van der Heever (Stellenbosch University), Anita van der Merwe (Stellenbosch University)

This study aimed to develop a framework to facilitate the appointment of women nurses of colour to leadership positions in hospitals. The objectives were to: • Explore the influence of the Employment Equity Act (EEA) on the promotion of nurses • Explore the views of nurses regarding the influence of race, class and gender on promotion • Explore the practices imbedded in the selection processes of nurses to leadership positions • Develop a race, class and gender sensitive framework to support nurses in their preparation for leadership positions A concurrent mixed method design was employed

comprising an exploratory survey and interpretive phenomenology. One third (n=825) of the population (N=2476) was selected by means of systematic random sampling. Six hundred and eighty eight professional nurses consented to participate and n=573 completed the survey (return rate = 83%). Five interviews were conducted with nurse leaders in SA and another 40 with persons who had participated in the selection processes of nurses to leadership positions. The quantitative findings revealed a cautious stance to admit that the EEA contributed to the promotion of African, Coloured and Indian nurses, a divide between nursing management and nurses on ward level, an inferior outlook towards African and the superior viewing of White nurses. Qualitative findings suggested efforts to consider the EEA, racial discrimination, and questionable promotion practices. Meta-inferences were drawn from the qualitative and quantitative findings. A framework was developed from these meta-inferences that focused on the credibility of promotion practices, diversity training, succession-planning and the creation of healthy managerial structures.

ABSTRACT NUMBER / ABSTRAKNOMMER: 19

Alterations in selenium concentration in HIV-infected individuals: A review

Karen Cilliers (Division of Clinical Anatomy, Faculty of Medicine and Health Sciences, Stellenbosch University), Christo Muller (Biomedical Research and Innovation Platform, South African Medical Research Council), Ben Page (Division of Clinical Anatomy, Faculty of Medicine and Health Sciences, Stellenbosch University)

HIV-infected individuals commonly have nutritional deficiencies due to decreased food intake, gastrointestinal alterations or an increased nutritional requirement. Alterations in selenium concentration have been related to an increased mortality risk, since selenium acts as an antioxidant that forms part of the enzyme glutathione peroxidase. Furthermore, adequate levels of selenium are needed to ensure proper functioning of the immune system. Thus, the aim of this study was to review the literature and determine if selenium is altered in the serum of HIV-infected individuals. Several researchers have studied the selenium concentration changes in different stages of HIV. When comparing controls to asymptomatic HIV-infected individuals, most studies agree that there is no change in selenium levels, with only limited authors observing significant reductions in HIV-infected individuals. In contrast, most authors have observed significant reductions in selenium levels in symptomatic HIV-infected individuals and in individuals with acquired immune deficiency syndrome. These changes have also been reported in individuals on highly active antiretroviral therapy (HAART). While HAART has improved the survival of HIV-infected individuals, selenium supplementation could further slow disease progression. Studies have reported that selenium supplementation increases glutathione peroxidase activity and CD4 count, with a concomitant decrease in hospitalization, diarrhoea, and viral load. In conclusion, selenium concentration appears to only be significantly reduced in the later stages of HIV infection, even in individuals on HAART. More research is needed to ascertain if selenium supplementation will be beneficial as an adjunct therapy to HAART.

ABSTRACT NUMBER / ABSTRAKNOMMER: 20

Developing and implementing a blended Research Protocol Writing Course for clinician researchers at Stellenbosch University, South Africa

Dr Tania Brodovcky (Research Development and Support, Faculty of Medicine and Health Sciences, Stellenbosch University), Dr Karis Moxley (Department of Psychiatry, Faculty of Medicine and Health Sciences, Stellenbosch University)

Blended course offerings, which are mixes of online and face-to-face contact sessions, are becoming commonplace in practice and research capacity development offices cannot be ignorant of this. In South Africa, a research project is a mandatory component of medical specialist (registrar) training, but formal methodological instruction is not part of their curricula. In the past, the Research Capacity Development and Funding Opportunities Office at the Faculty of Medicine and Health Sciences has offered an annual Short Course in Clinical Research Skills and a Research Protocol Writing Workshop, with registrars as the primary, but not exclusive, target audience. However, these offerings have not

had the desired reach since heavy clinical training schedules limit the time available for course and workshop attendance. In an effort to accommodate a flexible learning alternative and to improve reach and access, a synchronous, blended Clinical Research Protocol Writing Course was developed and implemented, based on the concept from research idea to protocol. This 16-week course utilised the SUNLearn online platform to deliver content as short readings and videos, with workshop-style contact sessions strategically interspersed. The course was structured around five core online modules that were specifically developed for this mode of delivery. Participants were required to develop their own research protocol by the end of the course, which encouraged active rather than passive learning. We will describe the strategies used and challenges experienced during the design and implementation of this blended course within the restrictions of a resource-limited environment. We will also share feedback from the first cohort, and discuss lessons learnt and future directions.

ABSTRACT NUMBER / ABSTRAKNOMMER: 21

Educational value of procedural videos as perceived by surgical trainees

Karin Baatjes (Stellenbosch), Nico Stevenson (Stellenbosch), Elize Archer (Stellenbosch)

Introduction: Teaching videos make procedural course content available in a technological format and can be a source for self-learning and revision by students in surgical education. It is important to use varied educational strategies to enhance knowledge and technical skills during surgical training, in addition to active participation in operations. The aim of this study was to evaluate the self-perceived educational value of the procedural videos from a surgical trainee's perspective. Methods: All surgery trainees (n=29) in the division of Surgery were invited to participate on a voluntary basis. After providing written informed consent, trainees were asked to complete a paper-based questionnaire, before and after having watched two procedural videos. All of this took them about 15-20 minutes to complete. A total of 15 Registrars took part in the study. The results are reported using descriptive statistics. Results: Two operative videos were evaluated by 15 trainees. The findings indicate that the videos are useful for their learning, aligned with learning goals and valued as a source of information. Useful feedback in terms of the design and planning of the video material was also offered by the registrars. Conclusion: Surgical trainees confirmed the self-perceived educational value of videos that were recorded from the operating surgeon's viewpoint. The needs analysis indicates that more videos are needed in the digital video library.

ABSTRACT NUMBER / ABSTRAKNOMMER: 22

Evaluating the health needs of Mamre: A retrospective review

Carla Swart (Stellenbosch University), Professor Bob Mash (Stellenbosch University)

Introduction: With global and national increased focus on strengthening Primary Health Care a COPC approach is being implemented in the Western Cape Metro. This is being pioneered at 4 learning sites. The aim of this study is to assess the local health needs of Mamre (one of the four learning sites) and start implementing COPC in this community. Reviewing the literature on Mamre produced little results other than Census 2011 and a 1988 cross sectional survey describing morbidity parameters. In this retrospective review one gets a more current and comprehensive picture of the community's profile and health needs. Methods: This was a descriptive observational study using an existing database. Data from January 2018 to December 2018 collected by CHWs during household assessments has been analysed using the Statistical Package for Social Sciences. The sample includes data from 1338 households and 3895. The analysis is predominantly descriptive. Results: 97.6% resided in formal dwellings, most having access to water and electricity. Non-communicable diseases have been identified as the main health problem in this community. Hypertension was the most commonly reported condition, followed by diabetes. 26.6% of individuals were identified as smokers. Low numbers of TB and HIV were recorded. Immunisations and vitamin A of almost half of children less than five were not up to date. Of all health risks identified only 2.2% was referred, although this could be explained by the CHWs recording referrals on an alternative document. Of those being referred to clinic the most frequent reason was for pap smears, blood pressure, HIV and tuberculosis as well as breast related

complaints and eye tests. Conclusion: The main health problems in Mamre are non-communicable diseases. Targeting adherence support and addressing lifestyle could be beneficial for this community.

ABSTRACT NUMBER / ABSTRAKNOMMER: 23

Knowledge, attitudes and beliefs of pathologists regarding business, administration, leadership and management in South African pathology services

Carla Griesel (AMPATH Laboratories, Cape Town, South Africa.), Carmen Swanepoel (SUN/NHLS), Tonya Esterhuizen (SUN), Zivanai Chapanduka (SUN/NHLS)*

Background: There is a paucity of literature regarding the level of business, administrative, leadership and management (BALM) education and/or experience among pathologists and pathology registrars in South Africa. BALM skills are increasingly being recognised, as being important for successful pathology laboratory practice. Aims: To establish the level of education and experience in the fields of BALM, among pathologists. To determine the knowledge, values, attitudes and beliefs that pathologists hold towards the subjects of BALM. Methods: An online survey was conducted among all the active pathologists in South Africa, using REDCap™ survey software. A study questionnaire consisting of 19 multiple choice questions was used. Reports were generated using REDCap™ software and analysed using STATA Statistical Software. Results A total of 235 responses were received, response rate 33%. Of the respondents 62.1% (146) were specialists and 33.6% (79) were registrars while 4.3% (10) did not state their registration category. Only 12.8% (30) had formal training in a BALM subject. Eighty three percent believe that registrars require more BALM training. Only 9.4% are fully confident to deal with BALM aspects of their job. Eighty percent (189) believe that BALM competency is important for a successful pathology career and 78.4% believe BALM qualifications give pathologists a career advantage. Only 2.1% (5) of the respondents have Master of Business Administration (MBA), 0.9% (2) are currently enrolled for MBA degrees, one specialist and one registrar. 65.1% (153) state that they would enrol for an MBA if a relevant and convenient MBA program was available. Only 6.4% (15) have a certificate, diploma or degree in a BALM subject. Conclusion: Education and experience in BALM subjects are lacking among South African Pathologists. There is a belief that BALM competency is required for successful pathology services and the majority of pathologists would enrol for an MBA in pathology services.

ABSTRACT NUMBER / ABSTRAKNOMMER: 24

Preparing health science professionals for multilingual contexts

Sybil Nontsikelelo Masiba (CHPE), Cecilia Jacobs (CHPE), Linda Mhlabeni (CHPE), Fezeka Dyubeni (CHPE), Elize Archer (CHPE)

Introduction IsiXhosa Clinical Communication (XCC) offerings were designed and implemented at the Faculty of Medicine and Health Sciences at Stellenbosch University for undergraduate students. The different programmes within the faculty embraced these offerings with a purpose of improving health care, particularly targeting communication in isiXhosa and addressing language barriers. The aim of this evaluation was to determine whether these offerings have achieved their intended purpose and investigate how the stakeholders understood the purpose thereof. Methods In this study, a number of methods were implemented, ranging from interviews with focus groups, observations of class activities and assessment, student surveys and document scans. Data collected from past and current students, facilitators, simulated patients, management and external moderators was recorded, transcribed and coded. Analysis of data was executed through a thematic process and questionnaires were summarised, and coded. Results An apparent convergence has been observed amongst stakeholders regarding, Purpose, Time, Content, Assessment, Collaboration, Integration, Communication & implementation. These themes will be covered in detail in the poster presentation. Conclusion Participants valued the collaboration between XCC facilitators and clinical module lecturers and the resulting integration of isiXhosa and clinical content. However, there were differences of opinion regarding whether the XCC offerings should be embedded in programme modules or be loose-standing modules in their own right.

ABSTRACT NUMBER / ABSTRAKNOMMER: 25**Task-based syllabus design for teaching isiXhosa as a second language to health sciences dietician students**

Fezeka Dyubeni-Sikele (Stellenbosch University)

A number of countries such as South Africa are multilingual. Universities that host medical faculties such as Stellenbosch University (SU) equip students with communication skills to cope with monolingual patients during consultations. The main research questions of the study are: • How can real-world tasks for dietician-patient consultations be analysed with regard to their communicative content in respect to task-based language teaching approach, including task properties of interactional and cognitive complexity? • How can target tasks in isiXhosa be decomplexified for teaching learners at beginner level? This study is based on ten communication tasks on dietician-patient consultations. The focus is on Task Based Language Teaching (TBLT) and theoretical framework of language scholars, in particular, second language learning. It also consists of clinical discourse that is presented in isiXhosa, where unique dietician-patient dialogues are used in authentic clinical settings. These tasks were analysed within a specific framework and cognition hypothesis. This hypothesis is used to determine levels of complexity that occur in dialogue tasks which are manipulated from authentic language production and graded from complex to simplest form. The main finding of this work is that TBLT cannot take place without pillars such as content, syllabus, methodology, outcomes and assessment. Teachers should prioritise these curriculum design key elements to achieve meaningful teaching and learning. Other findings were: • When teaching second additional language focus on form needs minimal attention; • Grammar should be taught when necessary; • Students may raise grammar concerns when communicative language production is expected to be richer and more complex; The significance of this study lies in language learning for specific medical students; however, its benefits can be useful to other professions. Communicative language is also valuable for generic language production. Linguistic barriers between healthcare professionals and patients can be addressed through acquiring patient's language.

ABSTRACT NUMBER / ABSTRAKNOMMER: 26**The health needs of Nomzamo based on household data: A descriptive survey**

Ella van der Merwe (Stellenbosch university), Professor Robert Mash (Stellenbosch university)

Primary health care (PHC) aims to promote health as well as to prevent and treat disease. A good PHC system is vital for strengthening the overall quality of health services. In line with the Department of Health's vision for 2030, the Western Cape is reorganizing the PHC which includes the implementation of COPC. The COPC model is being tested in 4 sites to eventually be adopted by the entire Cape metro. Nomzamo is one of the sites being tested. Community health workers have gone to the households in the community and done a "household survey" collecting data on the current health problems in the community. The aim was to evaluate the utility of routine household data collected by community health workers to assess the health needs of Nomzamo community. This descriptive survey is based on a geographically defined community, Nomzamo. 320 households were randomly selected from existing database of 1500 household. Data was extracted and entered into an excel. SPSS was then used to analyse the data. Inferential statistics was used to look for relationships between variables. We found that HIV and TB were the most common chronic conditions, followed by hypertension, asthma, diabetes and mental health. The mean age of the sample was 24.7 years with 57% of people residing in formal dwellings. Looking at the dwellings, 82.2% had access to electricity and 41.8% had piped water in the house. Health risks and CHWs action was evaluated and 45 people were identified as possibly needing referral, however only 27.8% of these people were documented as being referred by the CHWs. This research presents the demographics and health needs of the community and identifies potential health risks. This data is valuable as it enables Nomzamo to fully engage with the COPC model and will also assist with the development of COPC in the broader metropolitan area.

ABSTRACT NUMBER / ABSTRAKNOMMER: 27

The impact of physician education designed to improve the provision of essential information on the thrombophilia screening request form

Ibtisam Abdullah (Stellenbosch University/NHLS Tygerberg Hospital), Zivanai C. Chapanduka (Stellenbosch University/NHLS Tygerberg Hospital), Debbie A. Jafta (AMPATH Laboratory and Stellenbosch University)

Background: Thrombophilia screening tests are highly specialised and are affected by several pre-analytical variables. Completeness of essential information on the request forms is crucial for patient-specific interpretation of thrombophilia test results. That information is often missing from the request forms. Objective: To determine the impact of insufficient clinical data on request forms received at Tygerberg Hospital. Method: Two retrospective audits were performed to evaluate the completeness of request forms for thrombophilia screening and the effect of incomplete data on the interpretive comment. The second audit was performed after an educational event, directed at the requestors of the thrombophilia screening. The education focused on the importance of completing the request forms properly and highlighted the information required for interpretation of the results. Results: In the first audit, all request forms had complete patient demographic information but none had complete essential information for the thrombophilia result interpretation. Lack of essential clinical information had a significant impact on the interpretive comment provided. Based on the results of the second audit, the educational event had no demonstrable impact because there was no improvement in the provision of the essential information. On questioning of a sample of the physician population, all respondents revealed that the reason for the non-provision of the information was the request form itself. They shared that the request form did not have enough space for the information required. Conclusion: Insufficient clinical information on request forms has a significant impact on patient-specific interpretive comments. Education alone failed to resolve the problem, possibly due to the inappropriate design of the current request form. It is strongly recommended that a new method of capturing the required information be designed. This should include a new format for the current request form, a separate request form for thrombophilia screening and electronic ordering.

ABSTRACT NUMBER / ABSTRAKNOMMER: 28

Why are Appendicitis and Abscesses treated at Tertiary Hospitals: The Capacity of First-Level Hospitals to Perform Essential Surgical Operations in South Africa

Kathryn M. Chu (Stellenbosch University), Juan H. Klopper (University of Cape Town), J. Christo Kloppers (University of Cape Town), Megan Naidoo (Stellenbosch University), Anthony Reed (University of Cape Town)

Objective: To describe the volume and proportion of six essential operations conducted at first-, second-, and third-level hospitals in Cape Town, South Africa. Methods: The Metro West Geographic Service Area of Cape Town, South Africa has an urban population of 2.1 million persons, and three first-level, three non-obstetric and non-gynecological second-level, and one third-level hospital. The number and volume of six essential operations: abscess drainage, appendectomy, hernia repair, cholecystectomy, laparotomy, and amputations were captured from April 1, 2015 to March 31, 2016. Findings: First-level hospitals performed 0.2% of the selected essential operations. The majority of these were performed at second-level hospitals (66.9%) while, third-level hospitals conducted a third (32.9%) of these procedures. Conclusion: First-level hospitals in this study performed very few of the selected essential operations that are designated as first-level hospital procedures by the World Bank. In contrast, third-level hospitals conducted nearly a third of these procedures, which is not as cost-effective and limits resources for more complex surgical conditions. Improving surgical capacity at lower level hospitals is urgently needed to expand surgical access. Understanding reasons for the lack of surgical capacity at first-level hospitals is paramount to developing strong surgical systems in lower- and middle-income countries..

Theme 2 / Tema 2
Infectious Diseases /
Infeksiesiektes

ABSTRACTS/ABSTRAKTE

Oral Presentations / Referate

ABSTRACT NUMBER / ABSTRAKNOMMER: 1

A longitudinal analysis of host transcriptional responses during tuberculosis progression

Stuart Meier (Stellenbosch University), Gerard Tromp (Stellenbosch University)

A detailed understanding of the host response to M.tb infection during progression to active TB diagnosis can help identify a) early biomarkers of disease; b) pathological host immune responses that may contribute to disease development; and c) targets for new treatment regimes. Here, we analysed RNA-seq data generated in two separate longitudinal studies of incident TB to quantify the transcriptional response of M.tb infected individuals from 24 months to a few months before TB diagnosis. The Grand Challenges 6-74 (GC6-74) and Adolescent Cohort Study (ACS) enrolled and followed healthy individuals that were at high risk of developing TB for a period of two years and respectively identified 79 and 46 individuals that developed TB out of 4,446 and 6,363 participants. Peripheral whole blood was collected at each predetermined time point and was used for RNA-seq. All cases and 435 matched controls were sequenced. We initially analysed the studies separately using 6-month intervals to TB diagnosis. Substantial overlap in, and similar numbers of, differentially expressed (DE) genes suggested that a joint analysis was reasonable. The samples size of the combined study permitted using 3-months intervals to provide finer-grained resolution of time to TB diagnosis. In all analyses, more DE genes were detected at times closer to TB diagnosis. Pathway and gene ontology analyses identified over-representation of genes involved in numerous host defense pathways with a predominance of interferon signaling and neutrophil mediated immunity detected up to 9 months before TB diagnosis. The results generated in this study reveal novel host longitudinal responses that may contribute to the development of active TB.

ABSTRACT NUMBER / ABSTRAKNOMMER: 2

A retrospective review of the utility of chest x-rays in diving and submarine medical examinations

LR Davids (Institute for Maritime Medicine), WAJ Meintjes (Stellenbosch University)

Introduction / Background: There's controversy regarding routine Chest X-rays (CXR) as part of fitness evaluations of divers and submariners. The UK HSE require CXR on clinical indication only, while individuals in high TB prevalence areas (such as SA) insist on annual CXR. National policy must consider the utility of CXR against the risks associated with screening (e.g. radiation). Excellent records are available for medical examinations of military divers and submariners. These were used to evaluate the utility of CXR. **Methods:** CXRs of all military divers and submariners from 1987 to 2018 were reviewed to describe the incidence of abnormalities, false positive results and subsequent response. For those with abnormalities, the medical history of the preceding year was reviewed, to determine whether a clinical indication existed. **Results:** A total of 894 individuals (47% divers, 51% submariners and 2% both) contributed 5,281.41 person-years of service (range: 1-28.43 years). Fitness examinations totaled 3,562, including 2,777 CXRs, with reports for 2772. Abnormalities were reported for 58(6.49%) participants, in 72 (2.6%) CXRs. The 58 individuals with abnormal CXRs had 31 no follow-up and 19/27 normal (including 11/15 CT scans). Radiology results caused 15.5% (n=9) being declared unfit (n=6 temporarily), 45 were fit, and one fit with restrictions. Three were declared unfit for other medical reasons. **Discussion / Conclusions:** Almost one in 15 participants had an abnormal CXR, most commonly at baseline. However, 32.8% were normal on subsequent examinations (including acute infection). We recommend routine CXR at baseline and every five years thereafter, possibly more frequently after >15 years of service.

ABSTRACT NUMBER / ABSTRAKNOMMER: 3

A 'nice to have' or a 'non-negotiable': South African healthcare workers' knowledge, attitudes, practices and perceptions of vaccination

Kayla Liedemann (Stellenbosch University), Angela Dramowski (Division of Health Systems and Public Health, Department of Global Health, Stellenbosch University)

Introduction: Non-immune healthcare workers (HCWs) are at high risk of contracting and transmitting vaccine-preventable diseases (VPDs). Data on the knowledge, attitudes and practices (KAP) of African HCWs regarding the World Health Organization (WHO)-recommended vaccinations is extremely limited. Methods: A self-administered KAP survey was completed by 300 HCWs at Tygerberg Hospital, Cape Town between June and October 2018. All categories of HCWs were eligible including clinical staff (nurses, doctors, allied health) and non-clinical staff (laboratory, pharmacy, administrative, household and porter staff). Results: Of the 300 participants, most were female (76.0%), aged between 18-40 years (63.3%) and employed as clinical staff (252; 84.0%). The overall mean knowledge, attitudes and practices scores were 57.1% (17.7/31), 68.4% (13.7/20) and 39.9% (6.0/15) respectively; clinical staff scored significantly higher than non-clinical staff in all three areas ($P < 0.001$). HCWs believed vaccines to be effective (84.7%) and safe with few side effects (73.0%). Vaccine uptake was highest for hepatitis B (82.3%), followed by measles (53.0%) and diphtheria/ tetanus (33.7%) and poorest for influenza (22.7%). Common reasons for vaccination included HCWs wanting to protect themselves, their families and their patients. Common reasons for not vaccinating included fear of vaccine side effects and lack of workplace access. Conclusions: Clinical HCWs had better KAP regarding vaccination than non-clinical HCWs. Strategies to improve HCW vaccination uptake should focus on vaccination education and facilitation of better workplace access to vaccination.

ABSTRACT NUMBER / ABSTRAKNOMMER: 4

Development of functional immune readouts for the confirmation of Mendelian Susceptibility to Mycobacterial Disease and related Primary Immunodeficiencies

Ansia van Coller (Stellenbosch University), Brigitte Glanzmann (Stellenbosch University), Helena Cornelissen (NHLS/Stellenbosch University), Marlo Möller (Stellenbosch University), Craig Kinnear (Stellenbosch University), Michael Urban (Stellenbosch University), Monika Esser (NHLS/Stellenbosch University), Richard Glashoff (NHLS/Stellenbosch University)

In countries with high TB prevalence, individuals with Mendelian Susceptibility to Mycobacterial Disease (MSMD) are prone to severe, persistent, unusual and/or recurrent TB. Several mutations that disrupt the IL-12-IFN- γ cytokine pathways (essential for control of mycobacterial infections) have been described. These mutations result in distinct disorders, which vary in clinical presentation. The aim of this study was to implement and optimise a set of immune phenotyping and functional validation tests for the key pathway, the IFN- γ and IL-12 cytokine axis, involved in MSMD, and to use these assays to assess immune function in a cohort of suspected MSMD patients. DNA and PBMCs were isolated from the blood of 17 participants with suspected MSMD. Whole exome sequencing was performed, and the data was processed using an in-house bioinformatics pipeline, TAPER™. IFN- γ R1 and IL-12R β 1 expression was assessed by standard flow cytometry, and IFN- γ and IL 12 signalling was assessed by the detection of pSTAT1 and pSTAT4 through intracellular phospho-specific flow cytometry (Phosflow). IFN- γ -induced IL-12 production and IL-12-induced IFN- γ production was assessed by ELISA following 48-hour co-stimulation of PBMCs with PHA and the respective cytokine. The functional and genetic data were reconciled to determine the extent of functional impairment associated with identified variants. Plausible disease-causing variants were identified in 71% of participants, of which 47% were in known MSMD-associated genes. All but one of the identified variants were novel. Through these functional assays, we identified functional immune deficits in all participants. The functional results were variable, which emphasises the importance of in vitro functional confirmation of MSMD. These assays could be routinely performed for patients with suspected MSMD. A molecular diagnosis with confirmed functional

impairment paves the way for targeted treatment and improved disease management options for these patients.

ABSTRACT NUMBER / ABSTRAKNOMMER: 5

Evaluation of MALDI-TOF to determine accessory gene regulator system functionality in *Staphylococcus aureus* isolates

Shima Abdulgader (Stellenbosch University), Amike van Rijwijsk (Stellenbosch University), Johan van Wyk (Ampath Laboratories), Mae Newton-Foot (NHLS / Stellenbosch University), Andrew Whitelaw (NHLS / Stellenbosch University)

Introduction: The quorum sensing two-component accessory gene regulator (*agr*) system regulates the expression of virulence factors in *S. aureus*. Changes within this *agr* locus may result in its dysfunctionality, altering virulence regulation, and affecting disease manifestation and clinical outcomes. The phenotypic hemolysis test commonly used to determine *agr* dysfunctionality is subjective, therefore we assessed the use of MALDI-TOF MS for the detection of the delta-hemolysin protein and thereby *agr* functionality. Method: 199 *S. aureus* isolates were screened for *agr* dysfunctionality using both the hemolysis assay and MALDI-TOF MS. Delta-hemolysin is detectable by MALDI-TOF as a wild type (WT) peak at 3005±5 Th or a variant peak at 3035± 5 Th in functional isolates, while dysfunctional isolates show neither peak. The agreement between the two assays was assessed using Cohen's kappa. PCR and Sanger sequencing were used to characterise isolates in which both peaks were observed. Results and conclusion: *agr* dysfunctionality was detected in 12.5% and 11% of isolates using the phenotypic assay and MALDI-TOF MS respectively, with 95% agreement between assays (kappa=0.74). Both WT and variant peaks were detected in 29 isolates, with the variant peak being dominant in intensity. PCR and sequencing confirmed the presence of a mutation within the *hld* gene, consistent with the mass shift. These findings suggest that in isolates with both peaks, the dominant peak is indicative of the *hld* genotype. The agreement between these two assays suggests that MALDI-TOF MS is an efficient method to assess *agr* functionality.

ABSTRACT NUMBER / ABSTRAKNOMMER: 6

HPV strain prevalence and HPV-related biomarker expression in vulvar carcinoma at Tygerberg academic hospital

Nadine Petersen (Stellenbosch University), Rubina Razack (Stellenbosch University), Micheline Sanderson (NHLS / Stellenbosch University)

Vulvar carcinoma has globally increased, possibly due to escalated human papillomavirus (HPV) infection, albeit type-specific HPV varying geographically. In South Africa, vulvar carcinoma histological subclassification is occasionally specified with HPV prevalence largely unknown. Furthermore, HPV infection may augment susceptibility to HIV infection and vice versa. The study aim was to identify HPV subtypes in vulvar intraepithelial neoplasia (VIN) and vulvar squamous cell carcinoma (VSCC) samples from HIV negative and HIV positive patients and to correlate HPV strain prevalence with clinical data and histopathological features. DNA was extracted from 72 VIN and 68 invasive VSCC FFPE tissues. HPV16, 18, 11 and 35 E6/E7 genes were amplified using SYBR green- based qPCR with cycle thresholds below 36 interpreted as positive for HPV DNA. Results showed that patients diagnosed with VIN and VSCC at Tygerberg hospital, between 1997 and 2018, were mostly between 36 and 59 years old. In the pre-cancerous subclass, 37% LSIL and 78% of HSIL cases were HPV positive, whilst for the VSCC subclasses, HPV was detected in 60% keratinizing, 66% non-keratinizing, 40% warty and 43% basaloid lesions, respectively. HPV16 was detected in 64% VIN and 50% VSCC samples whereas HPV18 was detected in 4% VIN and 7% VSCC samples. HPV11 was amplified in 8% VIN and 6% VSCC samples while HPV35 was detected in 3% VIN samples. Results showed 43% VIN and 53% VSCC cases positive for HPV16 were from HIV positive patients while all HPV18 and 11 positive samples had HIV co-infection. HPV16 was predominantly identified in VIN and VSCC samples and HIV co-infection was observed in a large number of HPV positive cases. Elucidation of HPV epidemiology in our region is

important to improve the understanding of molecular and pathological changes during vulvar carcinoma development to better predict the clinical behaviour and metastatic potential of these tumours.

ABSTRACT NUMBER / ABSTRAKNOMMER: 7

Incident tuberculosis (TB) disease among patients receiving biologic therapies in the Western Cape, South Africa

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Setting: The Western Cape Province, South Africa, has one of the highest tuberculosis incidence rates worldwide. Biologic therapy is associated with an increased risk of tuberculosis disease. We evaluated the incidence of tuberculosis disease in Western Cape public sector patients treated with biologic therapy. Objective: To describe the incidence rate and time to tuberculosis onset among public sector patients in the Western Cape receiving biologic therapies. Design: We conducted a retrospective, descriptive analysis using data recorded by the Provincial Health Data Centre (PHDC) from January 2007 (first use of biologic therapy in the Western Cape) to September 2018. We identified 613 patients treated with TNF α or non-TNF α biologic therapies. Results: Of the 613 patients, 37 developed tuberculosis after biologic therapy exposure. The incidence rate of tuberculosis disease per 100 000 person years was estimated to be 2216 overall [95% confidence interval (95% CI) 1583-3022], 2987 for TNF α inhibitors [95% CI 1826-4629] and 1525 for non-TNF α inhibitors [95% CI 886-2459]. The incidence rate ratio was 1.96 times higher in the TNF α inhibitor compared to non-TNF α group ($p = 0.057$). Patients treated with rituximab, golimumab and infliximab had the highest tuberculosis incidence rates. The median time to tuberculosis disease in months was lowest in golimumab (4.9) followed by rituximab (7.5). Conclusion: Non-TNF α and TNF α biologic therapies increased the risk of tuberculosis by 2.2-fold and 4.4-fold respectively compared with the background risk of 681 cases per 100 000 per year in the Western Cape.

ABSTRACT NUMBER / ABSTRAKNOMMER: 8

Low Isoniazid Concentrations in Pregnant and Postpartum Women Treated for Tuberculosis Irrespective of Efavirenz-based ART Co-Treatment

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Background: Physiological changes during pregnancy may alter drug pharmacokinetics. We explored the effects of pregnancy on isoniazid (INH) and rifampin (RMP) pharmacokinetics in women treated for tuberculosis with and without efavirenz (EFV)-based antiretroviral treatment (ART) co-treatment. Methods: P1026s is a non-blinded study of antiretroviral and antituberculosis pharmacokinetics in HIV-infected and uninfected pregnant women. Intensive steady-state 12-hour pharmacokinetic profiles of INH and RMP were performed during the 2nd trimester (2T), 3rd trimester (3T) and 2-8 weeks postpartum (PP). Daily antituberculosis tablets were given according to WHO recommendations. HIV-infected women also

received EFV-based ART. INH and RMP plasma concentrations were measured and the pharmacokinetic parameters were characterized using non-compartmental analysis and compared to published non-pregnant South African adult data. Results: Preliminary pharmacokinetic data are available for 25 participants; 14 African, 6 Thai and 5 of other descent. Eleven women were HIV-infected on EFV-based ART. The INH and RMP pharmacokinetic data in 2T, 3T and PP were available for 7, 10 and 7 women in the ART-group and 5, 11 and 8 women in the non-ART-group. INH median AUC_{0-∞} was 7.9, 8.4 and 8.7 µg·h/ml and 6.2, 10.9 and 14.8 µg·h/ml in the 2T, 3T and PP groups with and without ART respectively. INH exposure was low across all stages of pregnancy compared to historical South African non-pregnant INH exposure. RMP median AUC_{0-∞} was 36.8, 35.8 and 31.2 µg·h/ml and 30.6, 41.4 and 32.7 µg·h/ml respectively and similar to historical data. The respective INH and RMP exposures in each trimester were not statistically different between the ART- and non-ART-groups. Conclusions: In pregnant women treated for tuberculosis, INH concentrations were lower compared to non-pregnant concentrations, irrespective of EFV-based ART co-treatment. RMP concentrations in pregnancy were similar. The clinical relevance of low INH exposure when treating pregnant woman with tuberculosis needs to be determined.

ABSTRACT NUMBER / ABSTRAKNOMMER: 9

Peripheral blood transcriptome is correlated with PET measures of lung inflammation during tuberculosis treatment

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Background: Pulmonary tuberculosis (PTB) is a leading cause of morbidity and mortality worldwide and treatment is long (six months). PET-CT has been used to monitor lung inflammation and has shown that only a small fraction of patients with durable cure have no inflammation at the end of treatment. We analyzed longitudinal transcriptomic data to identify genes whose expression correlated with inflammation. Methods: Ninety-nine patients diagnosed with active TB were enrolled and were examined by [¹⁸F]FDG PET-CT to monitor lung inflammation at diagnosis, month 1 and month 6, at each time whole blood was collected. Seventy-six participants attained durable cure. We used linear- mixed-effect, multi-level models to identify genes with expression levels that changed in concert with PET metrics while correcting for cell-type proportions derived by deconvolution. We performed over-representation analysis of the genes to identify the pathways and processes driving the biology. Results: We identified genes whose change in expression levels was an independent predictor of the change in PET metrics of inflammation during PTB treatment. Gene set over-representation analyses identified numerous pathways relating to inflammation, but also the complement and coagulation cascade pathway, as over-represented. Our results showed that peripheral blood transcription reflects gene expression changes highly correlated with the changes in PET-CT metrics, and that these identify signatures of inflammation. [¹⁸F]FDG uptake indicates glycolytic activity that was assumed to be due to inflammation. Our results demonstrated that PET-CT of lungs does indeed measure the lung inflammation in PTB. Our results also add to our understanding of the biology during the resolution of lung inflammation in active PTB.

ABSTRACT NUMBER / ABSTRAKNOMMER: 10

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 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. Objectives: To validate recently identified host protein biosignatures as tools for the diagnosis of TB. 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 small protein biosignatures comprising of three analyte (NCAM, CRP and I-309) which diagnosed TB in all study participants with AUC of 0.901 (95% CI 0.707-0.928). 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 WHO Target Product Profile minimum requirements such a test.

ABSTRACT NUMBER / ABSTRAKNOMMER: 11

South African undergraduate health science students' knowledge, attitudes, practices and preferences regarding vaccination

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Background. South African universities lack comprehensive vaccination policies for undergraduate health science students, despite exposure to vaccine-preventable diseases (VPDs) during clinical training. We investigated Stellenbosch University's health science students' knowledge, attitudes and practices (KAP) regarding vaccination and established their preferences for delivery of a student vaccination programme. Methods. A 32-question survey regarding students' KAP and preferences about vaccination was emailed to undergraduate health science students (n=2 472) between November 2017 and April 2018. Mean KAP scores and vaccination preferences were compared between Medical and Allied Health students. Responses to three open-ended questions were coded by two independent researchers to identify emerging themes. Results. Questionnaires (n=403) were completed by Medical (79.8%) and Allied Health (20.2%) students. There was no difference between the mean K-scores of the two groups (6.8 vs 6.4/10 questions; p=0.998). Students had positive attitudes to vaccination (mean A-score 4.1/7 questions) but felt education regarding recommended vaccinations was lacking. Although students supported the idea of mandatory vaccinations, many raised concerns regarding access to and affordability of vaccinations. Most (90.3%) had completed/were completing the Hepatitis B immunization series. There was widespread support for peer vaccination sessions and development of a webpage or mobile application to assist with scheduling of vaccinations. Conclusions. Undergraduate health science students support the introduction of an expanded vaccination policy. Additional educational content, vaccine accessibility and affordability are important issues to consider in the development of a health science student vaccination programme..

ABSTRACT NUMBER / ABSTRAKNOMMER: 12

Structural impact of selected Raltegravir resistance variants on Dolutegravir binding to South African HIV-1 Integrase subtype C protein

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Background: HIV-1's viral Integrase enzyme has become a viable target for highly specific antiretroviral therapy (ART) due to its importance in the infection and replication cycle of the virus. Sequence analysis identified 6 novel variants that could be associated with Integrase drug resistance. These variants were identified in routine HIV-1 drug resistance testing in patients failing ART and Raltegravir (RAL) treatment.

Therefore, Dolutegravir (DTG) is now considered a drug of choice for treatment. Aim: In this study we assess the impact of 6 variants, based on their positions relative to the binding pocket and DNA, on the binding of DTG to the HIV-1 subtype C (HIV-1C) Integrase structure using structural methods. Methods: DTG was extracted from a homologous template, 3s3n, into the binding pocket of the three-dimensional (3D) homology model of HIV-1C Integrase using PyMOL. The 3D model in complex with DNA, magnesium (MG) and DTG was energy minimized using Gromacs software. Stabilizing/destabilizing effects of selected variants on protein stability were calculated using mCSM webserver. Interaction analyses of DTG to the wild type (WT) and mutated energy minimized structures were performed using PyMOL. Results 5 variants resulted in the destabilization of the protein, while only 1 stabilized the Integrase. PyMOL affirmed stability predictions and showed that 5 of the variants resulted in loss of polar interactions with neighbouring residues, with 1 variant showing no change in interactions. Moreover, interaction analysis performed among the catalytic triad residues of the Integrase (D64, D116 and E152), drug, MG and DNA molecules showed a reduction in polar activity for the mutated Integrase in comparison to the WT protein. Conclusion: Results indicate that the WT structure retained more interactions compared to the mutated structure; suggesting DTG binds more strongly to the WT than mutated structures. Therefore, variant screening can be beneficial before prescribing treatment.

ABSTRACT NUMBER / ABSTRAKNOMMER: 13

The Contemporary Study of Acute Myocarditis in Sub-Saharan Africa (CAMISSA)

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Introduction: The aetiology and estimated incidence of acute myocarditis (AM) remains undefined in Africa. Whilst cardiac magnetic resonance (CMR) provides for a provisional non-invasive diagnosis, endomyocardial biopsy (EMB) remains the gold standard. The developed world has experienced a shift in the viral epidemiology of AM and the European Society of Cardiology's most recent position statement on myocarditis recommends both CMR and EMB as the standard of care in suspected cases. We report on the interim results of the study. Purpose: To determine the nature of presentation, underlying aetiology, and outcomes of patients presenting with AM to Tygerberg Hospital. Methods: A cohort of patients presenting or referred to Tygerberg Hospital between January 2018 and December 2022 with clinically suspected AM that are investigated according to the ESC recommendations on myocarditis, which includes CMR and EMB, will be included. Results: A total of 46 (mean age 41.3±13.3 years, 65.3% male) clinically suspected cases of AM were identified between January 2018 and June 2019. 23 patients presented with symptoms of ACS, 16 with heart failure, 4 with ventricular tachycardia and 2 with heart block. At index presentation 31 had an elevated hs-Trop T. CRP was elevated in 18 of these, and in isolation in another 6. 31 patients met the Lake Louise criteria on CMR, of which 4 fulfilled the Dallas criteria and 15 the immunohistochemical criteria on EMB. 8 CMR negative cases were found to have AM on EMB. 29 were PCR positive for cardiotropic viruses. Conclusion: This study demonstrates the heterogeneity in presentations and provides insight into the possible viral pathogens within our local setting. This appears to be similar to those reported in the developed world. To our knowledge, this is the first study to evaluate AM in Africa.

ABSTRACT NUMBER / ABSTRAKNOMMER: 14

THE IMPORTANCE OF CONFIRMATORY HIV SEROLOGICAL TESTING: HIGH POSITIVE RESULTS CAN STILL BE FALSE POSITIVE

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Background: The consequences of a falsely reactive HIV test can be significant, for patients and healthcare providers. This case report describes a sample collected from a patient prior to elective surgery which yielded pronounced discordant HIV serological test results: high positive on a fourth generation serological screening assay (Roche COBAS Elecsys HIV combiPT) but negative on a fourth generation confirmatory assay (Abbott HIV Ag/Ab Combo). We investigated this case thoroughly to determine HIV infection status. **Methods:** Five separate samples obtained over a period of 2 weeks were tested using the screening and confirmatory assays as well as another fourth generation assay, HIV immunochromatographic rapid assays and molecular assays for HIV-1 and HIV-2. Potential causes of falsely reactive serological results were investigated, including autoimmune and non-HIV infectious diseases. Samples were sent to the manufacturer for further analysis. **Results:** The screening assay result was positive on all samples with a very high signal to cut-off ratio (S/CO) of more than 400 throughout. However, multiple confirmatory serological and molecular assays were unable to detect HIV-1 or HIV-2 specific antibodies, antigen or nucleic acid. There was no evidence of auto-immune disease or non-specific reactions in other immunoassays on the same platform. However, a recombinant immunochromatographic assay had a faintly visible reactivity to gp41 peptide and the manufacturer investigation reported cross-reactivity to one of the screening assay's synthetic peptides. **Conclusion:** This is a rare case of a false-high-positive result on a fourth-generation HIV serology assay due to high level non-specific reactivity to an isolated synthetic peptide component of that assay. It highlights the need for confirmatory testing even in HIV high prevalence settings and awareness that false-positive serological results may have a high S/CO.

ABSTRACT NUMBER / ABSTRAKNOMMER: 15

The in vivo evolution of antimicrobial resistance of a single *Acinetobacter baumannii* strain

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Introduction: *Acinetobacter baumannii* is a common nosocomial pathogen, and frequently resistant to multiple antimicrobials. Although multidrug resistance in *A. baumannii* at a population level has been extensively researched, little is known about the development of resistance in patients on treatment. *A. baumannii* was isolated from three sequential sputum samples from a single patient at Tygerberg Hospital, over 8 days. The isolates exhibited stepwise development of resistance against multiple antibiotics. This study describes the progressive development of resistance by this strain during treatment. **Methodology:** The genetic relatedness of the isolates was determined by rep-PCR. Antimicrobial susceptibility was determined using Vitek® 2 AES™, disk diffusion, gradient diffusion and broth microdilution. PCR was used to detect the aminoglycoside modifying enzyme aphA6; mutations in the *adeB*, *adeA*, *adeR* and *adeS* genes were detected by PCR and Sanger sequencing. **Results:** Rep-PCR confirmed the three isolates to be identical. Increasing resistance to amikacin, gentamicin and tobramycin, as well as to tigecycline, was observed. Amikacin resistance was attributed to the presence of the *aphA6* gene, present in all three isolates. The patient was treated with amikacin prior to any of the samples being taken; therefore, it is unclear whether amikacin resistance was harbored prior to or emerged during therapy. A novel 24 bp duplication was detected in the *adeS* gene of isolate 3. The in-frame duplication results in an 8 amino acid duplication in the AdeS sensor histidine kinase, which regulates expression of the AdeABC efflux pump. As the patient was not treated with tigecycline, gentamicin treatment may have selected for the duplication in *adeS*, resulting in cross resistance to tigecycline. **Conclusion:** This study identified a possible novel tigecycline and gentamicin resistance mechanism and contributes to the basic understanding of how antimicrobial treatment can contribute directly to the acquisition of resistance.

ABSTRACT NUMBER / ABSTRAKNOMMER: 16

Tuberculous Sclerokeratouveitis in Immunocompetent South African Patients

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BACKGROUND/AIMS: Ocular tuberculosis remains a diagnostic challenge since its clinical presentation is so variable. We describe the clinical characteristics of patients presenting with sclerokeratouveitis secondary to *Mycobacterium tuberculosis* infection. **METHOD:** Retrospective analysis of 11 consecutive patients presenting with sclerokeratouveitis to Tygerberg Hospital. All patients underwent: 1) detailed ophthalmological evaluation, 2) tuberculin skin test (TST), 3) chest X-ray to assess for systemic disease and 4) laboratory investigations to exclude other causes of ocular inflammation. Tuberculous sclerokeratouveitis was diagnosed if: 1) clinical findings showed scleritis with adjacent peripheral keratitis and anterior uveitis, 2) TST was positive, 3) other causes of sclerokeratouveitis were excluded and 4) positive response to tuberculosis treatment without adjunctive anti-inflammatory agents was noted. **RESULTS:** All 11 patients were females with no history of previous/current pulmonary tuberculosis and only 1 was HIV-positive but virologically suppressed. The mean age was 29.1 ± 12.1 years. All patients had a strongly positive TST result. Scleral involvement was nodular in 4 patients and diffuse in 7. Corneal involvement manifested as ill-defined peripheral stromal opacities adjacent to the area of scleritis with deep corneal stromal vessels. Corneal sensation was decreased in all involved eyes. All patients responded to tuberculosis treatment with complete resolution of the sclerokeratouveitis. **CONCLUSION:** In our highly endemic area, tuberculous sclerokeratouveitis is seen in young, immunocompetent patients and responds well to tuberculosis treatment without concurrent immunosuppression. Decreased corneal sensation may lead to an incorrect diagnosis of herpetic infection if a high index of suspicion is not maintained for ocular tuberculosis.

ABSTRACT NUMBER / ABSTRAKNOMMER: 17

Acquired HIV-1 drug resistance identified using high throughput sequencing (HTS) in South African People Living with HIV-1 (PLHIV-1)

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BACKGROUND: HIV-Integrase (IN) has proven to be a viable target for highly specific HIV-1 therapy. The Integrase strand transfer inhibitor (InSTI) dolutegravir (DTG) could play major role in future antiretroviral therapy (ART) regimens in sub-Saharan Africa. It has a high potency and barrier to resistance, good tolerability, and low cost. In South Africa ART for the treatment of people living with HIV-1 (PLHIV-1) has been scaled up since its first initiation in 2006, with over 4.4 million people accessing treatment by the end of June 2018. We aimed to characterize the HIV-1 pol gene in patients receiving first/second-line ART in South Africa and identify resistance-associated mutations (RAMs) against available first and second-generation InSTIs. **MATERIALS AND METHODS:** We performed high-throughput sequencing (HTS) analyses on 68 treatment-experienced PLHIV-1. Plasma samples were obtained from the National Health Laboratory Services (NHLS), thereafter-genotypic resistance testing (GRT) was done using next-generation sequencing (NGS) with the Illumina HiSeq2500 platform. **RESULTS:** GRT-NGS detected major RAMs against PIs, NNRTIs, and NRTIs. We identified that $n=57$, 85% PLHIV-1 were susceptible to all classes of InSTIs treatment regimens. However, $n=3$, 4% of the patients had major InSTIs mutations such as Y143R, S147G, and E138K, although the patient report did not mention the use of InSTI. Of concern is the presence of E138K mutation in a patient receiving 3TC, AZT LPV/r. This confers Low-Level Resistance to elvitegravir (EVG) and raltegravir (RAL) and confers Potential Low-Level Resistance to bictegravir (BIC) and DTG. **CONCLUSION:** Our data suggest the lower prevalence of InSTI RAMs, in South Africa. HTS with a multiplexed amplicon is a promising approach for the large-scale surveillance of primary drug resistance mutations DRMs in sub-Saharan Africa where routine pre-ART GRT is not the standard of care. We propose this strategy for future optimization for therapeutic regimens in our settings.

POSTER PRESENTATIONS / PLAKKAATAANBIEDINGS

ABSTRACT NUMBER / ABSTRAKNOMMER: 18

A diagnostic interferon-gamma release assay for *Mycobacterium bovis* infection in white rhinoceros (*Ceratotherium simum*)

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Mycobacterium bovis (*M. bovis*) pathogen, the cause of bovine tuberculosis (bTB) is endemic in Kruger National Park (KNP), South Africa. White rhinoceros are a threatened species and the risk of *M. bovis* infection currently prevents their translocation. Therefore, accurate assays are necessary for screening white rhinoceros. Interferon gamma (IFN- γ) release assays (IGRA) are commonly used for TB detection in humans and other wildlife species. Hence, the aim of this study was to develop an IGRA for white rhinoceros. Heparinized whole blood was collected from immobilized white rhinoceros in KNP (n=131) and incubated overnight in QuantiFERON®-TB Gold (QFT) blood collection tubes, after which the plasma was harvested following centrifugation. Tissue samples for mycobacterial culture were available from a subset of 21 rhinoceros. *Mycobacterium bovis*-specific IFN- γ release in plasma samples were measured using the Mabtech equine IFN- γ ELISAPRO. An IGRA result was calculated as the difference in IFN- γ concentrations in the Nil and TB antigen tubes. Using test results for the white rhinoceros with known infection status, a diagnostic cutoff value was calculated as 21 pg/ml. Additionally, cutoff values for IFN- γ concentrations for plasma from QFT Nil and QFT Mitogen tubes were calculated to increase confidence in IGRA result interpretation. The combination of the QFT stimulation platform and Mabtech equine IFN- γ ELISA is a promising diagnostic test to distinguish between of *M. bovis*-infected and -uninfected white rhinoceros.

ABSTRACT NUMBER / ABSTRAKNOMMER: 19

A STRATEGY TO REDUCE THE PREVALENCE OF FALSE POSITIVE HIV TEST RESULTS

MA Linström (NHLS / Stellenbosch University)

High prevalence of Human Immunodeficiency Virus (HIV) presents a contamination risk on automated platforms. Highly sensitive HIV serology assays detect miniscule amounts of HIV antigen and antibodies. At Tygerberg a high number of low positive and equivocal (LP&E) and false positive (FP) results were seen after an automated platform was installed. The chemical pathology module was suspected as the source of the contamination. As a solution, a "q" suffix was added to the sample. Only the HIV serology module can process this label. The impact of the "q" suffix on false positive prevalence and the factors influencing false positive prevalence were assessed. Results from samples sent to TBH NHLS for HIV screening between September '17 and May '19 were included. Creatinine was used as proxy for contamination risk stratification. The prevalence of FP and LP&E results was calculated in these strata and compared before and after the "q" suffix. For comparing risk of contamination and efficacy of the assay odds ratios, positive predictive value (PPV) and specificities were calculated. The FP and LP&E prevalence decreased by 55-60% after the "q" suffix. The odds ratio for samples first tested for creatinine to generate a FP result was 4.1 (CI95% 1.69-9.97). Of the LP&E results 85% were proven negative on repeat testing. The assay's PPV over this time was 91.98%, almost 8% lower than the manufacturer's. The "q" suffix was successful in curtailing the rate of FP production. The 2-4 times increased likelihood of generating a FP with concurrent creatinine testing is strongly suggestive of contamination on the creatinine module. Patient factors are known to influence the specificity of the assay, but in our context it was contamination. A low PPV together with the multiple safeguards needed to prevent contamination, emphasises the importance of national guideline focus on dedicated separate sample testing.

ABSTRACT NUMBER / ABSTRAKNOMMER: 20

A Third-Line ART Referral Process in the Western Cape Province, South Africa: Estimating Qualification and Predictors of Referral

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BACKGROUND: HIV is a major contributor to burden of disease and the South African ART programme is the largest in the world. Implementation of a universal test and treat policy is expected to significantly increase the number on ART. However, increasing exposure to ART may have implications for rates of treatment failure and drug resistance, implying greater need for third-line regimens in the future. South Africa initiated the world's first public sector third-line access programme in 2013. However, there is a paucity of data quantifying the need for third-line therapy in this setting and the programme has not been formally evaluated. **METHOD:** Routinely collected data were analysed to derive an estimate of patients meeting the criteria for referral to a third-line ART committee. This output was then matched with a list of patients who were actually referred. Predictors of referral were subsequently identified. **RESULTS:** 947 patients met criteria for referral to the third-line ART and 167 were actually referred. Comparison between the two groups revealed a poor overlap of only 42 patients. In multivariate analysis, independent predictors of referral included receiving care at a hospital rather than a PHC facility (aOR=2.15, 95% CI 1.1-4.2), a higher number of VLs ≥ 1000 copies/ml whilst on a PI (aOR=1.2, 95%CI 1.01-1.42) and a greater number of years on a PI (aOR=1.25, 95% CI 1.07-1.46). Patients with a six-month gap in dispensing records were less likely to be referred (aOR=0.37, 95% CI 0.17-0.81). **CONCLUSION:** This study adds to a limited body of knowledge regarding third-line ART programmes and provides an estimate for the need for third-line therapy in the South African setting. The findings indicate missed opportunities and inappropriate referral of patients. Predictors of referral were not unexpected, however clinician awareness of and compliance with the referral criteria remains unknown and may be contributory.

ABSTRACT NUMBER / ABSTRAKNOMMER: 21

Admixture mapping of TB susceptibility in a five-way admixed southern African population

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Tuberculosis (TB), caused by the human pathogen *Mycobacterium tuberculosis* (M.tb), is ubiquitous in almost all populations residing in southern Africa. A number of studies indicated a disparity in the rates that different ethnic groups are infected with the TB bacterium and progress to active TB disease. The difference is not merely a reflection of socio-economic circumstances. Centuries of exposure to TB in Europe may have resulted in adaptive selection for TB resistance, in comparison to groups in sub-Saharan Africa that were only relatively recently exposed to the virulent European M.tb strains. Previous investigations of a highly admixed southern African population not only revealed indigenous Khoesan ancestry in the region, but also indicated that African ancestry are associated with an increased risk to progress to active pulmonary TB rather than remaining latently infected. However, these studies relied on a limited number of controls, inadequate sample size for reference populations and low SNP density. This study focuses on localizing and investigating ancestry-specific genetic regions associated with TB susceptibility in a unique complex five-way admixed South African population. Admixture mapping of 820 individuals (413 cases and 407 controls) was done using data generated from the Illumina Multi Ethnic Genotyping Array, a more appropriate tool for our diverse and highly admixed population. Our local ancestry results identify the ancestral origins of distinct chromosomal segments with a high degree of accuracy and allow for the identification of genetic regions associated with TB susceptibility. The adjusted allelic association results point to several candidate regions.

ABSTRACT NUMBER / ABSTRAKNOMMER: 22

Ancestry inference on the X chromosome yields novel tuberculosis susceptibility loci

Janine Schuin (Stellenbosch University), Haiko Schurz (Stellenbosch University), Caitlin Uren (Stellenbosch University), Marlo Möller (Stellenbosch University)

Background: Tuberculosis (TB) is complex disease influenced by the bacterium, environment and human host. South Africa is not only one of the World Health Organisation's top 22 high burden TB countries, but also home to diverse human populations with complex multi-way and sex-biased genetic admixture. This genetic diversity together with the exceptionally high South African TB incidence (1000/100 000 population per year) and the observed sex-bias of the disease - males are twice as likely to develop disease - can be used to elucidate disease susceptibility. Here we inferred global ancestry and identified sex-biased admixture, followed by local ancestry inference to facilitate the identification of TB susceptibility loci on the X chromosome. Methods: Global ancestry was inferred on the autosome and X chromosome using the ADMIXTURE program, while local ancestry inference on the X-chromosome was done using RFMix. Significant sex-bias admixture was detected using a Wilcoxon signed rank test based on the differences in ancestral distribution between the X chromosome and autosome. XWAS software was used for quality control and association testing of the genotyping data. Results: Significant sex-biased admixture was detected using global ancestry inference, confirming previous studies done in South Africa. Local ancestry inference allowed the identification of chromosomal regions with excess African ancestry, which correlated with TB cases. These loci may contain promising immune-related susceptibility genes. Conclusion: Global ancestry inference can quickly and accurately identify sex-biased admixture in highly admixed South African populations. Our findings indicate that X chromosome genes may contribute to the observed sex-bias of TB, which is further compounded by sex-bias admixture.

ABSTRACT NUMBER / ABSTRAKNOMMER: 23

Autophagy progression in *Mycobacterium tuberculosis*-infected macrophages

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While approximately 25% of the world's population is infected with the tuberculosis-causing bacteria *Mycobacterium tuberculosis* (M. tb), about 10% progress to active TB disease. Several studies have identified genomic loci that influence susceptibility. However, it is certain that more loci are involved. Recently, the Autophagy pathway has been shown to be involved in the clearance of M.tb. Autophagy is a degradative process in cells that digests and recycles unwanted cellular material. A key regulator of this pathway is the Ubiquitin ligase, PARKIN, and polymorphisms in the PARKIN-encoding gene, PARK2 are associated with mycobacterial diseases. We, therefore, believe that genes encoding components of the Autophagy pathway may be important in TB susceptibility. Additionally, M.tb can escape autophagic clearance by manipulating the host response. To better understand how this occurs, we investigated Autophagy progression over 72 hours in M. tb-infected macrophages. We report expression and localization of Autophagy-related proteins and the influence of Autophagy inhibition on intracellular bacterial viability. Our results show differential expression of autophagic organelle markers over time which correlated with mycobacterial survival in the cell. We also show that knockdown of PARKIN results in increased bacterial viability. These data provide us with new insight into how M.tb evades Autophagy, pointing to novel genes that may play a role in TB susceptibility. With this baseline response documented, modulations can be made to the experimental conditions providing us with more insight into the differential immune response of individuals to TB. A better understanding of this disease contributes to better drug treatments.

ABSTRACT NUMBER / ABSTRAKNOMMER: 24

Characterisation of colistin resistance mechanisms in clinical Enterobacteriaceae isolates from the Western Cape of South Africa

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Background: Colistin is a last-resort antibiotic for the treatment of carbapenem-resistant Gram-negative infections. Colistin resistance thus poses a threat to human health. Colistin resistance is encoded by mutations in chromosomal *pmrA*, *pmrB*, *phoP*, *phoQ* and *mgrB* genes; and the presence of plasmid-mediated *mcr* genes. This study describes colistin resistance mechanisms in clinical Enterobacteriaceae isolates from the Western Cape, South Africa. Materials/methods: Non-duplicate colistin resistant *E. coli* and *Klebsiella* spp. isolates were collected from the microbiology laboratory at Tygerberg Hospital during 2016 and 2017. Colistin resistance was confirmed using broth microdilution and SensiTest™. *mcr-1-5* were detected by PCR. Whole genome sequencing was used to identify colistin resistance mutations in *mcr*-negative isolates. Strain typing was performed by rep-PCR, MLST and SNP analyses. Results: Twenty-two *E. coli* and 7 *Klebsiella* spp. isolates, from nine healthcare facilities, were confirmed to be colistin resistant. *mcr-1* was present in 56% (12/22) of *E. coli* and 57% (4/7) of *Klebsiella* spp. isolates; which were largely unrelated based on rep-PCR. Colistin resistance mutations in *pmrB* were identified in 9 *mcr*-negative *E. coli* isolates; *pmrB* G19E (n=1) of ST636, *pmrB* P94Q (n=4) and *pmrB* L102Q (n=1) of ST1193, *pmrB* V161G (n=1) and *pmrB* G19R (n=1) of ST131, *pmrB* D312N (n=1) of ST1491. Two *mcr*-negative *Klebsiella* spp. isolates had complete deletions of *mgrB* and one contained an insertion sequence (IS1) in *mgrB*. Conclusions: While *mcr-1* was responsible for >50% of colistin resistance, mutations in *pmrB* and disruption of *mgrB* were common in *E. coli* and *Klebsiella* spp. respectively. Inactivation of *mgrB* results in activation of the Pmr system. The Pmr system and the *mcr-1* encoded phosphoethanolamine transferase modify the outer membrane lipopolysaccharide which is targeted by colistin, conferring resistance. The diverse strains, hospitals and resistance mechanisms suggest that selective pressure is the main driver of colistin resistance, rather than spread within the healthcare system.

ABSTRACT NUMBER / ABSTRAKNOMMER: 25

Determining the correlation between persister formation and clinical outcome in tuberculosis (TB) patients

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Tuberculosis (TB) is one of the top ten causes of death worldwide. Despite the availability of multiple anti-tuberculosis drugs, TB still claims ~2 million lives annually. Statistics indicate that 80% of the South African population (~46 million) has latent TB. Latent TB is defined as individuals infected with *Mycobacterium tuberculosis* without clinical symptoms, which is in part attributed to a phenomenon known as bacterial persistence. Persisters are antibiotic tolerant and could contribute to the requirement for prolonged TB treatment. Unfortunately, factors that trigger the entry into, survival in, and exit from a persistent state is largely unknown due to a lack of suitable tools to identify, study and characterise these small populations of non-or slowly replicating bacteria. However, the successfully adapted and validated fluorescence dilution (FD) technology provides a tool to investigate viable, but non-replicating (VBNR) persister bacteria. A recent study has shown that patients who have undergone the 6-month treatment for *M. tuberculosis* have remaining lesion activity based on positron emission tomography (PET-CT) imaging of the lung and presence of *M. tuberculosis* mRNA in sputum and bronchoalveolar lavage samples, suggestive of persisters. The aim of the study is to determine whether *M. tuberculosis* strains from TB patients who were considered cured, but have relapsed, or failed treatment, will be more likely to be predisposed to persister formation than those who remained "cured". This will be achieved using previously collected PET-CT imaging data as indication of TB lesion activity in the lung, transcriptomics data as indication of the presence of *M. tuberculosis* mRNA and next-generation sequencing (NGS) data on sequence variants in *M. tuberculosis* for each patient. This could elucidate the reason why apparently curative treatment for pulmonary TB is not eradicating all of the *M. tuberculosis* bacteria in most patients (in the context of non-resolving and intensifying lesions).

ABSTRACT NUMBER / ABSTRAKNOMMER: 26

DIAGNOSTIC PERFORMANCE OF POINT-OF-CARE ULTRASOUND IN DIAGNOSING HIV-ASSOCIATED TUBERCULOSIS IN PATIENTS PRESENTING TO THE EMERGENCY CENTRE

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Background: Diagnosing active TB in HIV-positive patients with advanced immunosuppression remains challenging. Point-of-care ultrasound is an attractive option to rapidly diagnose TB and expedite the initiation of TB treatment. The aim of the study was to evaluate the diagnostic performance of point-of-care ultrasound in diagnosing HIV-associated TB in patients presenting to an emergency centre. Methods: A cross-sectional diagnostic study was performed within the emergency centre of Khayelitsha Hospital, South Africa. Consecutive HIV-positive adults with at least one symptom of current cough, fever, drenching night sweats, or weight loss were eligible. Point-of-care ultrasound was performed by a single emergency physician according to a standardised protocol. A TB case was defined as the detection of *M. tuberculosis* from Xpert and/or culture on any specimen from any anatomical site obtained during hospital admission and up to 6 weeks after hospital discharge. Diagnostic test characteristics are presented and were calculated using standard formulas. Results: A total of 414 patients were analysed of which 172 (41.5%) had TB. 85% of participants had two or more samples from two or more anatomic sites. Mean age was 37.1 years and 58.7% were female. Median CD4 count was 85.5 cells/ μ L; 52.5% previously had TB; and 47.1% were on antiretroviral therapy. Sensitivity and specificity of ultrasound findings were: Any sized intra-abdominal lymphnode (30%, 92%); ascites (22%, 93%); any sized hypoechoic splenic lesion (37%, 87%); pericardial effusion \geq 5mm (37%, 82%); and pleural effusion (21%, 85%). The positive likelihood ratio for at least 1 finding was 1.6; at least 2 findings 2.7; at least 3 findings 3.7; and at least 4 findings 7.5. The negative likelihood ratio for at least 1 finding was 0.5. Conclusion: Point-of-care ultrasound is a feasible, non-invasive option to rule TB in. Analysis are being done to determine the best ultrasound predictors for HIV-associated extrapulmonary TB.

ABSTRACT NUMBER / ABSTRAKNOMMER: 27

Eliminating the need for TB culture: DNA extraction from sputum

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Introduction: South Africa has one of the highest drug-resistant tuberculosis (TB) incidences globally. To evaluate the complete phenotypic drug susceptibility profile, initial culturing of *Mycobacterium tuberculosis* followed by drug susceptibility testing (DST) is required. This is a lengthy process, which delays prescription of an effective regimen. Next generation sequencing technologies are capable of obtaining a comprehensive genotypic drug susceptibility profile but require high quality DNA obtained from pure cultures. Methods: We modified an existing DNA extraction method, which could be used even in a resource-poor setting. Decontamination of spiked sputum was achieved using the OMNIGene-Sputum transport medium. Heat-killing was optimized to eliminate any biohazardous risk. Human DNA was removed using enzymatic treatment. Lysing of bacterial cells using both enzymatic and detergent action was employed and a range of enzyme concentrations and incubation times were compared. Cetyltrimethylammonium bromide was used to precipitate protein contaminants out of solution. Nucleic acids were concentrated out of an organic solution. Results: OMNIGene-Sputum allowed for simultaneous decontamination and liquefaction of sputum while allowing bacteria to remain viable. Heat-killing of liquid cultures was achieved after 20 minutes at 80°C. Removal of DNA was improved following treatment with DNase. Lysis was optimal following an overnight incubation period with lysozyme. Glycogen improved nucleic acid precipitation. Conclusion: DNA extraction from sputum presents a great technical challenge to circumvent culturing for sequencing to obtain pertinent gDST results. High quality DNA from early MGIT cultures as well as from negative sputum spiked with early

positive MGIT cultures were obtained. Fragments of at least 700 bp could be amplified from the extracted DNA samples.

ABSTRACT NUMBER / ABSTRAKNOMMER: 28

Fluoroquinolone resistance in children exposed to levofloxacin: a TB-CHAMP sub-study

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Background: Antimicrobial resistance (AMR) is recognised as a major global threat. While much attention has been focused on AMR in health care settings, there is less data on AMR in the community, particularly in African settings. The Tuberculosis Child Multidrug-resistant Preventive Therapy (TB-CHAMP) clinical trial is evaluating the efficacy of levofloxacin prophylaxis in multidrug-resistant tuberculosis (MDR-TB) exposed children in South Africa. This sub-study describes the rates of quinolone resistant bacterial carriage in children before and during the trial. Materials/methods: Children (<5 years) with a known household MDR-TB adult contact were randomized to 24 weeks of levofloxacin or placebo (50:50). Stool samples were collected from the children at baseline, after 16 and 24 weeks of treatment, and at 48 weeks, which is 24 weeks post-treatment. *E. coli* and *Klebsiella* spp. were isolated and susceptibility to naladixic acid and ciprofloxacin determined. Plasmid-mediated quinolone resistance genes (*qnrB* and *qnrS*) were detected using PCR and quinolone resistance mutations in *gyrA* and *parC* were characterised by PCR and sequence analysis. Results: The proportion of participants carrying quinolone resistant organisms increased from 46% (n=94) at baseline to 63% (n=40) at 16 weeks and decreased to 52% (n=29) at 24 weeks and further to 18% (n=11) at 48 weeks. Of the quinolone resistant organisms, gyro mutations were more common in *E. coli*, while *parC* mutations were more common in *Klebsiella* spp. and the presence of the *qnrS* gene increased over time in both organisms. Conclusions: Carriage of quinolone resistant organisms is disturbingly high at baseline. Prevalence of qnr genes increased at 16 and 24 weeks, although numbers are still small. Once the blind is broken and stratification by quinolone exposure is possible, we will be better able to determine the contribution of levofloxacin treatment to these increases.

ABSTRACT NUMBER / ABSTRAKNOMMER: 29

Genetic-relatedness of bloodstream infection pathogens in hospitalised South African neonates

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Background: Few publications report the clinical and microbiological profile of healthcare-associated bloodstream infection (HA-BSI) in hospitalised African neonates. Data describing the genetic relatedness of major neonatal HA-BSI pathogens in South Africa is limited. Methods: Infants (0-90 days) with laboratory-confirmed BSI, at Tygerberg Hospital, Cape Town, were prospectively recruited to a neonatal sepsis case-control study from January to October 2018. Genetic relatedness of selected bacterial BSI pathogens was analysed using rep-PCR (*Escherichia coli* and *Klebsiella pneumoniae*), ERIC-PCR (*Serratia marcescens*) and spa-typing (*Staphylococcus aureus*). Results: Of 126 neonatal BSI episodes, the majority were HA-BSI (114/126; 90.5%) occurring at a mean of 11.1 days of life. Mean gestational age and birth weight were 30.5 weeks and 1396 g respectively; 30-day all-cause mortality rate was 14.8%. Blood culture isolates were available to analyse for: 21/29 (72.4%) *K. pneumoniae*; 7/12 (58.5%) *E. coli*; 15/21 (71.4%) *S. marcescens* and 20/28 (71.4%) *S. aureus*. Of the 21 *K. pneumoniae*, 19 (90.5%) were resistant to 3rd generation cephalosporins (3GC); all *E. coli* and *S. marcescens* were 3GC susceptible; 16/20 (80%) *S. aureus* isolates were methicillin resistant (MRSA).

Enterobacteriaceae and MSSA were largely unrelated, however a cluster of 14 MRSA isolates were identified as spa type 045. Conclusion: Although Enterobacteriaceae are frequent neonatal BSI pathogens, there is limited transmission of genetically-related isolates, suggesting acquisition of diverse strain types from the hospital environment and/or mother-to-child bacterial colonization. The cluster of MRSA isolates, spa type 045, requires further investigation as this clone has previously been associated with MSRA outbreaks at Tygerberg Hospital.

ABSTRACT NUMBER / ABSTRAKNOMMER: 30

HIV and orthopaedics: A descriptive cross-sectional study correlating HIV status and musculoskeletal infections in the paediatric population at Tygerberg Hospital during 2018

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The antiretroviral (ARV) roll-out program across South Africa has contributed to extending the life expectancy of children living with human immunodeficiency virus (HIV) significantly; nevertheless many still experience musculoskeletal infections. Literature mostly focuses on the musculoskeletal manifestations and outcomes HIV has on adults, thus not providing any information on the impact it has on orthopaedics in the paediatric population. The aim of this study is to help understand the association between HIV and musculoskeletal infections in paediatric orthopaedic patients infected with the HIV. A single-centre, retrospective cross-sectional study was performed 2018 in Tygerberg Hospital included paediatric patients aged <13 years with musculoskeletal infections, that had undergone an HIV test. The HIV was recorded as HIV positive/negative/unknown. The prevalence of HIV in each condition was then reported on. There was a total 123 patients with musculoskeletal manifestations of which 65,85% fulfilled the requirements of the study. 54,32% of these paediatric patients (<13 years old) with musculoskeletal infections (including septic arthritis, osteomyelitis, osteitis, tuberculosis-related orthopaedic complications and pyomyositis), neoplasms and bone disorders had an unknown HIV status. The most common manifestations irrespective of HIV status were: septic arthritis (39,50%), osteomyelitis (27,16%), and tuberculosis-related orthopaedic complications (17,28%). Of the 5,88% that were HIV positive, infective manifestations occurred in 33% with septic arthritis being the most prevalent one. The results of this study reveal that joint disorders are the most common musculoskeletal manifestations. It is also uncertain whether the HIV status plays a role in the occurrence rate of specific manifestations in paediatric orthopaedic patients, as majority have an unknown status. In order to fully understand the correlation more HIV testing will have to be performed.

ABSTRACT NUMBER / ABSTRAKNOMMER: 31

HIV Pseudo viremia from large lysed defective CD4 cell clone

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HIV viral load and drug resistance testing for patient management is based on the accurate and reliable analysis of circulating replication competent virus. The presence of cellular DNA in plasma can cause an overestimation of the HIV viral load and influence drug resistance results. A vast majority of the HIV reservoir is defective, partially due to APOBEC mediated hypermutations. These hypermutated proviruses do not produce progeny virus but can be detected in plasma as a result of cell lysis due to improper sample processing. Drug resistance associated mutations (M184I and E183K) have been identified in proviral DNA of treatment naive patients as a result of APOBEC editing. Investigating unusual cases of unsuppressed viremia is essential to understand the mechanism and cause of the detectable viral load. Diagnostic error due to pre-analytical sample processing could impact patient management through overestimation of viral loads and detection of drug resistance mutations arising from defective proviruses. It is therefore imperative to avoid cell lysis when processing plasma samples. In this study a patient on cART presented with an unsuppressed viral load for over 3 months. Drug

resistance nucleotide sequencing revealed identical APOBEC mutated sequences in three plasma samples taken over this time period. A whole blood EDTA sample (sample 4) was collected for further investigation. Peripheral blood mononuclear cells and plasma were isolated from the EDTA sample for HIV cell associated DNA analysis and single genome sequencing (SGS). SGS targeting the p6, protease and reverse-transcription (p6ProRT) region was performed on cell debris and virus isolated from plasma samples. Identical p6ProRT hypermutated sequences were detected in centrifuged cell debris from multiple plasma samples suggesting that lysed cells rather than free virus is the predominant species detected by viral load testing and sequencing.

ABSTRACT NUMBER / ABSTRAKNOMMER: 32

Human genetics of TB resistance in HIV-infected persons

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Tuberculosis (TB) is caused by bacteria in the *Mycobacterium tuberculosis* complex. According to the World Health Organization, globally an estimated 10 million people developed TB and 1,6 million TB deaths were reported in 2017. Certain individuals, however, are able to resist *M. tuberculosis* infection despite persistent and intense exposure. These persons do not exhibit adaptive immune priming as measured by tuberculin skin test (TST) and/or interferon-gamma (IFN-gamma) release assay (IGRA) responses, nor do they develop active TB. The contribution of the innate immune system and the exact cells involved in this phenotype remains poorly understood. The present study aims to identify these individuals, who live in low-resource and high TB incidence settings. All enrolled individuals are HIV-infected. This phenotype is of particular interest, since individuals who are HIV-infected, are at increased risk to progress from *M. tuberculosis* infection to disease. Whole genome sequencing will be used to detect genetic variants that contribute to this phenotype. To date, 408 eligible individuals have been enrolled and 41 out of 84 (48.8%) IGRA negative individuals tested persistently IGRA negative and TST = 0mm on follow up. Whole genome sequencing results of these participants may shed light on innate immune-mediated *M. tuberculosis* infection resistance and reveal clinically important activities for prevention as well as vaccine and treatment development.

ABSTRACT NUMBER / ABSTRAKNOMMER: 33

Identification of TAP1 mutations in patients with Primary Immunodeficiency Disease showing recurrent episodes of tuberculosis

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Background: Primary Immunodeficiency Diseases (PIDs) are a diverse group of heritable diseases characterised by poor or absent immunological functions. PID patients are typically predisposed to multiple, unusual infections, autoimmune disease and cancer. Of interest in the present study is a group of PIDs designated Mendelian Susceptibility to Mycobacterial Diseases (MSMD) that predispose sufferers to increased susceptibility to mycobacterial infections, including tuberculosis (TB) and BCG vaccine. Here we report on patients with recurrent episodes of TB caused by infections with *Mycobacterium tuberculosis*. Aim: To use whole exome sequencing (WES) to identify mutations responsible for increased susceptibility to mycobacterial infections in two patients with MSMD from South Africa. Methods: Whole exome sequencing was performed on DNA extracted from whole blood of two unrelated patients suspected to have a PID and had recurrent episodes of TB. Sanger sequencing was performed on the variants of interest to confirm the WES results. Flow cytometry was used to

characterise the effects of the mutations. Results: WES identified novel mutations in both patients in the Transporter associated with Antigen Processing 1 gene, TAP1. Patient_01 has a heterozygous I296M variant; Patient_02 has compound heterozygous R54Q and G77R variants. Mutations in TAP1 significantly impair intracellular antigen presentation to cytotoxic T-cells, influencing immune defence, which result in increased susceptibility to infections. Flow cytometry comparing the total CD4+ and CD8+ T-cells of Patient_01 and ethnically matched healthy controls showed a significant reduction in CD4+ T-cells in the patient compared to the control, accompanied by a significant increase in CD8+ T-cells. Conclusion: WES is rapidly becoming invaluable in PID diagnoses, which is generally difficult to diagnose due to its wide spectrum of phenotypes. It may also assist in targeted treatment for patients and allow future prenatal diagnosis.

ABSTRACT NUMBER / ABSTRAKNOMMER: 34

In vivo, ex vivo and in vitro effect of melatonin treatment during antiretroviral therapy

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Introduction: Although antiretroviral therapy (ART) has dramatically reduced HIV-associated morbidity and mortality, non-HIV-related comorbidities continue to rise in this population. Cardiovascular disease has been reported to be the leading cause of death in the HIV-positive population receiving ART. ART impairs vascular endothelial function through increased reactive oxygen and nitrogen species (ROS, RNS) production. This study aimed to assess the effects of melatonin - a potent antioxidant -supplementation during ART on rat Aortic Endothelial Cells (AECs), aortas and hearts. Methods: Cells were treated with melatonin and/or ART for 24 hours. Nitric oxide (NO), RNS and necrosis were measured. The effects of melatonin and ART treatment on vascular reactivity was measured by aortic ring isometric tension studies, and heart function and recovery after global ischaemia and infarct size after regional ischaemia, in organs isolated from control male Wistar rats treated for 8 weeks. Signalling proteins were measured by western blot analyses. Results: In AECs ART lead to increased NO, RNS and necrosis compared to controls ($p < 0.05$). 1nM melatonin decreased necrosis from control ($p < 0.05$). When combined, 1nM melatonin + ART decreased necrosis compared to ART ($p < 0.05$). Western blot analyses showed that ART increased nitrotyrosine levels, but decreased p22 PHOX and cleaved caspase-3 expression ($p < 0.05$). In aortas from treated rats, all groups showed a pro-contractile response compared to control. Western blots showed that ART decreased cleaved caspase-3 expression ($p < 0.05$). No differences were seen in infarct size or function in isolated hearts. Conclusion: Decreased necrosis shows the protective effect of melatonin. Further investigations are needed to elucidate this mechanism. ART induced anti-apoptotic effects and increased RNS production, but not NADPH-oxidase activity. ART treatment does not affect vasorelaxation.

ABSTRACT NUMBER / ABSTRAKNOMMER: 35

Increased proportion of CD4+ T follicular helper (Tfh) cells in HIV-infected individuals is associated with increased levels of T cell activation and exhaustion

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Chronic immune activation and dysregulation in both T and B cell compartments are principal pathogenic characteristics of HIV infection. Preferential HIV replication within CD4 T cells makes them susceptible to virus-induced activation and/or elimination by activated CD8 T cells. Contrasting the overall CD4 T cell loss, a specialised subset, namely follicular helper T (Tfh) cells appear to be expanded in untreated individuals. This cross-sectional observational study characterised peripheral Tfh cells in 40 HIV-infected individuals as CXCR5+PD-1+ (with/without ICOS co-expression). The relationship between Tfh cell population changes and the association with immune activation (CD38) and exhaustion (PD-1) was also evaluated. Red cell lysed whole blood was stained with a panel of monoclonal antibodies and proportions of cell populations of interest were determined using multicolour flow

cytometry within sub-groups of HIV-infected individuals with low (<500 cells/ μ l) and high (\geq 500 cells/ μ l) CD4 T cell counts. Low CD4 T cell count individuals demonstrated significantly higher proportions of Tfh cells compared to those with high CD4 T cell counts (39,4% vs 28,3%; $P = 0,003$), in contrast to the reduction in overall CD4 T cells percentage (14,9% vs 37,1%, $P = 0,0002$). Additionally, Tfh cells correlated significantly with both immune activation (CD38+CD8+ T cells) and exhaustion (PD-1+CD8+ T cells) ($Rho = 0,39$; $P = 0,01$ and $Rho = 0,87$; $P < 0,0001$). Therefore, there is an inverse expansion (or selective preservation) of Tfh cells, contrasting to the CD4 T cell decline that is closely associated with immune activation and exhaustion. The assessment of Tfh cells is important as these cells serve as major reservoir cells for HIV latent infection and their function is linked to B cell dysregulation and hypergammaglobulinemia. Ongoing work is assessing Tfh dynamics in long-term treated HIV+ children.

ABSTRACT NUMBER / ABSTRAKNOMMER: 36

Intact HIV proviruses are detectable in children 7-9 years after initiation of ART in the first year of life

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Background: In adults starting ART in acute infection only 2-5% of proviruses are intact. However, no intact full length proviral sequences were detected in a cohort of early treated, long-term suppressed children. We sought to characterize proviral sequences in another cohort of early treated children after 6-9 years on suppressive ART. Methods: PBMC samples from perinatally infected children in the CHER study were analysed. Single, near full length proviral amplification and sequencing (NFL-PAS) was performed at one time point after 6-9 years of suppressive ART. Amplicons with large internal deletions were excluded (<9kb on gel electrophoresis). All amplicons greater \approx 9kb were sequenced (Sanger and Illumina) and analysed through an 'Intactness bio-informatic pipeline' to detect indels, frameshifts, inactivating point mutations and/or hypermutations that would render the proviruses defective. Results: In 9 children who started ART at a median age of 2.3 (range: 1.7 – 11.1) months, 738 single NFL-PAS amplicons were generated. Of these, 538 (72.9%) had large internal deletions, 175 (23.7%) had hypermutation, 15 (1.4%) had small internal deletions, 3 (1%) had deletions in the packaging signal/major splice donor site and 7 (0.9%) were intact. These 7 intact sequences were from 3 children who initiated ART after 8 months of age; of whom one had two identical and intact sequences, suggestive of a cell clone harbouring a replication-competent provirus. No intact provirus was detected in 5 children who initiated ART before 2.3 months of age. Conclusion: Rare, intact proviruses could be detected in the blood of children who initiated ART after 2.3 months of age. The frequency of intact proviruses is similar to that reported for adults treated during early HIV infection.

ABSTRACT NUMBER / ABSTRAKNOMMER: 37

Investigating genome variation in a South African Wild dog population: Towards understanding their susceptibility to Mycobacterium bovis infection

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The African wild dog population is declining rapidly and is at high-risk for future extinction with only 6600 individuals left. The population decline is due to habitat fragmentation, human-carnivore conflict and infectious disease. Management of wild dogs in protected areas relies on the translocation of individuals between fragmented locations to maintain genetic diversity and facilitate breeding to increase the population size. However, little is known about the population genomics, such as relatedness, population structure, selection and susceptibility to disease. Numerous cases of *Mycobacterium bovis* (*M. bovis*) infection and mortalities associated with bovine tuberculosis (BTB) have been reported in wild dogs within the Kruger National Park (KNP). To investigate genetic diversity, including susceptibility to *M. bovis* infection, whole-genome sequencing (WGS) of *M. bovis* infected and uninfected wild dogs is required. The sequence data will be used to firstly estimate the relatedness between individuals, and as part of a larger study, to identify loci under selection and to conduct an association study, by identifying variants with large differences in allele frequencies between infected and uninfected wild dogs. The genomic data will provide us with detailed information about the genetic variation of this wild dog population and that it can be used to successfully develop a rapid method for assessing the genetic relatedness of individuals for management decisions. Additionally, the data can be used in the future to develop diagnostic tools to investigate disease susceptibility. Changes in genetic composition due to environmental changes and disease outbreaks can leave lasting community-wide effects on host populations, highlighting the significance of the role of host genetic diversity in species conservation.

ABSTRACT NUMBER / ABSTRAKNOMMER: 38

Investigating the antibacterial effects of curdlan-functionalized PLGA nanoparticles on intracellular *Mycobacterium tuberculosis*

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Introduction: Curdlan-functionalised poly-lactic-co-glycoside (C-PLGA) nanoparticles present us with an ideal anti-tuberculosis compound that will mimic pathogen entrance and stimulate macrophage-specific bactericidal pathways. This host-directed therapeutic approach is a valuable potential replacement of existing tuberculosis treatment regimens that are frequently hindered with the development of antibiotic resistance and adverse side effects. The C-PLGA nanoparticles specifically target the immune system of the host and not the pathogen itself thus reducing the likelihood of resistance to evolve over time. Curdlan is a well-known β -glucan that will primarily bind to the Dectin-1 receptor present on macrophages, one of the the main cell compartments harboring *Mycobacterium tuberculosis*, and stimulate an effective anti-TB immune response. In addition to immune stimulation, conventional antibiotics can be incorporated either into the core or onto the surface of the C-PLGA nanoparticles to further enhance their efficacy. This allows for the sustained release of the antibiotics at the specific *M. tuberculosis* infected site. A multi-modal approach makes it possible to simultaneously maximize pathogen killing and control inflammatory responses. Aim: Assess the antibacterial effect of C-PLGA nanoparticles on intracellular *M. tuberculosis*. Methods: RAW264.7 macrophages were infected at a MOI of 10:1 with *M. tuberculosis* H37Rv::pMV306hsplux. Different nanoparticle formulations were applied to the infected macrophages and luminescence readings was obtained over a period of 72 h to track bacterial numbers. Results: A decrease in relative light units was observed that directly correlates with a decrease in bacterial cell counts, indicative of the inhibitory effect of C-PLGA nanoparticles. Conclusion: We demonstrated the eradication of intracellular *M. tuberculosis* through macrophage-specific immune responses stimulated by C-PLGA nanoparticles. The results may contribute towards the application of these particles as a novel approach against the control of TB in the future.

ABSTRACT NUMBER / ABSTRAKNOMMER: 39

Investigating the host immune response to population-tailored PPE_MPTR peptides

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Introduction: Tuberculosis (TB), caused by *Mycobacterium tuberculosis*, is one of the leading causes of death worldwide, with more than 95% of deaths occurring in low- and middle-income countries. Eradication of TB disease within these countries requires the development of more effective anti-TB drugs, diagnostic tools and vaccines. The pe/ppe gene family encodes approximately 10% of the *M. tuberculosis* H37Rv genome. The role PE/PPE proteins play in *M. tuberculosis* pathogenicity is unclear, however, several have been shown to be highly immunogenic. A customized reverse vaccinology pipeline focused on the PPE_MPTR subfamily identified 35 PPE_MPTR epitopes predicted to have high population coverage across four different African populations (South African, Ethiopian, Zimbabwean and Congolese). In this project we aimed to assess the potential of these peptides as possible vaccine and/or diagnostic candidates. Methods: The immunological response of participants with black South African, Ethiopian, Zimbabwean and Congolese heritage will be measured in response to selected PPE-MPTR epitopes using Luminex. To assess the immunological response elicited by the peptides we will be investigating the production of the cytokines IFN- γ , TNF- α , IL-1 β , IL-4, IL-6, IL-10, IL-13, IL-17A and IL-22. These analytes were selected based on literature. The red pellet will be incubated with lysis buffer to obtain lysed whole blood which will be analysed with flow cytometry to identify the immunophenotype and memory distribution of immune cells. Conclusion: This work will help us better understand the role of PPE_MPTR proteins in the immune response. Hopefully we can use this information to develop a more effective vaccine and identify new diagnostically relevant antigens for TB in an African context.

ABSTRACT NUMBER / ABSTRAKNOMMER: 40

Investigating the role of a novel protein in iron-sulphur cluster biogenesis in mycobacteria

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Numerous uncharacterized genes have been identified in *Mycobacterium tuberculosis*, and the essentiality of these genes for survival of the organism is currently being investigated. Rv2204c in *M. tuberculosis* and its homologue, MSMEG_4272 in *Mycobacterium smegmatis*, are uncharacterized genes that produce hypothetical proteins that share homology with A-type carrier proteins. These proteins are thought to be involved in Fe-S cluster biogenesis. Iron, for cluster formation, is obtained from an unknown source and A-type carrier proteins are proposed to be involved in iron scavenging. A-type carrier proteins have also been thought to be involved in Fe-S cluster transfer from the scaffold protein to the target enzymes. In this study, we aim to investigate the role of these potential A-type carrier proteins in Fe-S cluster biogenesis. The ability of Rv2204c protein to interact with iron and/or Fe-S clusters was investigated. Rv2204c interacts with ferrous iron (Fe(II)), but not ferric iron (Fe(III)). Rv2204c protein can co-ordinate an oxygen sensitive Fe-S cluster. This provides the first insight into the role of Rv2204c and MSMEG_4272 in mycobacterial physiology.

ABSTRACT NUMBER / ABSTRAKNOMMER: 41

Pharmacokinetic study of anti-tuberculosis therapeutic PAS and its major metabolites Acetyl-PAS and Glycine-PAS

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Background: Since the introduction of PAS, gastrointestinal (GI) intolerance was noted, including reports of nausea, bloating, and diarrhoea. Thus, PAS was replaced with better tolerated agents. However, the extent of drug resistant tuberculosis has prompted its reintroduction and production of a granular slow-release formulation that delays the premature release in the stomach, avoiding high PAS concentrations. In previous studies tolerability of PAS under two dosing regimens (8g once-daily vs 4g

twice-daily) were investigated and showed no distinctive difference in the extent of the GI events, indicating that these symptoms were not necessarily attributed to higher PAS concentrations. It was found that once-daily dosing was associated with equivalent or less intolerance. These findings have led to the speculation that the rate of absorption and metabolism of PAS to APAS and GPAS, may be the cause of GI symptoms as opposed to the notion of high PAS concentrations. Purpose: Firstly, was to develop a method using liquid chromatography and mass spectrometry (LCMS) to simultaneously assay PAS, APAS and GPAS, in human plasma. Secondly, was to perform non-compartmental analysis (NCA) for establishing pharmacokinetic (PK) parameters of each compound. Lastly, was to correlated PK parameters with GI symptoms, determined by Visual Analogue Scale (VAS). Methods: PAS, APAS and GPAS were assayed using Waters triple quadrupole MS connected to a LC system, and NCA was performed using Winnonlin version 5.0. PK parameters were correlated with VAS scores using Spearman's correlation test to determine the association. Results: Significant correlations were observed for APAS, with bloating ($p= 0.025$) and diarrhoea ($p=0.044$). Similarly, with GPAS and diarrhoea ($p= 0.041$). Although significant, the Spearman's rho values were all below 0.5 and thus represented a low to moderate correlation between, which was not clinically significant.

ABSTRACT NUMBER / ABSTRAKNOMMER: 42

Predicting PET-CT with cytokines in the context of pulmonary tuberculosis

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Rationale: Long tuberculosis treatment regimens potentially increase the risk of non-adherence and drug-resistance. In addition, poor treatment outcomes (treatment failure or relapse) at or after completion of the 6-month standard regimen, increase time on treatment and possibly transmission. The minimum treatment duration for durable cure, as well as treatment response markers, have been the focus of various studies. Positron emission tomography and computerized tomography (PET-CT) has emerged as one way of monitoring and possibly predicting, treatment response during TB treatment, but is exclusive, expensive and not feasible under programmatic conditions. We investigated whether cytokines as a surrogate blood-based biomarker, can predict quantitative PET-CT scan information. Methods: Ninety-nine participants with active TB received PET-CT scans and provided whole blood samples at diagnosis, month 1 and month 6 on TB treatment. Quantitative variables were extracted from scans in a semi-automated way with commercial software. Cytokines were measured in whole blood samples on the Luminex platform. Partial least squares and elastic net regression models were trained on the training set, separately for each of total glycolytic activity index (TGAI), mean standardised lesion activity (MSLA) and cavity volume as dependent variable, and cytokines as independent variables. The models with the best combination of low prediction error and low optimism were chosen to apply to the test set. Results: 89 Participants and 13 cytokines were included to achieve a set of common cytokine observations per time point. Cavity volume prediction models proved to be unstable and was not pursued beyond training. One optimally trained model each for TGAI and MSLA was applied to the test set and produced comparable R squared estimates (0.41 for TGAI and 0.29 for MSLA). We conclude that cytokines measured in whole blood of TB patients can predict TGAI and MSLA, with imperfect precision.

ABSTRACT NUMBER / ABSTRAKNOMMER: 43

Putting RFMix and ADMIXTURE to the test in a complex admixed population

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Global and local ancestry inference in admixed human populations can be performed using computational tools implementing distinct algorithms, such as RFMix and ADMIXTURE. The accuracy of these tools has been tested largely on populations with relatively straightforward admixture histories

but little is known about how well they perform in more complex admixture scenarios. Using simulations, we show that RFMix outperforms ADMIXTURE in determining global ancestry proportions in a complex 5-way admixed population. In addition, RFMix correctly assigns local ancestry with an accuracy of 89%. The increase in reported local ancestry inference accuracy in this population (as compared to previous studies) can largely be attributed to the recent availability of large-scale genotyping data for more representative reference populations. The ability of RFMix to determine global and local ancestry to a high degree of accuracy, allows for more reliable population structure analysis, scans for natural selection, admixture mapping and case-control association studies. This study highlights the utility of the extension of computational tools to become more relevant to genetically structured populations, as seen with RFMix. This is particularly noteworthy as modern-day societies are becoming increasingly genetically complex and some genetic tools are therefore less appropriate. We therefore suggest that RFMix be used for both global and local ancestry estimation in complex admixture scenarios.

ABSTRACT NUMBER / ABSTRAKNOMMER: 44

RNA-sequencing data simulator: A tool for experimental design parameter estimation

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Experimental design is an important step in the scientific experimentation process as it highly influences the end results obtained after conducting the experiment. It also influences other factors such as cost and choice of instrumentation. It is therefore important to develop tools that can assist scientists with experimental design strategies that will enable sound scientific conclusions. RNA-sequencing is a biotechnology frequently applied in the study of gene expression and has gained wide use in studies of disease to understand the underlying biological processes. RNA-seq is a high-throughput technology that produces large amounts of data and is either unbiased or less biased than other technologies used for gene expression analyses such as microarrays. Inefficient experimental design of RNA-seq experiments can result unnecessary waste of time and resources, increased costs and can affect the biological conclusions drawn from the generated data. In this study, a tool for simulating RNA-sequencing data is proposed which can help in evaluating the effects of experimental design parameters such as the amount of data (sequencing depth per specimen) and the length of the sequences (read length) on downstream analysis which can be used to inform researchers on optimal parameter values for their particular study. Properties of RNA-seq data will be extracted from publicly available RNA-seq datasets, similar to the proposed experiment, to derive an error-model. This model will then be used to simulate RNA-seq data to closely resemble real data but will have known profiles of expression levels and expression difference. The user will be able to test various sequencing depths and read length combinations with different sample sizes to determine the optimal parameter values. The computer program will be written in the python programming language and will be implemented with a graphical user interface, (GUI) to make it user-friendly.

ABSTRACT NUMBER / ABSTRAKNOMMER: 45

Ruminant interferon-gamma release assay (IGRA) shows potential for detection of *Mycobacterium bovis* infection in antelope species

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Infectious diseases, such as bovine tuberculosis (bTB) caused by *Mycobacterium bovis*, pose a threat to wildlife populations globally. Maintenance hosts, including African buffaloes (*Syncerus caffer*) and greater kudu (*Tragelaphus strepsiceros*) are considered important sources of infection for bTB, with many carnivore species (spillover hosts) including African lions (*Panthera leo*) and African wild dogs

(*Lycaon pictus*) contracting bTB through the consumption of infected meat. One of the confounding factors influencing the management of bTB in wildlife populations is the lack of ante-mortem diagnostic assays available for the detection of bTB. The goal of this study was to determine whether a commercially available interferon-gamma release assay (IGRA) developed and optimized for detection of ruminant interferon-gamma (IFN-gamma) can be used to detect immune sensitization in various antelope species from the Kruger National Park, South Africa. New diagnostic tests are essential for advancing our understanding of bTB in susceptible species, especially for surveillance, monitoring and prevention strategies. A pilot study using mitogen-stimulate whole blood has shown that the QIAGEN cattletype® IFN-gamma ELISA is able to detect immune responses in greater kudu, nyala (*T. angasii*), bushbuck (*T. scriptus*), sable antelope (*Hippotragus niger*), waterbuck (*Kobus ellipsiprymnus*) and impala (*Aepyceros melampus*). In addition, antigen-specific IFN-gamma release was able to identify a culture-confirmed *M. bovis*-infected bushbuck (n=1) and kudu (n=1). This commercial ruminant IFN-gamma release assay shows promise as a screening assay for *M. bovis* infection in antelope species.

ABSTRACT NUMBER / ABSTRAKNOMMER: 46

Simulation Studies of Novel PASER Dosing Regimens

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Evidence suggests lower plasma para-aminosalicylic acid (PAS) concentrations are achieved with PASER formulation compared with sodium-PAS. Determining the optimal PASER dosing regimen is crucial to maximize the chances of cure while reducing the risk of resistance emergence in companion drugs. We aim to evaluate the probability of target attainment by conducting a simulation study of novel, high doses of PASER. We pooled datasets from Liwa and de Kock et al studies. R software was used to implement random sampling with replacement. One thousand virtual patients were created from the pooled dataset allowing for 10% extra random variability in body weight. Nonlinear mixed-effects modeling (NONMEM) software was used. Final parameter estimates of an optimised PAS model was used to simulate the steady-state concentration-time profile of PAS. Each patient was administered 12, 14, 16, and 20g once-daily PASER. This was implemented through Perl-Speaks-NONMEM. Model-predicted peak PAS plasma concentrations (C_{max}) and area under the concentration-time curve from time 0 to 24 hours after dose were estimated and compared. The probability of target attainment were compared for each dosing regimen, and at varying PAS minimum inhibitory concentrations (MIC). We found dose-dependent increase in plasma PAS exposure. The target C_{max} of 100 µg/mL was reached in 53%, 65%, 72%, and 84% of patients administered 12, 14, 16, and 20g once-daily PASER, respectively. Probability of target attainment (C_{max}) was reached in at least 80% of patients in all dosing regimens when PAS MIC < 1.0 µg/mL, but when the MIC was increased to 1.0 µg/mL, this target was reached only in those on 20g once-daily PASER. In conclusion, our study shows dose-exposure relationship of single high doses of PASER. The target PAS concentrations were reached in most patients administered 14, 16 and 20g once-daily PASER. Thus, future early bactericidal activity and pharmacokinetics studies should explore these doses.

ABSTRACT NUMBER / ABSTRAKNOMMER: 47

Surviving or Thriving? Health-related quality of life and resilience of adolescents living with HIV in the Cape Metropole, South Africa

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Background and objective: The availability of antiretroviral treatment (ART) for adolescents living with HIV (ALHIV) has shifted the focus from merely surviving to attaining long, healthy and productive lives. Resilience is a major factor shaping the experiences of ALHIV, enabling them to come to terms with their diagnosis, having hope for the future and maintaining meaningful relationships. As part of an

instrument development study, we aimed to explore the health-related quality of life (HRQOL) and resilience of adolescents who live with HIV in the Cape Metropole of the Western Cape. Methods: A cross-sectional sample of 385 adolescents aged 13-18, recruited serially over a period of 5 months from 11 different public health ART clinics in the Cape Metropole completed questionnaires. The KIDSCREEN-27 the Canadian Child and Health Youth Resilience Measure (CRYM-12) were used to measure HRQOL and resilience resources; both are valid and reliable scales. Results: The majority (n=354, 92.4%) of participants reported good to excellent overall health-related quality of life. HRQOL sub-scale mean scores, except for Family and Free time and Friends, were in the internationally reported ranges. Percentile values for resilience placed this study sample almost in the middle of the Canadian group with mental health/social difficulties and the comparison group with no reported health problems. Lower resilience resources was reported for having a role model, being able to handle a situation when it does not go one's way and having friends care when times are difficult. HRQOL scores differed across categories of gender (Mann-Whitney U=10530.5, p=0.005) and age (Mann-Whitney U=11595.5, p=0.045), with females and older adolescents (16-18) having lower scores. Conclusion: ALHIV reported HRQOL and resilience scores that are comparable to international norms. Efforts to improve HRQOL and resilience amongst ALHIV should be focused on strengthening family and peer relationships, especially for females and older adolescents.

ABSTRACT NUMBER / ABSTRAKNOMMER: 48

The effect of storage conditions on microbial communities in stool

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The collection, transport and storage of stool samples are major challenges faced by gut microbiome researchers in resource-limited settings. Cold-chain storage and the addition of DNA-stabilizing agents are not always feasible when samples are collected in the field. We investigated the impact of different stool storage methods common to the TB-CHAMP clinical trial on the microbial communities in stool. Ten stool samples were subjected to immediate extraction and 48-hour storage at -80°C, room temperature and in a cooler-box. Three stool DNA extraction kits were evaluated based on DNA yield (Qubit Quantitation) and quality (A260/280 ratio). Quantitative PCR was performed to determine the relative abundance of the two major gut phyla Bacteroidetes and Firmicutes, and other representative microbial groups. The QIAamp PowerFecal DNA Isolation Kit (Qiagen) was chosen for use in our setting, due to consistently high DNA quality and good yield. The bacterial populations in the frozen group closely resembled the immediate extraction group; supporting previous findings that storage at -80°C is equivalent to the gold standard of immediate DNA extraction. More variation was seen in the room temperature and cooler-box groups, which may be due to the growth temperature preferences of certain bacterial populations. However, for most bacterial populations, no significant differences were found between the storage groups. As seen in other microbiome studies, the variation between participant samples was greater than that caused by differences in storage. We determined that the risk of introducing bias to microbial community profiling through differences in storage will likely be minimal in our setting.

ABSTRACT NUMBER / ABSTRAKNOMMER: 49

The role of the SNARE-associated protein Snapin in host macrophage response to mycobacterial infection

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Autophagy is an important degradative process involved in the clearance of microbes such as *Mycobacterium tuberculosis* (*M. tuberculosis*) from the host. *M. tuberculosis* has evolved various

mechanisms that disrupts autophagy, allowing it to escape degradation and persist within the host. However, the underlying molecular mechanisms remain to be elucidated. The SNAP-associated protein (Snapin) is known to be involved in autophagy by playing a role in lysosomal acidification, however its role in the context of mycobacterial infection remains unknown. This study investigated the role of Snapin in host macrophage response to *Mycobacterium smegmatis* (*M. smegmatis*) infection, as well as its importance in intracellular mycobacterial survival. Human THP-1 macrophages were infected with *M. smegmatis* and Snapin expression was quantified for both uninfected and infected cells. Silencing of Snapin was achieved via siRNA transfection, after which the intracellular bacterial burden was determined. Results indicate that Snapin is involved in host macrophage response to mycobacterial infection and has a possible role to play in the intracellular survival of *M. smegmatis*. Snapin levels were significantly upregulated 24 hours post-infection. This paralleled an increase in LAMP1-positive organelles in both wild-type of Snapin knock-down macrophages. These findings suggest a potential role for Snapin in host immune response against non-pathogenic mycobacteria. Currently, Snapin's role in mycobacterial clearance in the context of *M. tuberculosis* infection is being investigated, with focus on lysosomal acidification.

ABSTRACT NUMBER / ABSTRAKNOMMER: 50

The role of type-5 Phosphodiesterase inhibitors on the reversal of peripheral- and lung-derived Myeloid Derived Suppressor Cell function in TB

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The current 6-month regimen for drug-sensitive TB only achieves a 82% success rate, leaving 936000 people sick after strict adherence (WHO, 2017). Development of new TB drugs is lengthy, expensive and has no guarantee of success. Repurposed drugs have already passed FDA/EMA safety requirements for other conditions and thus only need to prove efficacy against M.tb. Host-Directed therapy (HDT) improve beneficial host immunity and/or decrease inflammation and associated tissue pathology and thus facilitate disease cure. MDSC are a heterogeneous population of myeloid cells with the capacity to suppress T cell functions. MDSC frequencies are increased at TB diagnosis (du Plessis 2013). MDSC have a dual role in TB disease. Firstly, by suppressing T cell function, and secondly harbouring M.tb (Knaul 2014). Ablation of these cells is a feasible target for investigation of potential HDT. PDE-5 inhibitors, sildenafil, can reverse MDSC-induced immunosuppression by down-regulating ARG1 and NOS2 expression, key enzymes associated with MDSC suppression. Aim to improve treatment efficacy by using HDT, in combination with TB treatment, to improve anti-TB immunity. Readouts to be presented will include sildenafil dose optimisation, T cell phenotype and function, MDSC Mtb killing ability and T cell cytokine responses. Should we discover that sildenafil neutralises MDSC immunosuppressive functions, restrict MDSC numbers or alter pathogen killing during Mtb infection or TB disease, the results would have clinical relevance as a TB treatment solution.

ABSTRACT NUMBER / ABSTRAKNOMMER: 51

The views of managers of the TB control program on implementing active surveillance for TB in the Eastern Cape

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Background: The achievement of the END TB goals (World Health Organisation initiative for TB in the post 2015 era) will depend on the successful implementation of strategies for active case finding as well as retention of patients on effective therapy until cure. South Africa is numbered among the top ten countries with the highest burden of TB. An estimated 150 000 cases are missed annually. A number of identified gaps point to the inadequacy of strategies to identify presumptive cases of TB in communities, early loss to follow up before initiation of therapy and high rates of patients defaulting therapy. The aim

of this study was to explore the views of managers of the TB programme in Eastern Cape on the implementation of active surveillance for TB. Methods: This was a descriptive phenomenological qualitative study with 10 recorded semi-structured interviews with all managers of the TB programme in Eastern Cape. Data was analysed using the framework method and Atlas-ti. Results: There were three major themes that emerged from the 10 semi structured interviews - Current approaches to identifying patients with TB, reflecting current strategies in communities, primary health facilities and hospitals. - Effectiveness of current approaches for identifying active TB patients. Managers discussed successes of innovative processes in the under-resourced setting by health workers. Challenges differed across urban and rural districts. - Ideal mode of screening for active TB. Active surveillance for TB is considered the ideal but ideas for implementation differed across the varied contexts in each district. Conclusion: Implementation of active surveillance for TB is hindered by context factors that are unique to the various districts. Any strategy for effective active surveillance should take the unique context in each district into consideration.

ABSTRACT NUMBER / ABSTRAKNOMMER: 52

Tools for Analysis of Luminex Immunoassay Data: Development of a Robust Pipeline and Best Practices Recommendations

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Background & Significance: Cytokines are fundamental to the immune response in health and disease, e.g. infection such as tuberculosis that is a major health problem in South Africa. Currently available analytical tools, such as multiplexed enzyme-linked immunosorbent assays (i.e. multiplex ELISA) using the Luminex platform, enable the detection and quantification of multiple cytokines simultaneously from small amounts of sample. The multiplexed ELISA generates large data sets for diagnostic and prognostic use in immunology. Currently, there is no standard approach for data processing or analysis, and the data analysis approach is largely dependent on the operator, which introduces variability and potential bias. Aims: The aim of this study is to develop, evaluate, and implement a pipeline for the analysis of multiplex immunoassay data and to develop best practices guidelines. Study Design: We will develop best practices guidelines for data generation and analysis, and implement these with data management and quality control to provide high-quality data for more complex analyses. We will investigate a variety of analytical approaches to design an analysis pipeline that includes robust analysis options together with bioinformatics tools. The pipeline will use open source software and include data processing, methods for handling outliers, data transformation and imputation as well as statistical analyses for relevant research questions. I will validate all the methods using existing de-identified data sets from the Stellenbosch University Immunology Research Group and their international collaborators, as well as published data from public data repositories. Subsequently, we will apply the pipeline to newly generated data. Expected Results: The guidelines and pipeline will produce more reproducible results with less bias in research using multiplex ELISA. For tuberculosis research, we expect the pipeline to speed up the identification of diagnostic markers. The pipeline will assist scientists in any field where Luminex assays are used.

ABSTRACT NUMBER / ABSTRAKNOMMER: 53

Undetected isoniazid mono resistance in rural Eastern Cape Province: A risk for the emergence of multidrug-resistant TB

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The emergence of drug-resistant TB remains a public health challenge. In South Africa, current diagnostic algorithms ignore the possibility of new and retreatment TB cases with isoniazid mono resistance. Many cases remain undiagnosed and are inadequately treated with a weakened regimen,

increasing the risk of acquiring additional resistance including transmission of drug-resistant TB. This study aims to investigate the epidemiology of isoniazid mono-resistant TB at a community level in the Eastern Cape Province using molecular tools. Patients from the Kouga sub-district of the Eastern Cape Province confirmed GeneXpert TB positive, rifampicin susceptible or culture positive were recruited from April 2016-October 2017. Sputum specimens were obtained before treatment (baseline) and at routine follow up visits (7 weeks: end of intensive phase and 23 weeks: end of continuation phase), and these were sent to Stellenbosch University for further phenotypic and genetic analysis by means of antimicrobial sensitivity testing (isoniazid and rifampicin), spoligotyping, Fluorotype MTBDR, sanger sequencing and whole genome sequencing. To date, the dominant strain type observed in the cohort was the Beijing genotype. Canonical mutations shown to confer isoniazid resistance were found in codon 315 of *katG* and -15 of the *inhA* promoter region, but did not represent the majority of isoniazid resistant cases. Sanger sequencing of the entire *katG* gene revealed noncanonical mutations, likely responsible for conferring resistance. Isolates exhibiting resistance, for which no candidate resistance marker could be found is currently under further investigation using whole genome sequencing. Understanding the mechanisms of isoniazid resistance is importantly valuable in improving diagnostic and treatment protocols and ultimately aid in future control of the drug-resistant TB epidemic.

ABSTRACT NUMBER / ABSTRAKNOMMER: 54

Urine proteome for paediatric tuberculosis diagnosis

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Paediatric tuberculosis (TB) is difficult to confirm due to the low bacterial load found in sputum specimens. As a result, the pre-testing of TB depends on the child's TB exposure status leading to disease diagnosis being delayed or missed in many children. Additionally TB may be incorrectly diagnosed in children with similar symptoms who do not have TB. The lack of a sensitive and specific test for TB in children that can be performed in resource-limited settings, i.e. at low cost and with little or no laboratory infrastructure, is a major gap in our ability to diagnose and treat children with TB. The quantity of specific host proteins in urine is different for children with TB compared to symptomatic control children who do not have TB. These differences in individual host proteins in urine were quantitatively measured using shotgun mass spectrometry, a data dependent acquisition (DDA) approach and sequential window acquisition of all theoretical mass spectra (SWATH-MS), a data independent acquisition (DIA) approach to differentiate children with TB from children with similar symptoms who do not have TB sampled from Kenya, Peru and South Africa. Several proteins were identified that are moderately predictive of TB in children compared to controls. Identification of the urine proteome for TB in children, could lead to the development of simpler and more accurate tests to diagnose TB in children. Improved diagnosis will lead to more appropriate treatment and better outcomes for children with TB.

ABSTRACT NUMBER / ABSTRAKNOMMER: 55

Whole genome sequencing provides additional insights into recurrent tuberculosis classified as endogenous reactivation by IS6110 DNA fingerprinting

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Recurrent tuberculosis (TB) after successful TB treatment occurs due to endogenous reactivation (relapse) or exogenous reinfection. We revisited the conclusions of relapse in a high TB incidence setting that were drawn on the basis of IS6110 restriction fragment length polymorphism (RFLP) analysis in a large retrospective cohort study in suburban Cape Town, South Africa. Using whole genome sequencing (WGS), we undertook pair-wise genome comparison of *Mycobacterium*

tuberculosis strains cultured from diagnostic sputum samples collected at the index and recurrent TB episode for 25 recurrent TB cases who had been classified as relapse based on identical DNA fingerprint patterns in the earlier study. We found that paired strain genome sequences were identical or showed minimal variant differences in 22 of 25 recurrent TB cases, consistent with relapse. One showed 20 variant differences, suggestive of exogenous reinfection. Two of the 25 had mixed infections, each with the index episode strain detected as the dominant strain at recurrence in one of these patients, the minority strain harboured drug-resistance conferring mutations (*rpoB*, *katG*). In conclusion, our study highlights the additional value of WGS for investigating recurrent TB in settings with high infection pressure and closely related circulating strains, where the extent of re- and mixed infection may be underestimated.

ABSTRACT NUMBER / ABSTRAKNOMMER: 56

X-linked trans-ethnic meta-analysis reveals Tuberculosis susceptibility variants

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Globally Tuberculosis (TB) presents with a clear male bias that cannot be completely accounted for by environment, behaviour, socioeconomic factors or the impact of sex-hormones on the immune system. This suggests that genetic and biological differences, specifically relating to the X chromosome, further influence the male sex bias. The X chromosome has been shown to be heavily implicated in immune function and yet has largely been ignored in previous association studies. Here we report the first X chromosome specific association study on TB susceptibility. We identified X-linked TB susceptibility variants using seven genotyping datasets and 23229 individuals from different ethnic backgrounds. A sex-stratified and combined meta-analysis was conducted using the XWAS software and genomic regions previously associated with TB susceptibility were reproduced in this study. While significant associations were identified, the genes that they are located in have not previously been implicated in TB susceptibility.

Theme 3 / Tema 3
Mental Health and Neurosciences /
Geestesgesondheid en
Neurowetenskappe

ORAL PRESENTATIONS / REFERATE

ABSTRACT NUMBER / ABSTRAKNOMMER: 1

ALCOHOL'S EFFECT ON THE GUT MICROBIOME OF PREGNANT WOMEN

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Prenatal alcohol exposure is one of the most preventable causes of birth defects, developmental disorders and mental retardation, yet the prevalence of Foetal Alcohol Spectrum Disorder (FASD) in the Western Cape is 20-28%, significantly higher than the global prevalence of 0.77%. Excessive alcohol intake can result in alterations in gut microbial composition, causing both the microbial composition and functions to change from their normally beneficial state to one that is harmful to the host's health. This study aimed to compare gut microbial composition between women who exhibited hazardous alcohol use during pregnancy (cases) and those who abstained from drinking throughout pregnancy (controls). A total of 78 pregnant women were recruited - 38 cases and 40 controls. Microbial DNA extraction was performed on stool samples, followed by 16S rRNA sequencing of the V3-V4 region. The dada2 pipeline was used to pre-process the fastq sequencing files, create an amplicon sequence variant table, and assign taxonomy using the Ribosomal Database Project reference database. Differential compositional analyses were performed using PhyloSeq, while R was used to compute the statistical analyses of microbial composition, calculate alpha- and beta-diversity and perform enterotyping. The gut microbiome was dominated by Prevotella, Bacteroides and Succinivibrio. There were no significant differences in diversity measures or relative abundance of genera between cases and controls. The faecal communities clustered into two enterotypes - enterotype 1, enriched in Bacteroides, and enterotype 2, enriched in Prevotella. Although no significant gut microbial differences were identified, several cases exhibited a higher relative abundance of Prevotella which has been linked to mucin degradation. Mucin degradation may result in a compromised intestinal barrier, which, in turn, may result in increased bacterial translocation across the normally impenetrable intestinal barrier. Although no significant differences were identified between cases and controls, differences may become evident with a larger sample size.

ABSTRACT NUMBER / ABSTRAKNOMMER: 2

CLOZAPINE HAEMATOLOGICAL SIDE EFFECT MONITORING IN THE WESTERN CAPE: A RETROSPECTIVE REVIEW OF THE PROVINCIAL HEALTH DATA CENTRE DATABASE 2015-2017

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BACKGROUND: Clozapine is indicated for treatment-resistant schizophrenia but may cause life threatening leukopenia and agranulocytosis requiring haematological monitoring. Haematological side effects (HSEs) incidence data from Sub-Saharan Africa are lacking. Clozapine reduces cellular immunity and it is unknown whether clozapine is a risk factor for tuberculosis or whether HIV is a risk factor for

developing HSEs. The objective was to assess the frequency of white blood cell (WBC) monitoring and to determine the incidence of HSEs during the first 24 weeks of clozapine therapy. The secondary objective was to establish the incidence of tuberculosis and to determine the association of HIV with HSEs. METHODS: A retrospective descriptive study of patients initiated on clozapine between January 2015 and December 2017 using data from the Provincial Health Data Centre. A control group of patients initiated on risperidone were selected. Follow-up was 24 weeks. RESULTS: We identified 22818 patients; 5213 had WBC monitoring (n=1047 clozapine and n=4166 risperidone). The WBC of patients on clozapine were measured a median of 21 weeks, interquartile range 14 – 23 weeks. The incidence of leukopenia in patients on clozapine was 0.38% (95% CI 0.01-0.76%); 0.41% in patients on risperidone (95% CI 0.21-0.6%), (p=0.91). The incidence of agranulocytosis in patients on clozapine was 0.19% (95% CI 0.0-0.46%); 0.07% in patients on risperidone (95% CI 0.0-0.15%), (p=0.266). The incidence of tuberculosis disease were similar between patients on risperidone and clozapine (0.97% and 0.81% respectively; p=0.542). HIV infected patients had a higher relative risk than non-HIV infected patients of developing leukopenia (1.64% versus 0.22%, p<0.001) and agranulocytosis (0.36% versus 0.04%, p=0.004). CONCLUSION: Our incidence of clozapine-induced HSEs were lower than in the reported literature (0.8%) and not significantly different compared to risperidone. HIV infection was associated with HSEs. Our findings suggest the possibility of reducing the extent of WBC monitoring in HIV-negative patients..

ABSTRACT NUMBER / ABSTRAKNOMMER: 3

EFAVIRENZ IS ASSOCIATED WITH ALTERED FRONTO-STRIATAL FUNCTION IN HIV+ ADOLESCENTS

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Neurotoxicity associated with the antiretroviral efavirenz (EFV) has been documented in HIV-infected adults, but there are no data on the impact of EFV on brain function in adolescents. We investigated potential alterations in fronto-striatal function associated with EFV use in adolescents. A total of 86 adolescents underwent a Stop Signal Anticipation Task (SSAT) during fMRI: 39 HIV+ adolescents receiving EFV, 27 HIV+ adolescents on antiretroviral therapy without EFV (matched on age, gender, education, CD4 cell count and HIV viral load), and 20 HIV-negative matched controls (matched on age and gender). The task required participants to give timed GO responses with occasional STOP signals at fixed probabilities. Reactive inhibition was modelled as a correct STOP response and proactive inhibition was modelled after response slowing as the STOP probability increases. A priori mask based regions associated with reactive and proactive inhibition were entered into two respective Multivariate ANOVAs. The EFV treatment group showed significantly blunted proactive inhibitory behavioural responses compared to HIV+ adolescents not receiving EFV. There was no difference in reactive inhibition between treatment groups. We also demonstrated a significant effect of EFV treatment on BOLD signal in proactive inhibition regions. There was no difference in regions involved in reactive inhibition. We found no differences between adolescents not receiving EFV and HIV- controls, showing that functional and behavioural differences were unique to the EFV group. Here we demonstrate for the first time a potential adverse impact of EFV on higher cortical function in young HIV+ adolescents.

ABSTRACT NUMBER / ABSTRAKNOMMER: 4

IDENTIFICATION OF A NOVEL VARIANT IN A SOUTH AFRICAN FAMILY WITH FAMILIAL PARKINSON'S DISEASE AND THE SUBSEQUENT IN VITRO ANALYSIS

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Background: Parkinson's disease (PD) is a complex neurodegenerative disorder, the aetiology of which is thought to be an interaction of genetic, biological and environmental factors. It is mainly characterized by the loss of dopaminergic neurons in the Substantia nigra. No cure is available for PD, however genetic analysis has reported several PD-causing or associated genes. Recently, whole exome sequencing (WES), has been used to examine genetic causes of PD. However, in comparison to the global advances in the understanding of PD genetics, studies on Sub-Saharan African (SSA) populations have been scarce. Therefore, this study aimed to investigate the potential genetic causes of PD in a South African Afrikaner family with multiple affected individuals, by using the WES approach. Methods: WES was conducted on three affected individuals yielding over 20,000 variants each. Quality control and filtering only the co-segregating non-synonymous variants through bioinformatics analysis yielded nine variants. Sanger sequencing was used to verify these variants and exclude sequencing artefacts. Remaining variants were analyzed in silico for potential pathogenicity. Results: Five variants were found to be present in all affected PD individuals of the family. However, only one variant, p.G849D in NRXN2, fulfilled the various prioritisation criteria. The mutation was not present in the unaffected family members, in 671 South African PD patients and in 192 ethnically-matched controls. The transcribed protein, neurexin 2 (NRXN2), was found to be highly expressed in the substantia nigra, the main region of the brain affected by PD. Thus, it is a plausible candidate for PD. Future Work: Both the wild-type and mutant form of NRXN2 will be examined in vitro through the use of cDNA transfection. Thereafter the effects of the protein on cell viability, apoptosis, mitophagy and PD-related proteins. This will enable further understanding of the pathways involved in PD.

ABSTRACT NUMBER / ABSTRAKNOMMER: 5

RELEVANCE OF CANNABIS USE AS A PREDICTOR OF CLINICAL OUTCOME IN FIRST-EPIISODE SCHIZOPHRENIA SPECTRUM DISORDER PATIENTS OVER 24 MONTHS OF TREATMENT WITH FLUPENTHIXOL DEPOT

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Cannabis use is generally associated with an unfavourable course of illness in first-episode schizophrenia, including non-remission of psychopathology symptoms, higher rates of relapse and re-hospitalization, and poorer functioning. The aim of this study was to explore the influence of cannabis use on clinical and treatment outcomes in first-episode schizophrenia spectrum disorder patients over 24 months of assured antipsychotic treatment. The present longitudinal study included 123 minimally treated or antipsychotic-naive first-episode patients assessed over 24 months of treatment with flupenthixol decanoate according to a standardized regimen. Time to relapse, visit-wise changes in psychopathology severity and overall functioning were compared between cannabis users (n=41) and non-users (n=82) stratified based on urine toxicology results. While cannabis users were more likely to relapse at any point over 24 months of treatment, cannabis use was not a significant predictor of relapse. Furthermore, while cannabis users had poorer social and occupational functioning scores at baseline, cannabis use was not associated with poorer improvement in social and occupational functioning over the course of treatment. Since cannabis use was not a predictor of relapse, our results indicate that cannabis use is not likely to be a reliable predictor of overall treatment outcome in the presence of assured antipsychotic treatment. Therefore, although substance use still needs to be

targeted to improve the functional outcomes of substance using patients, assured antipsychotic medication appears to be sufficient to attenuate symptomatology and relapse in substance-using patients.

ABSTRACT NUMBER / ABSTRAKNOMMER: 6

MENTAL HEALTH AND WELL-BEING POST-STROKE: A CRITICAL CARE PATHWAY

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BACKGROUND: At least one in three stroke survivors in Africa can be expected to have post-stroke depression. Mental health problems post-stroke are associated with poorer rehabilitation outcomes and reduced quality of life. Nevertheless, mental health interventions are often inaccessible to stroke survivors. It is important that stroke services in Africa address mental health needs during rehabilitation. **METHODS:** We used a three-staged approach. Stage 1 comprised a scoping review of mental health interventions for stroke survivors in Africa. In Stage 2 we reviewed guidelines to extract mental health specific recommendations. Information from the first two stages was synthesised in order to develop a critical pathway for mental health interventions in Stage 3. **RESULTS:** The initial search conducted as part of the scoping review yielded 340 studies, only three (3) met our inclusion criteria. These studies focussed on brisk walking, an intensive neuro-physiotherapy protocol, and social support. Depression was the only mental health condition assessed across the three studies. Post-stroke depression improved in the neuro-physiotherapy and social support studies. Analysis of stroke guidelines yielded some recommendations for mental health, but with weak evidence. Many guidelines are based on a one-to-one model of care. **RECOMMENDATIONS:** There is a significant lack of research on interventions to support the mental health and well-being needs of stroke survivors in Africa. We recommend a contextualised critical care pathway that includes regular screening for a range of mental health problems; three levels of service provision, mainly in groups rather than one-to-one, dependent on the severity of mental health symptoms; and caregiver support. The proposed outcome of services is improved social support and community re-integration.

ABSTRACT NUMBER / ABSTRAKNOMMER: 7

EXPLORATION OF READING CULTURE WITHIN THE HOME ENVIRONMENTS OF GRADE 4 LEARNERS EXPERIENCING READING DIFFICULTY

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Introduction: The Progress International Reading Literacy Study (PIRLS) conducted in 2016, noted that reading is an issue in SA schools, where the environment was a contributing factor to the child's ability to learn to read. Reading ability either enhances or hinders a child's ability to successfully engage and participate in future occupations. This study aims to understand and describe the reading culture within the home environment of the Grade 4 learners, paving the way for further research and interventions aimed to improve the reading culture in the Worcester area. Objectives include to determine the level of education of the household members and their attitudes towards reading, to explore the availability of reading resources and activities in the home, and establish what caregivers consider to be possible causes of the reading difficulty. **Methodology:** An instrumental case study was done and four participants were selected through purposive sampling from the study population of Grade 4 learners' caregivers who fulfilled all the criteria for participation in the study. Data was gathered from participant observations and semi-structured, in-depth interviews, relating to the five objectives of the study. Transcriptions of the interviews underwent a thorough content analysis, which sought to objectively

identify and define all the possible perspectives describing the case. Findings: Four themes emerged: reading is important, that's just my child, this is what we do, and that's what happens here. These themes demonstrate how the interplay of environmental influences, household norms and children's individual traits contribute to a culture of reading. Conclusion: One participant cultivated a positive reading culture within her home, which had a positive influence on her child's reading ability. Factors limiting the development of a reading culture in the other households included the lack of positive role models, restricted access to books due to gang violence and minimal parental involvement.

ABSTRACT NUMBER / ABSTRAKNOMMER: 8

GENOME-WIDE DNA METHYLATION PROFILING REVEALS EPIGENETIC SIGNATURES ASSOCIATED WITH PTSD AND METABOLIC SYNDROME

Sylvanus Toikumo (Stellenbosch University)

BACKGROUND: Posttraumatic stress disorder (PTSD) is a disabling psychiatric disorder and shares overlapping pathogenic mechanism with metabolic syndrome (MetS). Although epigenome-wide association studies have identified genes associated with either PTSD or MetS, there remains uncertainty about genes involved in underpinning biological processes for PTSD and MetS comorbidity. The objective of this study was to identify differentially methylated regions (DMR) associated with PTSD and MetS comorbidity. **METHODS:** Blood samples were collected from PTSD cases (N = 61) and controls (N = 59) with/without MetS, and differential DNA methylation profiles were interrogated using the Illumina Infinium EPIC BeadChip. We performed DMR association analyses using linear regression models in the minfi function bumpHunter, adjusting for age, sex, smoking, childhood trauma and cellular heterogeneity. **RESULTS:** We identified 169 and 3 DMRs that were associated with PTSD diagnosis and PTSD-MetS comorbidity, respectively (FWER < 0.1). The DMRs associated with PTSD-MetS comorbidity were hypomethylated and annotated to genes involved in lipid metabolism (PM20D1, $p = 2.10E-6$, FWER = 0.07) and transcriptional regulation (C7orf50; $p = 7.38E-7$, FWER = 0.03, AC131097.3; $p = 1.08E-6$, FWER = 0.04). **CONCLUSION:** Our data reveal aberrant DNA methylation in the periphery in PTSD and suggests phospholipids metabolism as a potential biological pathway involved in PTSD-MetS comorbidity.

ABSTRACT NUMBER / ABSTRAKNOMMER: 9

A COMPARISON OF PUBLICLY AVAILABLE BIOINFORMATICS TOOLS TO ASSESS THE PATHOGENICITY OF VARIANTS IN MITOCHONDRIAL DNA

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Background: Neurological disorders including amyotrophic lateral sclerosis, Alzheimer's disease, Huntington's disease and Parkinson's disease, have all been strongly linked to mitochondrial dysfunction. Mitochondria are crucial for cellular health given their roles in cell maintenance and cellular energy production, thus, dysfunction in their metabolism has profound detrimental effects within the body. Notably, mitochondrial DNA (mtDNA) variation has been implicated in dysfunction of mitochondrial metabolism. Many in silico 'pathogenicity scoring' bioinformatic tools used to assess pathogenicity of mtDNA variation are publicly available. However, these tools have been shown to assign pathogenicity inconsistently across platforms, highlighting the need to further investigate the reasons for these recurrent discrepancies. As such, this study explored the reasons for publicly accessible bioinformatics tools presenting contrasting results, by means of comparison. We aimed to determine which of these tools are best for investigating mtDNA variation. **Methods and Results:** A test dataset of 50 mitochondrial variants was identified and taken from Mitomap. According to pre-selected

criteria, 25 of these variants were pathogenic and 25 were benign. These were used for the comparison of bioinformatic tools. Nine tools, identified as frequently used in past studies, were selected, with 5 having been developed for nuclear DNA and 4 for mtDNA. The Mutpred nuclear tool, assigned the pathogenicity of 47 of the 50 variants correctly, whilst MtoolBox, a tool using a mtDNA reference database, only assigned 40 of the 50 variants, correctly. Conclusions: Overall, assessing the pathogenicity of mtDNA variants is challenging. However, tools designed specifically for mtDNA are likely best for assessing mtDNA pathogenicity. Interestingly, in our initial analysis, MtoolBox proved to be less effective than the nuclear tool Mutpred but further analysis is warranted. Given the important role of mitochondria and mtDNA in human disease, the development of effective and accurate bioinformatics tools to study mtDNA variants, is urgently needed.

POSTERS/PLAKKATE

ABSTRACT NUMBER / ABSTRAKNOMMER: 10

COGNITIVE OUTCOMES AT 7 AND 9 YEARS IN THE CHILDREN WITH HIV EARLY ANTIRETROVIRAL THERAPY (CHER) TRIAL

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Introduction: Despite advances in pediatric HIV treatment, many HIV-infected children display significantly impaired cognitive performance. Recent studies suggest that early initiation of combination antiretroviral therapy (cART) produces the best cognitive outcomes in infected children. However, further research into the efficacy of different early treatment strategies is needed. Moreover, it is important that this research (a) be conducted in sub-Saharan Africa, where most HIV-infected children reside, and (b) go beyond cross-sectional between-group comparisons and instead focus on long-term effects of cART on the developing child's cognitive abilities. **Aim and Methods:** This longitudinal-observational study investigated the effects on cognitive performance, at 7 and 9 years of age, of Cape Town participants randomised to three early intervention strategies employed within the CHER trial. The strategies were deferred ART (ART-Def; n=22), immediate time-limited ART for 40 weeks (ART-40W; n=36), and immediate time-limited ART for 96 weeks (ART-96W; n=26). We also recruited HIV-exposed uninfected (HEU; n=28) and HIV-unexposed (HU; n=35) controls. All participants underwent a battery of standardized cognitive tests, assessing domains of fine motor dexterity, visual-motor integration, receptive language, attention, and executive functioning. **Results:** Mixed-model repeated-measures ANOVAs detected significant effects of Time ($p < 0.0001$) for most outcome variables (as expected, scores were better at 9 years than at 7 years). Contrary to original expectations, there were no significant Group effects for the five groups and only one significant Time x Group interaction, which showed the ART-96W groups scores significantly higher at 9 years for fine motor dexterity, while the other groups scores remained relatively stable. **Conclusion:** Regardless of cART treatment strategy, neurocognitive developmental trajectory is similar and within normal limits for HIV-infected children at 7 and 9 years of age.

ABSTRACT NUMBER / ABSTRAKNOMMER: 11

INVESTIGATING INFLAMMATION IN NEUROPSYCHIATRIC DISORDERS

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Neuropsychiatric disorders (NPDs) have a high prevalence of nearly 30% in South Africa and influences the health and economic well-being of affected individuals. Numerous studies have reported an inflammatory mechanism, characterised by increased concentrations of pro-inflammatory cytokines, that contributes to the pathophysiology of these disorders. Furthermore, a heightened state of inflammation pre-disorder has been linked to increased susceptibility and risk for comorbidity. The aim of this study is to measure pro-inflammatory cytokines as markers of inflammation in patients with posttraumatic stress disorder (PTSD), Parkinson's disease (PD) and schizophrenia (SCZ), as well as controls. Furthermore, a longitudinal analysis was done for the SCZ cohort at baseline (treatment naïve) and 12-month follow-up (following treatment). Samples were previously collected as part of a larger cohort study ("Shared Roots"). The pro-inflammatory cytokines interleukin 1-beta (IL-1 β), interleukin 6 (IL-6), tumor necrosis factor alpha (TNF- α) and interferon-gamma (IFN-g) were measured in duplicate in serum samples of the three NPDs (138 PTSD, 46 PD, 32 baseline SCZ, and 16 follow-up SCZ patients, as well as 180 PTSD, 21 PD, 39 baseline SCZ, and 23 follow-up SCZ controls) using the MILLIPLEX[®] Map Human Cytokine/Chemokine Magnetic Bead Panel (Merck's) on the Bio-Plex[®] 200 Luminex system (Bio-Rad), according to the manufacturer's specifications. Statistical analysis is underway, and data will be analysed using R.

ABSTRACT NUMBER / ABSTRAKNOMMER: 12

METHYLATED QUANTITATIVE TRAIT LOCI ASSOCIATED WITH PTSD

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Posttraumatic stress disorder (PTSD) is a complex psychiatric disorder characterised by symptoms of intrusive thoughts, avoidance behaviours, hyper-arousal and negative alterations to cognition and mood. PTSD is unique among psychiatric disorders in that it is a consequence of trauma exposure. Yet, studies previously conducted in the USA have shown that although 50-85% of individuals will encounter a traumatic event in their lifetime, the prevailing prevalence of PTSD is approximately 7%. This discrepancy serves to highlight the existence of factors granting individuals contingent resistance or vulnerability to the development of PTSD. While the genetic mechanisms elemental to PTSD remain largely unknown, prior epigenome-wide association studies investigating the epigenetic patterns underlying the disorder have shown that PTSD presents methylation alterations associated with disparate functioning in immune- and stress-response pathways that mediate risk and resilience to PTSD. The aim of this study is to integrate genomic and epigenetic data to identify methylated quantitative trait loci associated with PTSD in the uniquely admixed South African Coloured population. High throughput genomic and epigenetic data previously generated for a cohort of trauma-exposed controls (n = 54) and PTSD patients (n = 55) will be assessed to identify genetic variants that are positionally associated with methylated regions. PTSD severity scores obtained through the Clinician-Administered Posttraumatic Stress Disorder Scale for DMS-5 will then be used to investigate whether the severity of PTSD experienced is related to differential methylation levels at any of the considered variants. The data generated will supplement our current research on the genetic and epigenetic mechanisms underlying the development of PTSD in the South African Coloured population.

ABSTRACT NUMBER / ABSTRAKNOMMER: 13

THE POTENTIAL OF DIGIT RATIO AS AN ENDOPHENOTYPE IN A SCHIZOPHRENIA POPULATION

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Background: A number of studies have been conducted attempting to delineate the incidence and nature of minor physical anomalies in Schizophrenic patients compared to both the general population and their unaffected family members. The identification of such anomalies has led to the suggestion of a neurodevelopmental component in the aetiology of the illness. This study aims to augment previous research by examining the use of digit ratio as a parameter in identifying individuals with a possible strong genetic underpinning of their illness by assessing the reliability of digit ratio as a stable feature connecting the clinical phenotype of Schizophrenia and largely undifferentiated genotype. Methods: The 2nd (D2) and 4th (D4) digits of a large group (n=200) of participants with Schizophrenia who were subjects in a 2006 study on Morphological features in a Xhosa Schizophrenia Population by L Koen et al. are to be measured from a large image database with scientific image analysis software and the digit ratios (D2:D4) will be calculated. Participants will be characterised by sex, age of onset of their illness and dominant symptomatology and significant differences within and between these categories will be assessed for in order to identify a connection between features more suggestive of a strong genetic basis for disease and significantly unique digit ratios if present.

ABSTRACT NUMBER / ABSTRAKNOMMER: 14

COMT VAL158MET AND DAT-VNTR GENOTYPE ASSOCIATED WITH HIV-ASSOCIATED NEUROCOGNITIVE DISORDERS

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HIV/AIDS is a major public health burden in South Africa, affecting an estimated 13.1% of the population in 2018. Despite improvements in access to antiretroviral therapies, HIV-associated neurocognitive disorders (HAND), characterized by a spectrum of neurocognitive impairment, emotional disturbance and motor abnormalities, continue to persist. In addition, exposure to childhood trauma and experiencing depression have shown to worsen these symptoms. Cognitive impairment is a key characteristic of HAND. Dopaminergic signalling in the prefrontal cortex of the brain has been found to play a role in cognitive functioning. Dopamine transporter (DAT) and catechol-o-methyltransferase (COMT) represent crucial components with regards to dopamine transport and metabolism. This study thus aims to determine whether the DAT variable number of tandem repeats (VNTR) and COMT Val158Met (rs4680) polymorphisms are associated with cognitive decline represented by a change in global cognitive scores, ascertained on the HIV Neurobehavioral Research Centre (HNRC) battery for the assessment of HAND. For the genetic analysis, DNA was extracted from blood samples provided by each participant (n = 49 HIV-negative; n = 64 HIV-positive). Genotyping for the genetic variants will be done and statistical regression models will be used to determine the association between genotype, cognitive function, and change in global cognitive scores between baseline and 1-year follow-up while adjusting for childhood trauma exposure (Childhood Trauma Questionnaire) and depression (Centre for Epidemiological Studies – Depression Scale). Polymerase Chain Reaction (PCR) conditions for the two genetic variants have been optimised and genotyping experiments are currently in progress. This research will lead to a better understanding on the role of neurotransmitter genomics, particularly dopamine, in the progression of HAND.

ABSTRACT NUMBER / ABSTRAKNOMMER: 15

INVESTIGATING MENTAL HEALTH LITERACY OF PHC PRACTITIONERS IN SOUTH AFRICA AND ZAMBIA: PHASE 1 OF THE MEGA PROJECT – PRELIMINARY FINDINGS FROM THE WESTERN CAPE

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Background: A high prevalence and burden of psychiatric illness in childhood and adolescence suggests that primary health care (PHC) practitioners should routinely consider mental illness when assessing youth. However, common psychiatric disorders remain largely undetected and untreated in PHC settings, suggesting a need for greater awareness. Aims: The MEGA project aims to identify gaps in PHC practitioner knowledge with regard to child and adolescent mental health in South Africa and Zambia, in order to provide training to address these gaps and develop a locally relevant mobile-health tool to screen for common conditions. Methods: 70 PHC nurses from 7 PHC clinics in Cape Town completed (i) a background questionnaire which contained questions related to demographics, work experience, mental health knowledge, training, and resource availability; and (ii) the Mental Health Literacy Scale (MHLS)- a 35 item questionnaire that can be used to assess mental health knowledge, attitudes toward mental health and help-seeking. Results: Participants were between 21 and 58 years of age and mostly female (87%). Although the majority (74%) were confident about where to obtain information pertaining to mental illness, only half (50%) reported ever receiving any mental health training. Participants reported seeing an average of 2 (± 2.9) adolescents with suicidal thoughts or attempts and 9 (± 26.9) who had experienced a traumatic event each month. The mean score on the MHLS was 127.3 (± 12). Discussion: These findings suggest that PHC nurses would benefit from increased support with regard to managing mental health conditions. By identifying the needs of PHC practitioners in managing youth with common mental health problems, we hope to develop targeted training and a brief mental health screening tool that will aid in identifying youth in need of further attention. In this way we anticipate improved access to mental health services and enhanced mental health care.

ABSTRACT NUMBER / ABSTRAKNOMMER: 16

THE VAL66MET BRAIN-DERIVED NEUROTROPHIC FACTOR GENOTYPE DOES NOT PREDICT PTSD TREATMENT RESPONSE IN SOUTH AFRICAN ADOLESCENTS

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Posttraumatic stress disorder (PTSD) is a psychiatric condition characterised by intrusive thoughts, avoidance behaviours, hypervigilance and cognitive deficits that may occur consequent to trauma exposure. Recent studies suggest that genetic predisposition plays an important role not only in the risk of developing psychiatric disorders, but also into the response to therapeutic interventions. The purpose of this study was to determine whether Val66Met, a functional variant in the brain-derived neurotrophic factor (BDNF) gene, predicts treatment response in adolescents with PTSD. We performed secondary analysis of data collected from 52 South African adolescents (70 % of Mixed-Ancestry) diagnosed with PTSD and examined the relationship between treatment response and Val66Met genotype. Study participants were randomly assigned to one of two intervention programs, either prolonged exposure therapy (PE) or supportive counselling (SC). DNA was extracted from saliva samples provided by each participant. Genotyping was successfully performed on samples from 47 participants (PE, n = 22; SC, n = 25). PTSD symptom severity, as assessed by the Child PTSD Symptom Scale-Interview, improved significantly with treatment ($p = 2.0 \times 10^{-16}$). However, a repeated measures analysis of covariance, with Val66Met genotype as the between factor and time as the within

factor, revealed no significant effect of genotype on treatment outcome. The results of this study require replication in a larger study group that accounts for the multiple confounding factors affecting human genetic studies.

ABSTRACT NUMBER / ABSTRAKNOMMER: 17

SEX AND GENDER AS PREDICTORS OF AGE OF PSYCHOSIS ONSET IN FIRST-EPISEDE SCHIZOPHRENIA SPECTRUM DISORDERS

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Background: Sex-based differences in schizophrenia, including an earlier age of onset in male patients, are well-described. However, little is known about the associations of gender identity with clinical presentation and treatment outcome. In response to this knowledge gap, the aim of this study was to compare the influence of biological sex versus gender as predictors of age of onset in first-episode schizophrenia spectrum disorders. Methods: Gender role endorsement (masculinity/femininity) was assessed in 77 treatment-naïve or minimally treated patients (56 males, 21 females) enrolled as part of a larger cohort study (n=126) using the Bem Sex Role Inventory (BSRI). Data on sex, family history of schizophrenia, and history of substance use were documented, and age of psychosis onset calculated based on >1 week of continuous positive symptoms. Results: Male sex (p=0.030) and a history of substance use (p=0.004) were significantly associated with earlier age of onset in the total patient sample (n=126). In the subgroup of patients who completed the BSRI (n=77), femininity scores were significantly positively correlated with age of onset (r= 0.30, p=0.009). In a linear model (R-squared= 0.28, F(6,70)= 4.50, p<0.001), high femininity scores (p=0.010) predicted later age of psychosis onset in this subgroup, adjusting for sex, substance use, schizophrenia family history, diagnosis type (schizophrenia vs. schizoaffective/schizophreniform disorder), and masculinity scores. Conclusions: Sex- and gender-based analysis may hold value in providing a bio-psycho-social understanding of inter-patient heterogeneity in schizophrenia. Further studies are needed to explore the associations of gender identity with clinical presentation and premorbid profile.

ABSTRACT NUMBER / ABSTRAKNOMMER: 18

MEASURING NEUROCOGNITIVE FUNCTIONING IN HIV INFECTED ADULTS: THE DEVELOPMENT OF A SHORTENED VERSION OF THE HNRC NEUROCOGNITIVE TEST BATTERY

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In resource limited countries, like South Africa, reliable and valid neurocognitive batteries that are quick to administer and assess multiple domains of cognitive functioning are vital tools in the early detection of HIV-associated neurocognitive disorders. Early identification of HIV-associated cognitive decline is crucial in the treatment of this condition. The HIV Neurobehavioral Research Centre's (HNRC) International Neurocognitive Test Battery (HNRC battery) is a screening device that is sensitive to a decline in neurocognitive functioning caused by HIV and is culturally appropriate in the South African context. However, the battery can take over 2 hours to administer. The current study aimed to address this challenge by developing a shortened version of the HNRC battery that is more effective in a South African clinic setting. This study had a case-control design in which the neurocognitive test results of HIV-positive and HIV-negative participants were compared to identify the tests in the HNRC battery

that best predicted HIV-status. Data was collected from a convenience sample comprised of 103 HIV-positive and 135 HIV-negative South Africans. Six measures (i.e. the Hopkins Verbal Learning Test - Revised; WAIS-III: Symbol Search; Controlled Oral Word Association: FAS; WMS-III: Spatial Span; Grooved Pegboard test: non-dominant hand, and the Stroop Colour Word Test) that each measured a separate cognitive domain evaluated by the full battery, were selected for the shortened version. The measures that best discriminated between the HIV-positive and HIV-negative groups, that best predicted group inclusion, or that maximised practicality in clinical settings were prioritized in the selection process.

ABSTRACT NUMBER / ABSTRAKNOMMER: 19

AN EXPLORATORY STUDY OF THE BLOOD MICROBIOME IN POSTTRAUMATIC STRESS DISORDER, SCHIZOPHRENIA AND PARKINSON'S DISEASE

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Commensal human microbiota has shown to be vital in understanding health and disease. The gastrointestinal tract's microbiota and their metabolites play a role in digestion, homeostasis, the immune system's maturation and, recent studies show, in the brain's development and function. The gut microbiome has been associated with psychiatric and neurological disorders such as posttraumatic stress disorder (PTSD), schizophrenia (SCZ) and Parkinson's disease (PD), whereas the relationship between blood microbiome and these disorders have not been adequately investigated. In recent years, studies have shown that blood, which was previously thought to have been sterile, contains human microbiome. The presence of microbiota in the blood could be the result of translocation from their usual place of origin such as the gut and skin etc. To investigate the differences of the microbiome in blood, a study has re-analysed previous RNA sequences through the assembly of unmapped reads to the microbial genomes that are available. Exploring the differences in the gut and blood microbiome profiles would provide better insight into the gut-blood barrier's role in the underlying pathological mechanisms of these neuropsychiatric disorders. The aim of this study is to analyse and correlate the microbial profile of blood in patients with PTSD (cases: n=40; controls: n=39), SCZ (cases: n=18; controls: n=21) and PD (cases: n=15; controls: n=19). RNA was extracted from peripheral blood. High-quality RNA paired-end sequence reads (at 120bp read length and a depth of 50 million bp) will be separated into human and non-human reads whereby the latter would be identified as candidate microbial reads. For taxonomy profile assignment, PhyloSift will be used. The asbio and vegan packages from R will determine the alpha- and beta-diversity estimates. For this study, an analytical pipeline will be developed and preliminary results will be attained.

Theme 4 / Tema 4
Non Communicable Diseases /
Nie-oordraagbare Siektes

ORAL PRESENTATIONS / REFERATE

ABSTRACT NUMBER / ABSTRAKNOMMER: 1

THE INCIDENCE OF MELANOMA IN SOUTH AFRICA: AN EXPLORATORY ANALYSIS OF NATIONAL CANCER REGISTRY DATA FROM 2005 TO 2013 WITH A SPECIFIC FOCUS ON PIGMENTED SKIN

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Background. Melanoma is an aggressive skin cancer when diagnosed late. It is a malignancy of the melanocytes that produce melanin pigment which protects skin cells from solar radiation, and gives skin its colour. Differences occur in clinical and histological features of melanoma and disease outcomes in people with darker skin types. Methods. A retrospective review of National Cancer Registry (NCR) of South Africa (SA) data was performed for 2005 - 2013. Patient numbers, demography, location and biological features were analysed for all records. Closer analysis of melanoma of the limbs reported in black Africans (used as an indication of skin pigmentation) was done after manually collecting this information from original reports. Results. With 11 784 invasive melanomas reported to the NCR, the overall incidence of melanoma for SA was 2.7 per 100 000. Males (51%), individuals aged ≥ 60 years (48%) and the anatomical sites of lower limb (36%) and trunk (27%) were most commonly affected. Melanoma incidences in the white and black populations were 23.2 and 0.5 per 100 000, respectively. Most cases were diagnosed at private pathology laboratories (73%). Superficial spreading melanoma (47%) and nodular melanoma (20%) predominated. Among 878 black Africans diagnosed in the public sector with melanoma of the limbs, females (68%) and individuals aged ≥ 60 years (61%) were most commonly affected. Lower-limb lesions (91%) and acral lentiginous melanoma (65%) predominated, with 74% of cases affecting the foot and 62% of cases presenting with a Breslow depth >4 mm, implying late diagnosis and poor prognosis. Conclusions. This study provides up-to-date NCR incidence and demographic data on melanoma and highlights the research gaps in relation to melanoma in people with darker skin types.

ABSTRACT NUMBER / ABSTRAKNOMMER: 2

AUTO-ANTIBODY AND CYTOKINE PROFILE OF SLE PATIENTS WITH LUPUS NEPHRITIS COMPARED TO THOSE WITHOUT

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Background: Lupus Nephritis(LN) is a common and life threatening manifestation of Systemic Lupus Erythematosus(SLE). Associated SLE manifestations such as thrombocytopenia, may limit the use of kidney biopsy to determine the presence and class of LN. This study aimed to determine the prevalence of auto-antibodies and cytokines in LN in comparison to SLE without LN. Methods:A prospective crosssectional analytical study was done at Tygerberg Hospital in Cape Town, South Africa. SLE patients who presented between June2017 and May2018, were included. All relevant clinical detail were documented while auto-antibodies were analysed as part of standard of care. Blood for cytokine analysis(IFN- α ,IL-1,IL-2,IL-6,IL-10,IL-17 IL-18,TNF- α) as a measure of SLE activity and inflammation were collected and analysed by the Stellenbosch University Immunology Research Group. Patients were divided into two groups: those with biopsy proven LN and a control group of SLE patients without LN.Results:36 patients were included in the LN group of which 91% were female, 66% were of mixed racial ancestry and had a median age of 27years(IQR:14-55). Class IV LN was the most prevalent(72%). 35 SLE patients were included in the control group. They had a similar gender and race distribution, with a median age of 30years(IQR:15-57;p=0.03). Frequency of auto-antibodies results were not different between the two groups, with ANA(92%) and Anti-DsDNA(90%) testing the most frequently positive in both groups. High levels of IL-18(p=0.012) and IL-6(p=0.02), younger age(p=0.03) and low c3(p=0.003) were variables identified to have high predictive values for LN. The combination of IL-18,

age, c3, UPCR with eGFR had a high sensitivity(83%) and specificity(86%) for the diagnosis of LN. Conclusion: In our patient group, patients with LN were younger than those without. The combination of a younger patient with a decreased eGFR, low c3, raised UPCR, low serum VCAM and increased cytokines, IL-18 and IL-6, supports the diagnosis of LN where a renal biopsy is contra-indicated.

ABSTRACT NUMBER / ABSTRAKNOMMER: 3

PERSONAL AIR POLLUTION EXPOSURE IS ASSOCIATED WITH MARKERS OF CARDIOVASCULAR RISK: FINDINGS FROM THE ENDOAFRICA STUDY.

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Exposure to ambient NO₂ and BTEX (benzene, toluene ethyl-benzene and m+p and o-xylenes) is associated with adverse cardiovascular effects, but limited information is available on the effects of personal exposure to these compounds in South African populations. This 6-month follow-up study aimed to determine 7-day personal ambient NO₂ and BTEX exposure levels via compact passive diffusion samplers in female participants (n = 61) from Cape Town, and investigate whether personal exposure levels are associated with cardiovascular risk markers. Overall, the measured air pollutant exposure levels were lower compared to international standards. NO₂ was positively associated with systolic blood (2.42 mmHg; p = 0.047) and diastolic blood pressure (1.76 mmHg; p = 0.050), and inversely associated with central retinal venular equivalent (-2.08 µm; p = 0.048) and mean baseline brachial artery diameter (-0.11 mm; p = 0.005) for each standard deviation (SD) increment increase in NO₂ (4.96 µg/m³). o-Xylene was associated with diastolic blood pressure (2.01; p = 0.029) and benzene strongly associated with carotid intima media thickness (24.88 µm; p = 0.032) for each SD increment increase in o-xylene (2.51 µg/m³) and benzene (2.08 µg/m³) respectively. The urinary metabolite 3+4-methylhippuric acid (3+4MHA; a predominant marker of xylene exposure) was negatively associated with vascular function as indicated by % flow-mediated vasodilation (-1.446 %; p = 0.003) for each SD increment increase in 3+4MHA (3.12 ng/mL). Our findings show that personal air pollution exposure, even at relatively low levels, associated with several markers of cardiovascular risk in women residing in the Cape Town region.

ABSTRACT NUMBER / ABSTRAKNOMMER: 4

PHYSICAL ACTIVITY AND RISK FACTORS FOR CHRONIC NON-COMMUNICABLE DISEASE IN RELATION TO DISEASE SEVERITY IN PATIENTS WITH MS – A CROSS SECTIONAL SURVEY

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Background: Due to the improved medical management of patients with MS (pwMS) there has been an increased interest in secondary prevention of chronic comorbidity. It can be hypothesized that with increasing disease severity, pwMS are less likely to engage in physical activity thereby are predisposed for factors for comorbidity and specifically chronic non-communicable diseases of lifestyle. Methods: The first ever national survey including outcomes on health status, physical activity, and societal participation of patients with MS in South Africa was conducted through the national MS Society. Self-reported risk factors including Body Mass Index (BMI; underweight, normal, overweight, obesity I - III), presence of high blood pressure and high cholesterol, were compared using descriptive statistics across levels of disability (Patient Determined Disease Steps [PDDS]; mild, moderate, severe) and physical activity (International Physical Activity Questionnaire [IPAQ]; Inactive, Minimally-Active, and Health-Enhancing Active). Results: 122 of 1000 (12.2%) completed the survey (Age=47.4 +/- 9.7yr,

Male(%)=14, disease duration=10.7 +/- 9.1yr). Patients with moderate MS reported a significant (Chi-Square<.05) higher presence of high blood pressure (37%), and high cholesterol (37%) relative to patients with mild MS (12 and 14%). Independent of disease severity, >68% of pwMS were either overweight or obese. Patients with severe MS reported the highest BMIs (Obese class I 27%, class II 14% and class III 9%). Five percent of pwMS are health-enhancing active, 31% minimally active and 64% inactive. There was a trend (p=.06) towards lower levels of physical activity in patients with moderate MS (Inactive=77%, Minimally-Active=23%). Conclusion: Patients with MS are generally inactive independent of disease severity. The presence of self-reported risk factors significantly increased with disease severity, and are indicative of a higher risk for chronic non-communicable disease across the lifespan.

ABSTRACT NUMBER / ABSTRAKNOMMER: 5

PREVALENCE OF DYSLIPIDAEMIA AND HYPERTENSION IN DIABETIC PATIENTS AT TYGERBERG CHILDREN'S HOSPITAL

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Background: Diabetes and dyslipidaemia are independent risk factors for cardiovascular disease in adults. Poor glycaemic control, predisposing to dyslipidaemia, is frequently seen in diabetic children in South Africa. The local prevalence of dyslipidaemia in these children is however unknown. Objectives: To determine • Prevalence of dyslipidaemia and hypertension in paediatric diabetic population of Tygerberg Children's Hospital. • Whether dyslipidaemia and hypertension varied with HbA1c, duration of diabetes or body mass index. • Whether there was an improvement in lipid control and hypertension when comparing time periods 2007- 2011 and 2012- 2017. Study design: Retrospective observational study comparing two time periods. Methods: Diabetic patients, aged 1-18 years, seen at paediatric diabetes clinic of TBH from 2007-2017, diagnosed with diabetes for ≥ 5 years if pre-pubertal and ≥ 2 years if in puberty. Data collected: height, weight (BMI computed), blood pressure, HbA1c. Results: 154 patients included. 89 had dyslipidaemia (57.79% [95% CI 49-65]), 83 (93.3%) type 1 diabetes, 6 (6.8%) type 2 diabetes, 75 hypertension (48.7%, 95% CI 40.8-56.6). 144 (93%, [95% CI 88.3-96.4]) had poor glycaemic control, of which 86 dyslipidaemia (59.7%, p=0.066). 11 of obese (64.71%, p=0.546) and 24 of overweight patients (63.16%, p=0.546) had dyslipidaemia. As the lipid profile deteriorated, blood pressure increased. Similarly, as the BMI increased, lipid profile deteriorated. 43 of >16 year olds had dyslipidaemia (71.67%, p=0.005). 11 of overweight (68.75%, p=0.788) and 5 of obese patients had dyslipidaemia (83.33%, p=0.788). 41 had poor glucose control (74.5%, p=0.101), 5 hypertension (11.63%, p=0.244). An overall total of 38 patients (62.3%) seen in 1st period and 51 (54.84%, p=0.36) in 2nd period had dyslipidaemia. Conclusions: High prevalence of dyslipidaemia and hypertension noted, both increasing during adolescence. As BMI increased, lipid profile deteriorated. Poor control tended to be with dyslipidaemia. Prevalence of dyslipidaemia and hypertension did not improve over 10 years.

ABSTRACT NUMBER / ABSTRAKNOMMER: 6

ENDOCRINE COMMUNICATION BETWEEN ADIPOCYTES AND PROGENITOR CELLS: IMPLICATIONS FOR VISCERAL OBESITY

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Obesity has become a major public health problem. The rising prevalence of obesity and obesity-related comorbidities, such as diabetes, hypertension, cardiovascular disease and certain cancers, exert an exceptionally high burden of disease. Yet, the underlying biology of obesity is not well understood. When individuals become obese, excess energy is readily stored in expanding subcutaneous adipose tissue before it is accumulated in central, visceral adipose depots. While subcutaneous adiposity results in relatively benign lipid storage, expansion of visceral adipose depots is closely linked to adverse metabolic outcomes. However, it is not known how visceral fat accumulation is regulated and why some individuals more rapidly accumulate visceral fat and are therefore at higher risk for obesity-related metabolic dysfunction. We hypothesise that the lag in visceral adipose tissue expansion could be due

to endocrine factors secreted by subcutaneous adipose tissue. Accordingly, lipid-laden adipocytes in subcutaneous adipose tissue may influence the proliferation and differentiation of adipocyte progenitor cells in distal visceral adipose depots, modulating visceral adiposity. To investigate this, we isolated and expanded adipose-derived stem cells (ADSCs) from both subcutaneous and visceral adipose depots of obese and lean Wistar rats. Flow cytometry confirmed the homogeneity of cultured ADSCs. Subcutaneous ADSCs from obese rats were differentiated into adipocytes with adipocyte differentiation media (containing insulin, indomethacin, IBMX and dexamethasone), from which conditioned media (CM; containing adipocyte-secreted factors) was collected. Addition of CM from subcutaneous adipocytes onto undifferentiated visceral ADSCs from lean rats resulted in substantial lipid accumulation in visceral cells compared to CM from naïve subcutaneous ADSCs, suggesting that endocrine factors in CM are sufficient to induce ADSC differentiation. While the mechanism whereby CM achieves this is unknown, future work will aim to identify contributing secreted factors. A better understanding of endocrine communication between adipocytes and stem cells may give insight into the pathobiology of obesity.

ABSTRACT NUMBER / ABSTRAKNOMMER: 8

RENAL OUTCOMES OF IDIOPATHIC MESANGIOCAPILLARY GLOMERULONEPHRITIS AT A TERTIARY HOSPITAL IN SOUTH AFRICA

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Background and Aim: Idiopathic mesangiocapillary glomerulonephritis (MCGN) is a common cause of glomerular disease in South Africa. There is currently a paucity of data regarding renal outcomes in our setting. The aim of this study was to determine the renal outcome in patients with idiopathic MCGN at Tygerberg Hospital in Cape Town. Materials and Methods: We performed a retrospective cohort study of all adult patients with a biopsy-proven diagnosis MCGN between 1 January 2000 and 31 December 2016. The composite renal outcome was time to doubling of the serum creatinine from the time of biopsy or end-stage renal disease. Patients with a secondary cause for MCGN were excluded. Results: A total 144 patients were included. 95 patients had follow-up data available of which 31 (32.6%) reached the composite renal outcome. The median time to the composite outcome was 6 months with the majority (80.6%) reaching the outcome within 1-year following biopsy. Patients reaching the composite outcome had more severe renal failure at presentation ($p < 0.01$), advanced interstitial fibrosis ($p < 0.01$), more globally sclerosed glomeruli ($p < 0.01$) and more crescents ($p = 0.03$). Patients with a history of illicit drug use or incarceration, lower serum C3 levels at presentation and dense C3 deposits on immunofluorescence had a lower likelihood of reaching the composite outcome. On multivariate logistic regression the only predictor for reaching the composite outcome was a normal serum C3 at presentation (OR 21.2, $p < 0.01$). Conclusion: The renal prognosis of idiopathic MCGN was poor particularly in patients presenting with more severe renal failure and histological evidence of advanced disease

ABSTRACT NUMBER / ABSTRAKNOMMER: 8

THE INCIDENCE OF MOTOR NEURON DISEASE IN THE WESTERN CAPE PROVINCE OF SOUTH AFRICA

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Background: Very little is known about the epidemiological features of amyotrophic lateral sclerosis (ALS) in sub-Saharan Africa. Data from the region is limited to clinical series or case reports, and studies investigating the incidence of ALS in people of African descent were all performed among those living in Western countries. Methods: We performed a 4-year prospective incidence study in the Western Cape Province of South Africa between 1 July 2014 and 30 June 2018. To estimate the number of unobserved cases, we applied two source capture-recapture methodology. Age- and sex-adjusted incidence rates (ASAIR) were calculated using the 2010 USA population as reference. Results: 203 incident cases were identified over the 4-year study period. Of these, 71 and 7 cases were uniquely

identified via ALS clinic referrals and the MNDA database, respectively, while 125 were identified via both sources. This resulted in a crude incidence rate (IR) of 1.09 (95% CI 0.94-1.24) per 100 000 person-years in the at-risk population. Capture-recapture analysis estimated an additional 4 unobserved cases, resulting in an estimated IR of 1.11 (95% CI 1.01-1.22) per 100 000 person-years. The ASAIR, expressed as cases per 100 000 person-years, for the 45-74 year age group was 1.37 (95% CI 1.27-1.46). When analysed separately, there was a substantial difference in ASAIRs between the different population groups, with the highest in the white group (2.12; 95% CI 1.76-2.49) and the lowest in the black African group (0.58, 95% CI 0.49-0.66), while the ASAIR for the mixed ancestry group was between these two (0.96, 95% CI 0.85-1.07). Discussion: The incidence of ALS in the Western Cape Province of South Africa is lower than in North African and Western countries, but higher than in Asian countries. As suggested by previous epidemiological studies, ALS appeared to be less frequent in people of African descent.

ABSTRACT NUMBER / ABSTRAKNOMMER: 9

IDENTIFICATION OF A NOVEL IRAK1 MUTATION IN A PATIENT WITH RECURRENT MYCOBACTERIUM TUBERCULOSIS INFECTIONS

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Primary immunodeficiency diseases (PIDs) are a heterogeneous group of disorders that result in defective immunity due to an inherited or acquired gene defect. PIDs are rare and difficult to diagnose using conventional methods especially in regions with high endemic disease burdens and underdeveloped medical infrastructure. In the absence of external causes, recurrent Mycobacterium tuberculosis (M.tb) infection in a Tuberculosis (TB) endemic region may indicate increased susceptibility to mycobacterial infection, due to inborn errors of immunity. Cases such as these could be caused by a specific type of PID known as Mendelian Susceptibility to Mycobacterial Disease (MSMD). In this study we describe a South African patient with a history of recurrent tuberculosis and a possible undiagnosed PID. Whole exome sequencing (WES) was employed to identify a candidate disease-associated mutation in the patient using an in-house analysis pipeline TAPER. A mutation (c.C1939T p.L647P) in the interleukin-1 receptor-associated kinase 1 (IRAK1) gene, located on the X chromosome, was identified. The results from pathogenicity prediction software strongly suggest that this mutation in IRAK1 is the disease-associated mutation. Western-blotting and multiplex techniques were optimised to allow future functional verification of the mutation. Further investigations will elucidate the functional consequences of the candidate disease-associated mutation perhaps leading to personalised treatment options.

ABSTRACT NUMBER / ABSTRAKNOMMER: 10

CLINICAL AND ECHOCARDIOGRAPHIC CHARACTERISTICS OF MYOCARDIAL INJURY IN SYSTEMIC LUPUS ERYTHEMATOSUS, CLASSIFIED ACCORDING TO CARDIAC MAGNETIC RESONANCE CRITERIA.

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Background: Lupus myocarditis (LM) occurs in 5-10% of patients with systemic lupus erythematosus (SLE). Subclinical myocarditis occurs in 37% at post mortem. Echocardiographic strain (STE) supports clinical and subclinical myocardial dysfunction in SLE. Cardiac magnetic resonance (CMR), through tissue characterisation, detects clinical and subclinical myocardial injury (CMR-MIN) in SLE. CMR is the non-invasive diagnostic gold standard for myocarditis using Lake Louise criteria (LLC). Purpose: Determine prevalence of CMR-MIN in SLE (LLC). Compare clinical and echocardiographic features of

patients with and without CMR-MIN. Identify echocardiographic predictors of CMR-MIN. Methods: A prospective cross-sectional study was done at Tygerberg Hospital. Inpatients, fulfilling the 2012 SLE criteria were screened. Patients were grouped according to CMR-MIN: (absent LLC [AC]; single criterion [SC]; fulfilling LLC), comparing clinical, laboratory and echocardiographic (STE and regional function) parameters. Logistic regression and ROC were used to determine predictors of CMR-MIN. Results: 49/106 SLE patients screened were included. Median age: 27 years (IQR:22-35); 88% female. 46.9% of patients had CMR-MIN: 12.2% fulfilled LLC and 34.7% had SC. Compared to AC group, SLE disease activity was higher in patients fulfilling LLC ($p=0.022$), but not the SC group ($p=0.813$). Clinical and echocardiographic diagnosis of LM was made in all patients fulfilling LLC ($p<0.001$), 17.6% of the SC group ($p=0.026$) vs none in the AC group. Anti-DsDNA and anti-B2GP1 ($p=0.054$; $p=0.081$) were more frequently positive in SC vs AC group. LVID and mid STE score combined was the best predictor of CMR-MIN (OR:2.1;95%CI:1.2-3.5; $p0.008$). The prediction had an AUC of 0.791 (PPV:81.8%;NPV:86.4%). Conclusion: CMR is limited by contraindications in SLE (mainly renal disease). CMR-MIN is common in SLE, even in the absence of clinical myocarditis or high lupus activity. Impaired echocardiographic function occurs more frequently in patients with CMR-MIN. STE combined with LVID predicts the presence of CMR-MIN and has potential as a cost-effective screening tool.

ABSTRACT NUMBER / ABSTRAKNOMMER: 11

TAXATION OF SUGAR-SWEETENED BEVERAGES IN SOUTH AFRICA: PERSPECTIVES OF DIETITIANS

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In order to combat the battle against non-communicable diseases (NCDs), South Africa has implemented a sugar tax also known as the health promotion levy (HPL) on sugar sweetened beverages (SSB's) as a measure to reduce the high consumption of sugar in the population. A high intake of SSB's contributes to an increased risk of overweight and obesity. The aim of this study was to investigate the perspectives of dietitians on the HPL. In this cross-sectional descriptive study, a self-administered electronic survey, created using SurveyMonkey®, was used to collect data. Dietitians were recruited through the Association of Dietetics in South Africa's weekly newsletters and social media platforms. Descriptive statistics was performed using Statistica version 13.2. Most of the participants were female ($n=131$; 95). Two thirds were qualified with a four year Honors degree ($n=92$; 67%) and a quarter ($n=34$; 25%) had a Master's degree. The most common field of work included the clinical environment ($n=33$; 26%) and private practice ($n=27$; 20.9%). A majority of the respondents ($n=127$; 98%) were aware of the implementation of the HPL. Although three quarters of dietitians ($n=63$; 75%) were positive about the HPL, 56% ($n=68$) disagreed it will reduce the prevalence of obesity, 72% ($n=89$) agreed the tax is too little to influence purchasing behaviour and 87% ($n=108$) believe other factors contribute to NCDs. Nearly three quarters of dietitians ($n=90$; 73%) counsel patients with NCDs. Most dietitians ($n=77$, 88%) educate their clients on nutritional information of products with 83% ($n=75$) emphasising the total sugar content. Less dietitians perceived their patients to be consuming SSB's on a daily basis after the HPL levy was implemented. Dietitians have a positive opinion on the HPL, however they agree that the HPL alone will not influence the purchasing behaviour of consumers or reduce the prevalence of obesity.

ABSTRACT NUMBER / ABSTRAKNOMMER: 12

REVIEW OF STROKE MORTALITY AND MORBIDITY RATES IN TYGERBERG HOSPITAL

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Background/Aim: There is a shortage of data regarding epidemiology of cerebrovascular disease in developing countries like South Africa. The aim is to evaluate the magnitude of this burden by an accurate assessment of mortality and morbidity data for strokes at Tygerberg Hospital, to effectively plan for required resources. Additionally, the use of a hospital administrative database as a research tool will be evaluated. Methodology: This is a retrospective epidemiological study, utilising

administration data from Clinicom Database, of adult patients admitted to Tygerberg Hospital in 2013 – 2018 with a diagnosis of stroke/stroke equivalent [International Classification of Diseases-10 coding (I60-69)]. The number of admissions was compared to inpatient mortality and transfers. Additionally, the resources required was evaluated by considering patient length of stay and estimated cost of hospital admissions. Results The number of stroke admissions remained relatively constant, with the range between 835 (2017) and 913 (2015). The stroke mortality rate peaked in 2014 at 26%, and then showed a steady decline to 12% (2018). The average length-of-stay showed a downward trend from a peak of 8.19 days (2014) to 6.51 days (2018). There was an initial upward trend in estimated stroke expenditure per year, R10 095 228 (2013), peaking at R12 824 181 (2015), and then despite escalating admission costs, a slight decrease in estimated stroke costs in the subsequent years. Conclusion Mortality rates and stroke resource expenditure are significant at Tygerberg Hospital. Since 2015, there appears to be a downward trend. While direct inferences cannot be made, this suggests improved management and outcomes for our patients. Using administration data for stroke mortality and morbidity estimates improves efficiency, decreases resource utilisation and allows for analysis of trends. Extending this research method to all healthcare levels, and several other fields would assist in gaining better insight of the burden of disease.

ABSTRACT NUMBER / ABSTRAKNOMMER: 13

THE SOUTH AFRICAN SHARE-TAVI REGISTRY: INCIDENCE AND RISK FACTORS LEADING TO CONDUCTION DISTURBANCES REQUIRING PERMANENT PACEMAKER IMPLANTATION.

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Background Transcatheter aortic valve implantation (TAVI) has been implemented successfully in South Africa, the first case being performed in 2009. The SHARE-TAVI registry, established in 2014, monitors VARC-2 (Valve Academic Research Consortium-2) clinical endpoints. One of these endpoints, the most common complication post TAVI, is the development of heart block requiring permanent pacemaker implantation (PPI). The incidence of PPI in international registries ranges from 13 to 17.5%. No data from Africa on PPI has been published to date. Methods The aim of this observational study was to report the PPI rate in the SHARE-TAVI registry and determine the clinical, electrocardiographic and procedural predictors of PPI. This was done by analysing the registry data and performing a folder review, including detailed recording of pre- and post- procedural electrocardiographic parameters. Results 305 subjects from both the public and private sectors were analysed. The PPI rate was 9%. 3rd degree Atrio-ventricular block at the time of implant was the most common indication for PPI. No clinical predictors of PPI were found. Procedurally, self-expanding valves (PPI rate 14% vs 6% for balloon-expanding valves, $p=0.02$) and valve size were correlated with the need for PPI. Baseline ECG predictors of PPI were axis deviation, QRS duration and interventricular conduction delay, most notably a pre-existing right bundle branch block. PPI did not influence functional class, need for repeat hospitalisation or mortality at 30 day and 1 year follow-up. Conclusions A PPI rate lower than that of the large international registries was found. Predictors of PPI and the influence PPI on outcomes were similar to those reported in the international data.

ABSTRACT NUMBER / ABSTRAKNOMMER: 14

SYSTEMATIC REVIEW OF GENETIC FACTORS IN THE AETIOLOGY OF OESOPHAGEAL SQUAMOUS CELL CARCINOMA IN AFRICAN POPULATIONS

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Oesophageal squamous cell carcinoma (OSCC), one of the most aggressive cancers, is endemic in Sub-Saharan Africa, constituting a major health burden. It has the most divergence in cancer incidence globally, with high prevalence reported in East Asia, Southern Europe, and in East and Southern Africa. Its aetiology is multifactorial, with lifestyle, environmental and genetic risk factors. Very little is known about the role of genetic factors in OSCC development and progression among African populations. The study aimed to systematically assess the evidence on genetic variants associated with OSCC in

African populations. We carried out a comprehensive search of all African published studies up to April 2019, using PubMed, Embase, Scopus and African Index Medicus databases. Quality assessment and data extraction were carried out by two investigators. Twenty-three genetic studies on OSCC in African populations were included in the systematic review. They were carried out on Black and Admixed South African populations, as well as on Malawian, Sudanese and Kenyan populations. Most studies were candidate gene studies and included DNA sequence variants in 58 different genes. Only one study carried out whole exome sequencing of 59 OSCC patients. Sample sizes varied from 18 to 880 cases and 88 to 939 controls. Altogether over 100 variants in 37 genes were part of 17 case-control genetic association studies to identify susceptibility loci for OSCC. In these studies, 25 variants in 20 genes were reported to have a statistically significant association. In addition, eight studies investigated changes in cancer tissues and identified somatic alterations in 17 genes and evidence of loss-of-heterozygosity, copy number variation and microsatellite instability. Two genes were assessed for both genetic association and somatic mutation. Comprehensive large-scale studies on the genetic basis of OSCC are still lacking in Africa. The genetic aetiology of OSCC in Africa is, therefore, still poorly defined.

ABSTRACT NUMBER / ABSTRAKNOMMER: 15

RADIAL ARTERY DIMENSIONS IN SOUTH AFRICAN PATIENTS UNDERGOING TRANSRADIAL CORONARY ANGIOGRAPHY.

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Background: Transradial coronary angiography (TRA) is preferred over transfemoral coronary angiography due to a superior safety profile, but poses a greater technical challenge with unique complications, including radial artery spasm (RAS), radial artery pulsation loss (RAPL) and radial artery occlusion (RAO). Radial artery size and its relationship with cannulation success and complication rates have not been studied in a South African population. Purpose: Recording radial artery (RA) dimensions in a South African population and studying the relationship between RA dimension, cannulation success and complication rates. Methods: Stored radial artery ultrasound examinations obtained with a Logic E Ultrasound Machine with a 22MHz probe in patients who participated in the RADIAL study (Doubell et al., 2018) were measured to obtain a radial artery diameter, circumference and area. Results: 949 patients were included in the study. The normal distribution of RA dimensions (95% confidence interval) were: diameter 1.6mm–3.41mm; circumference 5.38mm–11.49mm; area 2.25mm²–10.06mm². In patients with a RA area below 3.01mm² cannulation was unsuccessful in 15.6%, RAS occurred in 12.82%, RAO in 8.05% and RAPL in 6.82%. Radial artery areas above 3.00mm² had 98.24% successful cannulation, 5.89% RAS, 1.03% RAPL, 2.54% RAO. Conclusions: The normal distribution of RA dimensions in South African patients range from 1.6mm–3.41mm in diameter and 2.25mm² – 10.06mm² in area. Cannulations success is lower in smaller radial arteries with a higher complication rate. RA dimensions should be taken into account when planning the access route for coronary angiography. Reference: Doubell J, Kyriakakis C, Weich H et al. Radial artery dilatation to improve access and lower complication rates during coronary angiography (RADIAL): a randomized controlled trial, European Heart Journal 2018, Volume 39, Issue suppl_1, P5519

ABSTRACT NUMBER / ABSTRAKNOMMER: 16

TEN-YEAR FOLLOW-UP OF CLINICAL OUTCOME IN BREAST CANCER PATIENTS TREATED WITH TAMOXIFEN: CONSIDERATION OF NANOPORE SEQUENCING USING A POCKET-SIZE MINION DEVICE

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Introduction Conflicting data on clinical outcomes of patients on tamoxifen may partly be related to incomplete genotyping identified as an important factor in the delayed routine implementation of

CYP2D6 pharmacogenetics in tamoxifen-treated breast cancer patients. Aim Data of a 10-year follow-up study in ER-positive breast cancer patients was evaluated to determine the potential consequence of incomplete CYP2D6 genotyping of the most common alleles associated with poor metaboliser status. Methods A retrospective pilot study was performed in 44 breast cancer patients after exclusion of BRCA1/2 mutation-positive patients previously screened based on family history. Available clinical data was obtained from hospital records for up to 10 years after the initial presentation. CYP2D6 (alleles *3, *4 and *5) genotyping was performed using real-time polymerase chain reaction on DNA extracted from whole blood. The MinION sequencer (Oxford Nanopore Technologies) was used to compare results in selected cases with known CYP2D6 genotypes. After base-calling with Albacore and mapping with minimap2, variants were called with Varscan2. Results CYP2D6 *3/*4/*5 alleles were detected in 10 of the 44 patients. In patients with these alleles, follow-up over 10 years showed a trend towards a higher recurrence rate (HR = 1.43, 95% CI 0.63-3.24) and poorer overall survival (HR = 2.2, 95% CI 0.91-5.33). A mean coverage of 13900x was obtained for CYP2D6 (chr22:42,524,310) using the MinION sequencer. Conclusion This study supports previous recommendations for CYP2D6 genotyping in South African patients at increased risk for breast cancer recurrence. Standardisation of MinION nanopore sequencing may overcome the limitations of incomplete CYP2D6 genotyping.

ABSTRACT NUMBER / ABSTRAKNOMMER: 17

PREVALENCE OF NON-COMMUNICABLE DISEASES IN ADULTS LIVING WITH THE HUMAN IMMUNODEFICIENCY VIRUS: AN OVERVIEW OF SYSTEMATIC REVIEWS

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Background Non-communicable diseases (NCDs) are on the rise in patients infected with the human immunodeficiency virus (HIV). This has been partly attributed to the increasing use of antiretroviral therapy (ART). The aim of this overview of systematic reviews was to consolidate findings on the prevalence of NCDs in people living with HIV (PLHIV) on ART, to inform the existing body of research and provide evidence to inform the planning of healthcare services. Methods We undertook a comprehensive search in February 2018, with no date limitations, in seven databases to identify systematic reviews. We included systematic reviews with participants over the age of 13 years on ART with one or more of the specified NCDs (type 2 diabetes mellitus, hypertension, dyslipidaemia and depression). We then assessed the quality of these systematic reviews using the AMSTAR 2 tool and extracted prevalence's of the NCDs from each one of them. Results We identified 10 systematic reviews meeting our inclusion criteria, of which three are ongoing. The methodological quality of the systematic reviews varied in many aspects. Only one systematic review assessed the prevalence of multi-morbidity, defined as the presence of two or more NCDs in PLHIV, which ranged from 8.4% to 47%. The remaining six only assessed the prevalence of comorbidity of any one NCD in PLHIV. Type 2 diabetes mellitus had the lowest prevalence, especially in African countries, and ranged from 7% to 48.6% globally. Dyslipidaemia had the highest prevalence globally, ranging from 6.3% to 100%. Depression in PLHIV on ART was considerably high, ranging from 25.81% to 64%, while hypertension ranged from as low as 4.0% to as high as 67.0%. Conclusions This overview highlights that NCDs are highly prevalent in PLHIV on ART. There is a lack of systematic reviews and primary studies focusing on multi-morbidity in the PLHIV on ART.

ABSTRACT NUMBER / ABSTRAKNOMMER: 18

EXPLORING THE ROLE OF GENOMICS IN POSTMENOPAUSAL BREAST CANCER PATIENTS TREATED WITH AROMATASE INHIBITORS: ONE-YEAR FOLLOW-UP.

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Introduction: Individual bone loss variation associated with aromatase inhibitors (AIs) emphasizes the importance of identifying postmenopausal breast cancer patients at high risk for this effect. The study explores the clinical relevance of genetic variation in the Cytochrome P450 19A1 (CYP19A1) gene in a subset of South African patients in the first year of taking AIs for estrogen receptor (ER)-positive breast cancer. Methods: The cohort consisted of ER-positive breast cancer patients on AIs, followed in real-life

practice. Body mass index and bone mineral density (BMD) were determined at baseline and month 12. CYP19A1 genotyping was performed using real-time polymerase chain reaction analysis of rs10046, extended to Sanger sequencing and whole exome sequencing (WES) in 10 patients with > 5% bone loss at month 12 at the lumbar spine (LS). Results:After 12 months of AI treatment, 72 patients had completed BMD and were successfully genotyped. Ten patients (14%) experienced > 5% bone loss at the LS over the period. Genotyping for CYP19A1 rs10046 revealed that patients with two copies of the A-allele were 10.79 times more likely to have an ordinal category change of having an increased percentage of bone loss or no increase at the LS, compared to patients with GA or GG genotypes (CI of 1.771- 65.830, p=0.01). None of the 34 patients without LS bone loss at month 12 were homozygous for the functional CYP19A1 polymorphism. At the total hip region, patients with the AA genotype were 7.37 times more likely to have an ordinal category change of having an increased percentage of bone loss or no increase (CI of 1.101- 49.336, p=0.04). Conclusion:Homozygosity for the CYP19A1 rs10046 A-allele may provide additional information to clinical and biochemical factors that may be considered in risk stratification to optimize bone health in postmenopausal breast cancer women on AIs.

POSTERS / PLAKKATE

ABSTRACT NUMBER / ABSTRAKNOMMER: 19

DETECTION OF LARGE DELETIONS IN THE BRCA1/2 GENES USING A COMBINATION OF WHOLE-EXOME AND MINION-BASED LONG-RANGE NANOPORE SEQUENCING.

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Objectives.Knowledge of a patient's BRCA1/2 mutation status is crucial for clinical management and family testing. Next-generation sequencing (NGS) has superseded Sanger sequencing, but large DNA rearrangements are not reliably detected with NGS. Nanopore sequencing is a novel technique that uses molecular pores to read long DNA fragments (kilobases). This study aims to evaluate the combined use of whole exome sequencing (WES) and nanopore sequencing to comprehensively screen for BRCA1/2 germline mutations. Methods.Five patients with small BRCA1/2 DNA variations and two patients with large BRCA1 gene rearrangements, were included in this study. Nanopore sequencing was performed on genomic DNA of all patients, by long-range PCR (LR-PCR) of overlapping amplicons covering the entire BRCA1/2 genes and sequencing on the MinION (Oxford Nanopore Technologies). After basecalling with Albacore and mapping with minimap2, variants were called with Varscan2. WES reads were analysed with Torrent SuiteResults.Mean read depth for BRCA1/2 was >100x for WES vs >1000x for nanopore sequencing. The MinION detected 5/5 small BRCA1/2 DNA variants and accurately defined the BRCA1 exon 23 deletion as the removal of 1103 basepairs. Though LR-PCR and nanopore sequencing could not detect the BRCA1 whole gene deletion, it was possible to distinguish this large DNA rearrangement by in silico read coverage analysis of WES reads Conclusion.Nanopore sequencing can accurately identify small variants and large exonic deletions in the BRCA1/2 genes. When combined with WES, very large rearrangements -including whole gene deletions- can also be detected.

ABSTRACT NUMBER / ABSTRAKNOMMER: 20

CONSTRUCTING RECOMBINATION MAPS FOR POPULATIONS WITH COMPLEX ANCESTRY

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It has been shown that the majority of human genetic studies are not representative of the diversity that exists globally, since they are based on populations of European descent. The lack of inclusion of under represented ethnicities in human genetic studies also means that when these studies are translated into clinical practice, the resulting policy or protocol might be incomplete or even mistaken.

Studies that investigate the genetic factors that affect disease often rely on a recombination map. There are no publicly available population specific recombination maps for southern African populations at the moment. Southern African populations have complex ancestry as a result of many migration events that have occurred over the last few centuries. Software used to develop population specific recombination maps are well-established, however, most software have either never been tested on populations with complex ancestry or have only been tested on, at most, a three-way admixed population. Any research on southern African populations with complex ancestry that require a recombination map would thus benefit from a protocol that directs the creation of population specific recombination maps using established software. However, if such a protocol cannot be established, a new approach to create high resolution population specific recombination maps for populations with complex ancestry needs to be developed. We are currently working on determining what adjustments can be made to pedigree based methods in order to accommodate multi-way admixed populations and comparing the results to publicly available recombination maps. The next step would be to determine whether these population specific maps yield better results than the available maps when used in an ancestry association study.

ABSTRACT NUMBER / ABSTRAKNOMMER: 21

USING EXOME SEQUENCING TO DETERMINE THE PATHOGENIC VARIANTS IN AN INDIVIDUAL WITH MABRY SYNDROME USING GENOMIC TESTING

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Mabry Syndrome (MS) is a rare autosomal recessive disease associated with glycosylphosphatidylinositol (GPI) deficiencies. The heterogenous phenotype is characterised by increased alkaline phosphatase (ALP) levels, developmental delay, intellectual disability, seizures and skeletal deformities. To date, genetic variants in 6 genes have been associated with MS; these are PIGO, PIGV, PIGW, PIGY, PGAP2 and PGAP3. The aim of this study was to identify the genetic variants causing MS in a patient who had previous diagnostic genetic testing for MS associated variants within PIGV, PIGW and PIGO (Invitae Congenital Disorders of Glycosylation). No pathogenic variants were detected. Whole Exome Sequencing (WES) was therefore performed on the patient and the patient's mother. The WES data was filtered for potentially pathogenic variants using an in-house developed analysis pipeline called TAPER. A novel homozygous variant in PGAP3 was identified in the patient. The mother was heterozygous for the identified variant. The variant is in exon 4 at nucleotide position 404, where a Guanine is replaced by a Cytosine. This substitution causes an amino acid change from Arginine to Threonine at the amino acid position 135. This PGAP3 variant has a SIFT score of 0.003 and a POLYPHEN score of 0.984 indicating that it is deleterious. The identification of a novel variant potentially causing MS, adds to the understanding of the genetic causes behind this severely debilitating disease and provides the family with a genetic diagnosis for future pregnancies.

ABSTRACT NUMBER / ABSTRAKNOMMER: 22

IMMUNO-ENDOCRINE INTERACTIONS IN CLOSE CONTACTS OF TUBERCULOSIS PATIENTS WITH AND WITHOUT TYPE 2 DIABETES

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Tuberculosis (TB) and Type 2 Diabetes (T2D) have been biting away at public health for centuries. Despite the decreases in TB incidence thus far, the increasing prevalence of diabetes threatens this progress (WHO, 2016). This increasing T2D incidence is especially concerning in low- and middle-income countries where TB is more prevalent (WHO, 2016). Combined, TB and T2D have further clinical implications with T2D patients having: an increased risk of becoming infected with *Mycobacterium tuberculosis* (Mtb); a quicker progression to active TB (Stevenson, 2007); greater disease severity; an increased risk of poorer TB treatment outcomes (Baker, 2011). Thus, it has become important to understand the mechanisms of this increased susceptibility of T2D to M.tb. infection. T2D has been

shown to affect the innate and adaptive immune functions. In the innate immunity of T2D patients, phagocytic functions are diminished in monocytes (Restrepo, 2017). Individuals with latent TB and T2D have increased IL-22 and Leptin; while having lower TNF- α , IL-10, IL18, adiponectin and adipisin compared to non-diabetic latently infected individuals (Kumar et al., 2014 & 2016). This study enrolled close contacts (CCs) of Tuberculosis patients having various stages of T2D. The CCs were split into four groups: 10 individuals without T2D (HC); 15 with prediabetic status (preT2D); 15 with T2D; and 15 with poorly controlled T2D (pT2D). Multiplex cytometric bead arrays were employed to measure the levels of various cytokines, including the IL20 superfamily, TNF superfamily and adipokines, as well as metabolic hormones (e.g. Ghrelin and Glucagon). Understanding these pathways and interactions between the immune system and hormonal functions may lead to future development of host-directed therapies. These HDTs may aid in preventing T2D patients becoming latently infected or developing active TB.

ABSTRACT NUMBER / ABSTRAKNOMMER: 23

IMPACT OF SALT INDUCED HYPERTENSION IN CAPTIVE-BRED VERVET MONKEYS (CHLOROCEBUS AETHIOPS)

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Hypertension is of 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 predominantly contribute to hypertension. This elevation together with high sodium intake is associated with increased cardiovascular events and mortality irrespective of basal blood pressure levels. Since Mendelian genetics contribute largely to the development of hypertension, identification of genetic variants related to blood pressure regulation remains crucial and may reveal new therapeutic drug targets. 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 blood pressure (BP) were also measured. Thus far, the animal intervention is ongoing and preliminary results have shown an increase in BP (126/56 to 157/83 mmHg) in the experimental group and a decline in the control group (140/72 to 132/77 mmHg). Moreover, 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. 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 Vervet monkey. However, these findings can only be confirmed when dietary salt intervention and gene expression is completed.

ABSTRACT NUMBER / ABSTRAKNOMMER: 24

THE GENDER DIFFERENCES IN PHENOTYPE OBSERVED IN HIGH FAT, HIGH SUGAR DIET-FED WISTAR RATS

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Women continue to suffer more adverse drug effects than men, attributed to their under-representation in drug development studies. To address this, the National Institute of Health has proposed to include both genders in future drug development. The aim of this study was to compare diet-induced molecular changes in female and male Wistar rats as part of an inclusive drug-development strategy for metabolic syndrome. In a longitudinal study, 130 female Wistar rats were fed a high fat, high sugar (HFHS) diet,

which has been shown to induce obesity and insulin resistance in male Wistar rats, for 12 months. In a second cross-sectional study, 20 male and 20 female Wistar rats were fed the HFHS diet or control diet for 9 months. Bodyweight and fasting blood glucose concentrations were measured regularly during the study. Animals were terminated at the end of the study, and livers were harvested for histology and molecular analysis. Twelve months of HFHS feeding did not induce obesity and insulin resistance in female Wistar rats. However, a significant increase in visceral adiposity was observed from the first month onward (0.41 ± 0.12 g/mm v. 0.24 ± 0.07 g/mm, $p < 0.001$). No pathological changes in the liver were observed. In the cross-sectional study, males fed the HFHS gained more weight than controls (539.9 ± 46.0 g v. 455.1 ± 32.7 g, $p < 0.001$), while once again no significant differences were observed for females (289.3 ± 39.6 g v. 260.0 ± 23.0 g, $p = 0.058$). Gender-specific differences in diet-induced obesity are important in the development of treatments for metabolic syndrome. Our data indicates that the HFHS diet elicits different phenotypes in male and female Wistar rats. These findings have implications for the design of future diet-induced obesity models and recommends that both genders be used in all future drug development strategies for metabolic syndrome.

ABSTRACT NUMBER / ABSTRAKNOMMER: 25

THE ROLE OF ATAXIA TELANGIECTASIA MUTATED PROTEIN KINASE (ATM) ON METFORMIN TREATMENT EFFICACY: A STUDY CONDUCTED IN AN OBESE, INSULIN RESISTANT IN VITRO CARDIOMYOBLAST MODEL

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Metformin is the first line drug treatment for type 2 diabetes (T2D) patients, worldwide. A significant variation in response to this drug has been observed among its users. A recent large genome-wide association study suggested that variations in ATM expression could possibly contribute to variable patient drug response. Additional discoveries supporting this claim is ATM's interaction with the insulin signalling and Metformin mechanism of action pathway (LKB1/AMPK) as well the fact that non-functional ATM is associated with glucose intolerance, cardiovascular diseases and T2D. However, the role of ATM in Metformin response is still controversial. Our laboratory has shown that ATM expression and phosphorylation was downregulated under obese and insulin resistant conditions, we therefore aim to explore the possibility of ATM as a determinant of Metformin treatment success. In this study our objectives was to firstly determine the concentration and time of exposure needed for metformin to activate its known target AMPK. Secondly, to create an insulin resistant in vitro H9c2 cardiomyocytes model of obesity and explore the interaction between Metformin and the relevant signalling pathways. for our first objective various Metformin concentrations and time points were explored. The insulin resistant cardiomyoblast model was created by exposing cells to free fatty acids (FFA) or high insulin (INS) alone and in combination with high glucose (HG) for 24 Hours. Western blot analysis was conducted to confirm the latter. In our model, FFA ($p < 0.05$), FFA+HG ($p < 0.05$) and INS ($p < 0.001$), significantly downregulated ATM phosphorylation vs controls. Additionally, PKB/Akt was also downregulated. In conclusion, results obtained in this study demonstrated that ATM phosphorylation is down-regulated under obese and insulin resistant conditions in vitro. Additionally, the down-regulated PKB/Akt phosphorylation also suggests that our model is insulin resistant. With the appropriate and clinically relevant Metformin concentration, we can further explore the relevance of ATM in Metformin efficacy.

ABSTRACT NUMBER / ABSTRAKNOMMER: 26

THE TAXATION OF SUGAR-SWEETENED BEVERAGES IN SOUTH AFRICA: PERSPECTIVES OF CONSUMERS IN THE CITY OF CAPE TOWN, WESTERN CAPE, SOUTH AFRICA

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Globally, fiscal measures such as taxes are increasingly recognised as effective complementary tools to curb the obesity epidemic at population level. In 2018, a health promotion levy (HPL) was implemented in South Africa (SA) to discourage purchasing of sugar-sweetened beverages (SSBs). This study aimed to determine the perspectives of consumers within the City of Cape Town regarding the HPL and to determine the self-reported impact on consumer purchasing behaviour and consumption of SSBs since the HPL implementation. In this cross-sectional descriptive study, an interviewer-administered questionnaire was conducted with literate adult consumers (n=696) from 16 grocery stores within four health sub-districts of the City of Cape Town, South Africa. Less than half (n=320; 45.97%) of consumers indicated that they were aware of the HPL. Of the consumers who were aware of the taxation, only two (0.63%) participants knew the correct amount of sugar (in grams) that is allowed in SSBs before being levied (4g in 100ml). Fifty four percent (n=379) of consumers reported to have noticed a price increase in SSBs and of these consumers, 43.07% (n=171) reported that the increased SSBs pricing influenced their purchasing behaviour resulting in them purchasing less SSBs. There is almost an equal amount of participants who agreed (n=326; 46.84%) and disagreed (n=331; 47.56%) on whether the HPL will help to reduce overweight and obesity rates in SA whilst the remaining participants (n=39; 5.60%) were unsure. More than half of participants had an overall positive feeling towards the HPL (n=388; 55.83%). City of Cape Town consumers had mostly mixed reactions towards the HPL, its effectiveness and whether it has influenced consumer purchasing behaviour. More should be done to educate consumers about the HPL and the impact of consuming large quantities of sugar on their health.

ABSTRACT NUMBER / ABSTRAKNOMMER: 27

THE TAXATION OF SUGAR SWEETENED BEVERAGES IN SOUTH AFRICA: THE PERSPECTIVES OF KEY-ROLEPLAYERS IN THE CITY OF CAPE TOWN, WESTERN CAPE, SOUTH AFRICA

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The prevalence of overweight and obesity, a major risk factor for non-communicable diseases, are reaching staggering statistics worldwide, claiming more lives every year. Eighty percent of these deaths occur in low- and middle income countries. The South African government responded to this crisis by implementing the taxation of sugar sweetened beverages (SSBs) or the health promotion levy (HPL). Added sugars may contribute to obesity and other NCDs. The aim of the study was to determine the perspectives of industry role-players regarding the HPL. A descriptive, observational study was conducted. Key role-players from government, the public sector and academia were identified via snowball sampling and recruited via email. An online, electronic survey using Survey Monkey was used for data collection. Thirty nine role players completed the electronic survey. Role players (n=31, 8%) were of opinion that the food industry understands the government's reason for implementing the HPL. Almost two thirds of the study participants (n= 25, 64,1%) felt that the general public are not aware of, nor understand (n=24, 64,5%) the HPL. Sixty four percent (n= 24) of the participants believed that the proposed taxation rate of 11% is not sufficient to have a significant impact on the purchasing behaviour of consumers. Half of the participants (n=20, 54%) believed that the HPL will not lead to a healthier population. Fifteen role-players (40.5%) were of opinion that the taxation will have a negative impact on job security. Participants were doubtful that the revenue from the HPL will be spent on health promotion. Two thirds of respondents (n=25, 64.1%) agreed that the food industry will reformulate products to lower the sugar content. Key role-players are of opinion that fiscal measures alone is not

enough to change consumer's behaviour. More should be done by government to educate consumers and create a supportive environment.

ABSTRACT NUMBER / ABSTRAKNOMMER: 28

A GAME OF CLONES: A CASE OF ELANE GENE MUTATION-RELATED CYCLIC NEUTROPENIA

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BACKGROUND ELANE is a gene which encodes for neutrophil elastase, a serine protease stored in the primary granules of neutrophils, and is the only gene in which mutation is known to cause ELANE-related neutropenia. ELANE-related neutropenia encompasses both cyclic neutropenia and severe congenital neutropenia, which are rare bone marrow failure syndromes. Cyclic neutropenia has an estimated frequency of 1:1000000 in the general population and is usually diagnosed in the first year of life. History typically reveals recurrent episodes of fever and oral ulcerations, usually at 3-week intervals, correlating with periodic oscillations in the absolute neutrophil count (ANC) characterized by severe neutropenia with ANC $<0.2 \times 10^9/L$. CASE REPORT We report a case of a 2-year-old female patient with a history of recurrent infections and previous admissions for neutropenia from her first year of life. Growth milestones were normal and she had no congenital malformations typically seen in any syndromes which have an associated neutropenia. Review of serial results revealed longstanding neutropenia with occasional nadirs of $0.00 \times 10^9/L$ seen. Bone marrow examination showed reduced granulopoiesis (myeloid: erythroid ratio of 0,18:1) which appeared left-shifted. Her karyotype was normal (46, XX). ELANE gene mutation analysis was performed and revealed a pathogenic variant in the gene. CONCLUSION This case illustrates the need to consider other rare causes in patients presenting with recurrent infections and associated neutropenia which may be cyclic. Examination of serial absolute neutrophil counts and molecular genetic testing for ELANE mutation may help in early recognition of cyclic neutropenia.

ABSTRACT NUMBER / ABSTRAKNOMMER: 29

THE UTILITY OF TTF-1, NAPSIN A, CK5 AND P63 STAINING IN THE SUB-CLASSIFICATION OF NON-SMALL CELL CARCINOMA OF THE LUNG

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Background: The potentially curative and/or palliative therapy for irresectable lung cancer has evolved significantly. With the availability of targeted therapies the need for precise sub-typing of the non-small cell lung carcinoma (NSCLC) have become paramount. Objectives: As there is paucity of data from South Africa, we aimed to determine utility of TTF-1, Napsin A, p63 and CK5 immunostaining on fine needle aspiration (FNA) cell block and formalin fixed paraffin embedded (FFPE) tissue biopsy specimens in subtyping NSCLC as adenocarcinoma and squamous cell carcinomas. Methods: All cases of NSCLC diagnosed during a three-year period were retrospectively identified. All FNA biopsy and FFPE cases that were stained with TTF-1, Napsin A, CK5 and p63 were collected. Results: We included 271 cases with diagnoses of adenocarcinoma of the lung (n=201), squamous cell carcinoma of the lung (n=53), unspecified NSCLC (n=8) and other carcinomas (n=9). TTF-1 and Napsin A had sensitivities of 99.0% and 91.9% respectively, positive predictive values (PPVs) of 90.8% and 90.3% respectively and accuracies of 91.0% for adenocarcinoma of the lung. Napsin A had a higher specificity than TTF-1 (90.2% vs. 62.8%). Both CK5 and P63 had high sensitivities (95.4% and 97.9% respectively) and negative predictive values (NPVs) of 96.4% and 96.8% respectively for squamous cell carcinoma of the lung. CK5 had a higher specificity than p63 (84.4% and 61.2% respectively), PPV (80.4% and 70.8% respectively) and accuracy (88.8% and 79.2% respectively) for squamous cell carcinoma. Conclusion: TTF-1 and Napsin A both had a high PPV and diagnostic accuracy for adenocarcinoma of the lung, whereas CK5 had an equally high PPV and accuracy for squamous cell carcinoma of the lung. The specificity of Napsin A for adenocarcinoma was higher than that of TTF-1. The specificity of CK5 for squamous cell carcinoma was higher than p63.

ABSTRACT NUMBER / ABSTRAKNOMMER: 30

AGREEMENT BETWEEN POINT-OF-CARE BLOOD GAS ANALYZER AND LABORATORY AUTOANALYZER MEASUREMENTS IN PATIENTS WITH HYPERKALAEMIA

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BackgroundHyperkalaemia is a common electrolyte disorder that may cause life-threatening cardiac arrhythmias. **Objective**To determine the level of agreement between point-of-care blood gas analyzer (POC-BGA) and laboratory auto-analyzer potassium concentrations in patients with hyperkalaemia.**Methods**This was a prospective, cross-sectional study of all consecutive adult patients referred to the Renal Unit with a serum potassium concentration > 5.5 mmol/L. Two simultaneous blood samples were taken using a standardized phlebotomy technique. Patients with hyperleukocytosis and thrombocytosis were excluded.**Results**A total of 59 paired blood samples were included in the final statistical analysis. The median laboratory auto-analyzer potassium concentration was 6.1 mmol/L as compared to the POC-BGA potassium concentration of 5.7 mmol/L ($p < 0.01$) with a mean bias of -0.43 mmol/L. There was a very strong correlation between the two methods ($r = 0.876$) (figure 1); however, agreement was poor with 52.5% of values outside of the total allowable error (figure 2). 96.6% of values were within the reference change value.**Conclusion**Despite the poor agreement between POC-BGA and laboratory auto-analyzer potassium concentrations, a very strong correlation exists. Therefore, POC-BGA potassium concentrations can be used as a surrogate measurement for laboratory auto-analyzer measurements in patients with hyperkalaemia after adjustment for this systematic negative bias.

ABSTRACT NUMBER / ABSTRAKNOMMER: 31

INVESTIGATION OF THE ROLE OF VITAMIN D METABOLISM IN SOUTH AFRICAN BREAST CANCER PATIENTS USING WHOLE EXOME SEQUENCING

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Background: The high global incidence of cancer drives the development of novel genomic approaches for disease prevention and treatment. Breast cancer patients treated with aromatase inhibitors (AIs) represent an important target group for studies of genetic variation in the vitamin D pathway implicated in bone health. **Objective:** To identify clinically relevant genetic variants associated with serum vitamin D levels in hormone receptor-positive postmenopausal breast cancer patients.**Methods:** DNA samples of 115 postmenopausal breast cancer patients with known vitamin D status were used in this study, after obtaining informed consent for whole exome sequencing (WES). Vitamin D status was extracted from genomics database for eligible patients with histologically confirmed breast carcinoma, who attended the Tygerberg Hospital Breast Cancer Clinic between August 2014 and May 2017. WES was performed on the Ion Torrent platform, followed by variant calling of vitamin D-related genes.**Results:** Vitamin D levels were deficient in more than half of study participants (54.5%), with a statistically significant inverse association detected between vitamin D levels and body mass index (BMI) ($p = 0.032$). A statistically significant effect of seasonal variation was also detected, with the lowest levels during winter ($p = 0.009$). WES identified 8 different variants in vitamin D-related genes: DBP/CG, CYP24A1, CYP2R1, DHCR7 and CDH1. DBP rs4588 (c.1307CA, T436K) is a clinically relevant functional polymorphism previously shown to be associated with vitamin D levels. The minor allele frequency of CDH1 rs201511530 (c.671G, R224H) identified as a variant of uncertain clinical significance is 0.00002 in ExAC database.**Conclusions:** Targeting the relationship between obesity and vitamin D status is of particular relevance in postmenopausal breast cancer patients treated with AIs to optimize bone health. Application of new knowledge gained through comparative studies of advanced molecular technologies such as WES, performed alongside standard pathology, may translate into immediate clinical benefits.

ABSTRACT NUMBER / ABSTRAKNOMMER: 32

EPIDEMIOLOGY OF BURKITT LYMPHOMA DIAGNOSED AT TYGERBERG HOSPITAL SOUTH AFRICA 2007 - 2014.

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Background: Burkitt lymphoma (BL) is a high grade non-Hodgkin lymphoma, which may be underdiagnosed in a country such as South Africa, due to a high burden of infectious diseases such as HIV and TB with similar clinical features. Objective: To describe the epidemiology and outcome of BL in HIV positive and HIV negative patients, diagnosed at Tygerberg Hospital, South Africa between 2007 - 2014. Methods: We performed a retrospective analysis of patients diagnosed with BL at TBH between 1 January 2007 and 31 December 2014 with at least 24-month follow up of patients. Data were collected from the Tygerberg Lymphoma Study Group database and the South African Children Cancer Study Group Tumour Registry. Results: There were 73 patients with BL, of whom 68 were admitted in Tygerberg hospital while 5 were excluded from further analysis. The majority of patients were adults (74%) as compared to children (26%). There was a male predominance in children (72%) and female predominance in adults (68%) ($p=0.002$). A lymph node biopsy confirmed the diagnosis of BL in 64 patients, while 9 patients presented with Burkitt leukaemia. Various regimens were used in adults as compared to single treatment protocol in children. The proportion of patients with HIV (78%) and advanced BL (69%) were higher in adults than in children. The 2-year overall survival (OS) of the treatment group was 45%. The outcome of BL in adults was poorer than that of children (OS: 34% vs 69%; $p=0.022$). Conclusion: This study demonstrates an improved cure rate in children treated for BL compared to adults, with HIV-infection being a risk factor for poor outcome.

ABSTRACT NUMBER / ABSTRAKNOMMER: 33

IDENTIFICATION AND FUNCTIONAL VERIFICATION OF MUTATIONS RESPONSIBLE FOR SEVERE COMBINED IMMUNODEFICIENCY IN SOUTH AFRICAN PATIENTS

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Primary immunodeficiencies (PIDs) are a group of genetic disorders caused by inherited or acquired inborn errors of immunity, resulting in impaired immune function. Severe combined immunodeficiency (SCID), although rare, with a prevalence of approximately 1:50 000, is the most severe form of PID. It is characterised by a profound deficiency in functional T-cells, which can manifest with or without functional B cell and/or natural killer (NK) cell deficiencies. Thus, SCID patients have absent or severely impaired cellular and humoral immunity and without treatment within the first two years of life, the condition is almost invariably fatal. In the present study, we aimed to identify disease-causing mutations in a cohort of unrelated SCID patients. All patients recruited for this study were diagnosed with SCID or initially diagnosed with SCID, with symptoms typically presenting within the first year of life. Common observed features included early onset persistent and recurrent viral, bacterial, or fungal infections and severe lymphopenia, with variable expression of other characteristic symptoms of SCIDs. Of the patients initially diagnosed SCID, atypical manifestations and/or factors that confound accurate diagnosis were observed later in the patient's life including survival well beyond two years in three patients, with one of these patients identified as HIV infected from an unknown source. To date, four patient trios have been identified with all four patients having a suspected SCID or confounding defect resulting in initial presentation as SCID. All patients currently lack a molecular diagnosis. The objective of this study is thus the identification and functional verification of potentially novel causal variants responsible for the observed disease phenotypes, in order to further elucidate the pathobiology of this disease. The molecular identification and confirmation of these variants entails identification through whole exome sequencing and pathogenicity inference analysis, as well as functional verification using control cell lines.

ABSTRACT NUMBER / ABSTRAKNOMMER: 34

CHALLENGES IN SCREENING OF MONOCLONAL PROTEIN

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Background: Screening of patients with clinically suspected monoclonal gammopathy requires analysis of monoclonal bands in the serum and urine samples using gel electrophoresis technique followed by immunofixation to identify the type of protein. These procedures have been used commonly in every academic laboratory within NHLS and private sector. However, there can be technical challenges and interferences that can lead to missing diagnoses or misinterpretations. Aim of the study is to highlight some of these in the six cases described. Method: Critical review of analytical methodology in the laboratory Result: Six patients (five for screening of myeloma and one known case for monitoring) were affected by technical problems; one operator error and others were interferences in the samples. Additional procedures had to be taken to pre-treat the samples before finalising the reports. Discussion: Gel electrophoresis is prone to errors as visualisation and interpretation of monoclonal bands can be subjective. Unusual findings on the serum and urine electrophoresis gels may require repeat or additional procedures to confirm or exclude the monoclonal bands in suspected patients. Closer and more critical analysis of gels, correlating band patterns in serum and urine of the same patient, and communication with the clinician involved helped in solving these cases. Conclusion and recommendation: It is recommended that laboratories use a light box and magnifying glass when analysing the gels and clinicians to provide information regarding reasons for suspecting, recent therapies related to monoclonal antibodies, contrast media and blood transfusions on the request form.

ABSTRACT NUMBER / ABSTRAKNOMMER: 35

MACRO-TSH: A CAUSE OF DISCORDANT THYROID FUNCTION PROFILE

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Background and Case history: Discordant thyroid function tests are periodically encountered in the clinical laboratory. Pathologists and medical technologists often do not have enough clinical history provided to allow for proper interpretation of discordant thyroid function tests. We present the case of a middle-aged female whose blood sample was found to have elevated TSH with normal FT4 and FT3. The only clinical history available from the clinic doctor was of generalized athermalgia and no specific diagnosis. This prompted the laboratory to do further tests to investigate for possible heterophilic antibody interference and the possibility of macro-TSH. The sample was incubated in a tube with blocking antibodies to remove potential interference by heterophilic antibodies. This did not result in any significant change in TSH or FT4. The sample was then subjected to polyethylene glycol (PEG) precipitation, after which the TSH went from 100 IU/mL to 8.44 IU/ml (92% decrease). Discussion: Macro-TSH is formed when TSH is bound to anti-TSH autoantibodies forming a large molecular weight structure with a longer half-life and low bioactivity. Some immunoassays suffer from macro-TSH interference which causes falsely elevated TSH in an otherwise euthyroid patient. Screening for macro-TSH is done by PEG precipitation which is suggestive of macro-TSH if the post-PEG TSH decreases by over 90% (Hattori et al 2015). Confirmation of macro-TSH is commonly done by gel chromatography which will show any differences in TSH migration pattern between unbound TSH and macro-TSH. Clinicians should be aware of macro-TSH when interpreting discordant thyroid function tests. Some patients with sub-clinical hypothyroidism present in a similar manner as macro-TSH which makes the differentiation of the two difficult in the clinical setting. Conclusion: macro-TSH is relatively uncommon, but a significant laboratory finding which requires appropriate investigation to prevent unnecessary treatment of patients due to discordant thyroid function results.

ABSTRACT NUMBER / ABSTRAKNOMMER: 36

A SCOPING REVIEW OF SPEECH AND SWALLOWING ASSESSMENTS FOR ADULTS WITH GENERALIZED MYASTHENIA GRAVIS

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Background: Generalized myasthenia gravis (MG) is an acquired neurological autoimmune disease characterised by communication disruptions between the nerves and the muscles at the neuromuscular junction resulting in fatigable weakness of the voluntary muscles, including those involved in eating, swallowing and speaking. Objectives: To determine which speech and swallowing assessments are used as part of the initial management of adults with generalised MG. Data sources: Systematized searching of nine databases (Scopus, PubMed, CINAHL, Africa Wide, Academic Search Premier, Web of Science, Academic OneFile, Health Source: Nursing and Medline) identified evidence regarding the types of speech and swallowing assessments used, the contexts of these assessments and the referrals made by health professionals. Articles were included if speech or swallowing assessments of adults with generalised MG were discussed, they were available in English, peer-reviewed and published between 2000 – 2019. Data charting and synthesis methods: The scoping review methodology was utilised to map the available literature and identify any research gaps within the field. Numerical data analysis documented the year and country of publication, the methodologies followed, the participant details and whether speech, swallowing or both were reflected in the articles. The information was further categorised into the types of assessments and what is included in each, the referrals made post diagnosis, and the settings in which they took place. Results: The types of assessments used were instrumental assessments, bedside assessments, diagnostic assessments, and questionnaires. All the articles utilised instrumental assessments and the contexts were predominantly out-patient. Surprisingly, no mentions of referrals were made, and no articles discussed both speech and swallowing assessments together. Most articles focused on swallowing assessments but research on both topics was limited. Research opportunities exist on the speech and swallowing assessments used for adults with generalised MG.

ABSTRACT NUMBER / ABSTRAKNOMMER: 37

"I AM ACTIVE AND HEALTHY, SO I DON'T NEED TO MAKE LIFESTYLE CHANGES!" A SHORT REPORT OF CLINICAL MARKERS OF "RISK" FOR NCD'S VERSUS HEALTH AND PHYSICAL ACTIVITY PERCEPTIONS IN A LOW-RESOURCED SETTING.

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Background: It is important to understand how to facilitate behaviour change in the context of healthy lifestyle, where gratification is often delayed and not directly noticeable, to prevent and manage NCD risk factors. The objective of this cross-sectional and pragmatic study, was to determine clinical markers of NCD risk in a low-resourced and socio-economic challenging neighbourhood, and to determine the association between key commonly measured health parameters with self-reported levels of physical activity and perceived health. Methods: Bishop Lavis (Cape Town, South Africa) is a low-resourced and socio-economic challenging neighbourhood. All participants of the annual Bishop Lavis health festival (Friday 19th of October 2018) were requested to complete a fully anonymous "health passport", which included gender, age, smoking, alcohol, drug-use, work status, medical insurance, and self-reported presence of non-communicable disease (i.e. Cancer, Cardiovascular Disease, Respiratory disease or Diabetes). Perceived levels of current physical activity and perception of health were recorded using a simple Likert scale ranging from 1 (unhealthy; inactive) to 5 (very healthy, very active). Results: Out of the 104 participants, 63% presented with blood pressure recordings indicative of hypertension. A majority of the participants (58.1%) could be categorised as obese (class I–III). Non-fasting blood glucose concentrations could be considered normal in most participants (81.6%). Participants reported a 4.1 (SD 1.0) in terms of engaging in habitual physical activity, and 4.0 (SD 1.1) in terms of health on a 5-point Likert scale. Only the bivariate association between systolic blood pressure and reported

physical activity was found significant ($p < .05$). Conclusion: This pragmatic study exemplifies that these participants, living in a challenging socio-economic context, portrait a clinical risk profile in line with that for the development and presence of NCD. However, these risks did not reflect in point-estimates of perceived physical activity and health.

ABSTRACT NUMBER / ABSTRAKNOMMER: 38

EVALUATION OF CEPHEID® XPERT® BCR-ABL MONITOR AND ULTRA ASSAYS USED IN THE MOLECULAR MONITORING OF CHRONIC MYELOID LEUKAEMIA PATIENTS

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Background: Chronic myeloid leukaemia results from the reciprocal translocation between chromosome 9 and 22, resulting in the generation of the BCR-ABL oncogene. Highly effective therapies have been developed, particularly tyrosine kinase inhibitors, however these therapies are not curative. Thus, molecular monitoring of the BCR-ABL transcript has become standard of care as it aids in prognosis, help with monitoring treatment response and help predict relapse. It is thus critical that the BCR-ABL test is accurate and has improved sensitivity. The present study aims to evaluate the automated Cepheid® Xpert® BCR-ABL Monitor and Ultra assays using the Cepheid® GeneXpert® instrument to verify the claim of greater sensitivity with the improved Xpert® BCR-ABL Ultra assay. This study also aims to perform a cost and labour analysis of this automated methodology compared to the manual methods used in other diagnostics settings. Methods: A total of 20 patients' blood was analysed with both the Xpert® BCR-ABL Monitor and Ultra assays using the same blood sample and was run in parallel on the Cepheid® GeneXpert® system. Furthermore, 20 negative controls were also included. Results: High concordance was found between the two assays. Also, higher sensitivity was observed with the Xpert® BCR-ABL Ultra assay when compared to the Xpert® BCR-ABL Monitor assay. Furthermore, the differences in sensitivity between the assays had clinical significance, as 50% of patients already receiving treatment had a different treatment response between assays. Conclusion: It was concluded that the Xpert® BCR-ABL Ultra assay was more sensitive than the Xpert® BCR-ABL Monitor assay, thus supporting Cepheid's claim of greater sensitivity with the improved Xpert® BCR-ABL Ultra assay. Furthermore, the Cepheid® Xpert® BCR-ABL assays were found to be superior to the manual methods used in other diagnostics settings in terms of cost, turn-around time and labour intensity.

ABSTRACT NUMBER / ABSTRAKNOMMER: 39

FIBROUS DYSPLASIA OF THE FEMORAL NECK: TREATMENT BY VASCULARIZED FIBULA TRANSFER

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INTRODUCTION Fibrous dysplasia is a rare benign mosaic disease in which the skeleton fails to develop normally. It is characterized by fibroblastic stroma and immature bone leading to weak bones, uneven growth, and deformity. It can occur as a solitary focus (monostotic form), in multiple bones (polyostotic form), or as part of the McCune–Albright syndrome. Fibrous dysplasia resulting in bowing and varus deformity of the femoral neck is difficult to treat. The soft bone does not tolerate any implant that depends on the stability of the cortical bone. Plates or external fixators are therefore not suitable for this kind of treatment. CASE PRESENTATION A 19-year-old female presented with chronic right hip pain and antalgic gait. There was no history of trauma or fractures. The examination demonstrated a leg length discrepancy of 2cm. Radiographic examination showed multiple cystic lesions involving the right proximal femur with a shepherd's crook deformity. The Mikulicz angle was 120 degrees with coxa vara. Bone scan and MRI confirmed extensive monostotic fibrous dysplasia of the proximal right femur. A

single stage surgery was performed, consisting of an anterior corticotomy and free vascularized fibula transfer at the right proximal femur. At 6-year follow up, the patient was pain-free, had no difficulty in one-foot standing, and no restriction in activities of daily living. The leg length discrepancy was corrected and gait normalised. Harris hip score improved from 70 to 98. There was no recurrent deformity. **CONCLUSIONS** The treatment of a shepherd's crook deformity is one of the most difficult problems in orthoplastic reconstructive surgery. Vascularised long bone transfer provides the best material properties for patients who require operative intervention and achieves the objectives of relief of pain and prevention of deformity.

ABSTRACT NUMBER / ABSTRAKNOMMER: 40

CLINICAL BREAST SCREENING OF WOMEN WORKING WITHIN THE CAPE UNION MART GROUP: A PILOT STUDY: INTERIM FINDINGS

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Background: Breast screening is a controversial issue. There are 3 modalities of breast screening that have been studied, namely, self-examination, clinical breast examination (CBE) and mammographic screening. In South Africa, there is no state-run breast screening programme for women. Mammographic surveillance is available only to some. CBE as a screening modality has been studied with mixed results. Aim of the study: To offer risk stratified CBE to all women working within the Cape Union Mart group and compare demographic and clinical factors between those with a 10 year risk of breast cancer of <1% (low risk group) with those with a breast cancer risk \geq 1% (higher risk group). Methodology: This was a cross-sectional study. All consenting women had their medical history taken, along with a risk assessment using the IBIS calculator. Eligible women (risk >1% or women with breast symptoms), underwent a CBE which was performed by a trained breast nurse. Any woman with a suspicious change in their breast was referred to an appropriate breast clinic for further investigation. This study was approved by the Health Research Ethics Committee of Stellenbosch University. Results: 200 women were included in the study of which 35 (17.5%) were in the low risk group and 165 (82.5%) were in the higher risk group. In total, 192 women had a CBE [low risk group: 27/35 (77.1%), higher risk group: 165/165 (100%)]. Compared to the higher risk group, the low risk group were significantly younger and reported fewer pregnancies and live births. Significantly more symptomatic women in the low risk group had mastalgia (52% vs. 16%). Groups were comparable in terms of BMI, age at menarche, number of first degree relative(s) with breast cancer, and referral for further breast examination. Conclusion: The IBIS risk calculator can be used in conjunction with a clinical breast screening programme.

ABSTRACT NUMBER / ABSTRAKNOMMER: 41

A RETROSPECTIVE STUDY OF 16 PATIENTS WITH SARCOMAS OR PHYLLODES TUMOURS (BORDERLINE OR MALIGNANT) OF THE BREAST AND A COMPARISON WITH PATIENTS WITH BREAST CARCINOMA.

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Introduction Sarcomas and malignant or borderline phyllodes tumours (SPT) of the breast have high local recurrence rates and the prognosis is often poor. Our aim in this study was to compare the pathological characteristics and diagnostic challenges of patients with SPT of the breast seen at Tygerberg Hospital (TBH) with those presenting with breast carcinoma. Method We performed a retrospective cohort study including all patients with newly diagnosed SPT of the breast discussed at the TBH breast and sarcoma combined clinic in the last four years, (1/1/2015 to 31/12/2018), Group 1. Patients were identified using the National Health Laboratory Services (NHLS) information system. Breast carcinoma patients were taken from a retrospective database and the first 50 new breast carcinoma patients seen in 2018 were used as a comparative group (Group 2). Patient demographics and tumour characteristics were captured through the NHLS, the Picture Archiving and Communication

System, and the TBH Enterprise Content Management electronic record systems. Results Sixteen patients with SPT were identified. All patients in both cohorts were female. The mean age in group 1 was 46.3 years (22-80) and in group 2, 55.2 years (23-90). Cytology was more unreliable for the diagnosis of SPT with only 1 of 13 fine needle biopsies being consistent with malignancy. This compared unfavourably with the patients with breast cancer where 82.5% had a malignant diagnosis. Core biopsy was more reliable than cytology. Seventy five percent of women with an SPT were accurately diagnosed and 100% of those with breast cancer who had a core biopsy were successfully diagnosed. Patients with SPT had significantly larger tumours. Conclusions When compared to women with breast cancer, patients with SPT were significantly younger and larger tumours and proved more difficult to diagnose. Cytology was not useful in diagnosing SPT.

ABSTRACT NUMBER / ABSTRAKNOMMER: 42

INTEGRATING TUMOUR PATHOLOGY WITH MOLECULAR AND BIOCHEMICAL GENETICS TOWARDS INDIVIDUALISED TREATMENT OF BREAST CANCER

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Background: Risk management of breast cancer involves a complex process spanning the continuum of care from early-stage to metastatic disease and survivorship. Integration of findings related to the somatic genome that determines prognosis and the tumour's response to therapy with the germline genome that governs treatment exposure and toxicity, is challenging. Aim: This study describes the implementation of a responsive research translation path moving beyond population genetics and ethnicity as a risk factor in the pursuit of personalized breast cancer management. Methods: DNA samples of 110 breast cancer patients were screened for genetic variants using a pathology-supported genetic testing (PSGT) platform developed to facilitate the interpretation of next-generation sequencing (NGS) results. Potential disease-causing variants were confirmed with Sanger sequencing. Findings relevant to breast cancer diagnosis, comorbidities and treatment response were integrated into adjustable reports for return of actionable research results in selected cases. Results: Clinically relevant variants were detected in several high- to moderate-risk breast cancer-associated genes, including ATM, BRCA1/2, CDH1, CHEK2, PALB2 and TP53. In a patient diagnosed with mixed invasive lobular (pleomorphic type) and (ductal) carcinoma of no special type, both a pathogenic CDH1 c.1587dupT (p.A530Cfs) mutation and likely pathogenic CHEK2 c.232C>T (p.Q78X) variant were identified. This finding was communicated to the treating clinician, followed by genetic counselling provided in the context of both tumour pathology and germline genetics. Extended data analysis resulted in the detection of biomarkers relevant to therapy-induced comorbidities and lifestyle/environmental risk implications across population subgroups. Conclusion: Application of advanced NGS technologies improved our understanding of the limitations of genetics to fully explain clinical variability and response to treatment. The role of vitamin D in CDH1 expression and maintenance of the epigenome warrants further study alongside standard pathology as an essential component for clinical interpretation of whole genome/exome sequencing results.

ABSTRACT NUMBER / ABSTRAKNOMMER: 43

ASSESSING THE DIAGNOSTIC ACCURACY OF A FIVE CABLE ECG PROTOTYPE

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Background: The 12-lead ECG is a standard part of cardiac assessment. However, it is often omitted or performed incorrectly. A new 5-cable ECG was developed that is easier to perform and could decrease risk of incorrect cable/electrode placement and reduce healthcare cost. The primary aim is determining the diagnostic accuracy (printed tracing) of the 5-cable ECG prototype is sufficient to be used in place of the standard 12-lead ECG machine. A secondary aim is to determine if the 5-cable ECG prototype can use machine learning algorithms to correctly distinguish "normal" from "abnormal" ECGs.

Methods: ECGs were performed on 200 adult patients (age ≥ 18 years) who presented to Tygerberg Hospital's coronary care unit and cardiac outpatients. A 12-lead ECG was performed, immediately followed by a 5-cable ECG. These printouts were randomized and interpreted blindly by an independent cardiologist for both classification (normal, abnormal, variations not necessarily indicating pathology, unclassified) and diagnosis. The 5-cable ECG prototype has been trained on a preexisting ECG database to classify ECGs as "normal" or "abnormal", using machine learning algorithms in a neural network developed by the Stellenbosch University Biomedical Engineering Research Group. Results: The 5-cable prototype generated interpretable ECGs in 49% (n=98) of cases. Analysis of the 98 ECGs determined that use of the 5-cable printout was comparable to use of the standard 12-lead ECG printout in order to assess classification ($p > 0.1$). However, diagnosis was found to differ significantly from diagnosis based on the 12-lead ECG ($p < 0.0001$). The 5-cable ECG prototype neural network could distinguish "normal" from "abnormal" with an accuracy of 70%. Conclusion: The 5-cable machine is still a prototype requiring refinement. Its tracings cannot be used for diagnostic purposes, but can generate ECGs leading to an accurate classification of "normal" versus "abnormal". The neural network algorithms have potential for use in future screening programs.

ABSTRACT NUMBER / ABSTRAKNOMMER: 44

THIRD MOLAR AGENESIS AND IMPACTION PREVALENCE IN THE KIRSTEN SKELETAL COLLECTION

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Different factors contribute to variations in third molar eruption, such as sex or ancestry. This can cause complications within third molars, such as the failure to erupt properly (impaction) or not erupting at all (agenesis). The current study aimed to determine the prevalence of third molar agenesis and impaction within the South African Coloured (SAC) and South African Black (SAB) population groups represented in the Kirsten Skeletal Collection. Specimens (n = 200) with both dental arches present and over 21 years-of-age were included. The sample consisted of 64.5% SACs (males = 58%, females = 42%) and 35.5% SABs (males = 79%, females = 21%). The anomalies were investigated by both a visual and radiographic examination, followed by a statistical analysis of the results. From the sample, 4.5% presented with third molar agenesis and 29% with impaction. Although no results proved significant, a higher prevalence of both anomalies were present in the SACs than SABs, which can be attributed to the SACs extended tooth eruption periods and smaller palatal dimensions. Additionally, a higher prevalence of both anomalies were present in males than females, maxilla than mandible, and left than right, which contradicts findings reviewed in literature. The lower representation of females and SABs in the sample, however, could have contributed to the non-significant nature of the results. Although the SAB results corresponded to previous findings, the SACs presented with a unique prevalence and distribution of both anomalies. This can be attributed to their characteristic genetic profile, and physical and biological traits.

Theme 5 / Tema 5
**Maternal and Child Health/
Moeder- en Kind Gezondheid**

ORAL PRESENTATIONS / REFERATE

ABSTRACT NUMBER / ABSTRAKNOMMER: 1

THE CONTEXT OF FETAL VENTRICULOMEGALY IN A DEVELOPING COUNTRY

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Aim: The goal of this study is to describe fetal ventriculomegaly in a developing country population with regards to clinical presentation, associated findings, natural history, outcome.

Materials and methods: This retrospective observational study was conducted at Tygerberg Academic Hospital, a secondary and tertiary referral centre in the Western Cape Province. Data was collected from all pregnancies with a prenatal diagnosis of ventriculomegaly from 2013 to 2015. The initial presentation and associated findings of VM was studied and a selection of perinatal outcomes was measured.

Results: A final cohort of 252 cases was analysed: 168 mild, 42 moderate and 42 severe cases of VM. The median gestational age at diagnosis was 23w4d, with 48,8% diagnosed after 24w0d. Mild VM was more likely to be unilateral ($p < 0,001$) and isolated ($p = 0,006$) when compared to moderate and severe VM. Mild VM was associated with multiple soft markers in up to a third of the cases and over half of the cases normalized during pregnancy; severe VM was associated with multiple major anomalies in 31,0%. The majority of major anomalies in all 3 groups were CNS defects in 25,8% and cardiac anomalies in 10,3%. Termination of pregnancy was opted for in 12,5% of mild, 35,7% of moderate and 59,5% of severe VM cases.

Conclusion: VM is a common prenatal finding but, in this setting, was often diagnosed late, which limits options for investigation and management. Associated findings included cardiac and other CNS abnormalities and increased with increasing severity of VM. Aneuploidies were encountered within all groups. In this cohort, unilateral VM was more associated with mild VM and may have been due to the inclusion of borderline VM, which was shown not to be a benign finding. Uptake of invasive testing and of TOP was low: the late diagnosis may have contributed to that.

ABSTRACT NUMBER / ABSTRAKNOMMER: 2

LETHAL MULTIPLE PTERYGIUM SYNDROME: A SOUTH AFRICAN CASE SERIES

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Lethal Multiple Pterygium syndrome (LMPS) is a rare genetically heterogeneous autosomal or X-linked recessive neuromuscular condition. Cases are characterized by non-viability due to fetal akinesia, arthrogryposis with pterygia, hydrops and pulmonary hypoplasia. Epidemiologic, phenotypic and genomic LMPS data has not been reported in the South African population. Cases matching the LMPS phenotype were ascertained retrospectively (2011-2015) and prospectively (2016-2018) from fetal medicine and medical genetic databases at Tygerberg Hospital. Detailed phenotyping was performed using clinical, radiological and autopsy sources. 20 women with 25 affected fetuses (10 female, 8 male, 7 unknown sex) were identified. 4/20 women had a subsequent pregnancy recurrence with the same non-consanguineous partner. 3/4 women with recurrence, presented for 1st trimester sonography detecting increased nuchal translucency, reduced fetal movements and oedema, facilitating surgical termination. 2nd trimester sonography detected poor fetal prognosis, i.e. generalised oedema or hydrops (14/14), reduced movements (11/14), fixed flexion of joints and pterygia (10/14), and pulmonary hypoplasia (9/14). Prenatally undiagnosed cases often resulted in unnecessary caesarean section (3/6). Sonographic or autopsy evidence of urological abnormalities were unexpectedly common. **Results:** Our data suggest at least a 50 fold increased incidence of LMPS in our population compared to international estimates. Our case series supports an autosomal recessive pattern of inheritance with recurrence risk implications. Evidence of fetal akinesia is detectable from 1st trimester ultrasound. Early

recognition allows for improved pregnancy management. Further genomic investigation is being undertaken to elucidate the genetics of LMPS, which may be unique in our population.

ABSTRACT NUMBER / ABSTRAKNOMMER: 3

WHY MOTHERS (CONTINUE TO) DRINK DURING PREGNANCY – A DESCRIPTIVE PHENOMENOLOGICAL INVESTIGATION IN A DEEPLY RURAL AREA.

Ismail Rawoot (Stellenbosch University), Michael Urban (Stellenbosch University), Chantelle Scott (Stellenbosch University)

Background: Much epidemiological research has been conducted in South Africa that shows that fetal alcohol spectrum disorder (FASD) is a common, important and under-recognised health burden. FASD encompasses a diverse range of congenital abnormalities related to alcohol consumption during pregnancy. However, the data are sparse in terms of a qualitative understanding of the phenomenon of drinking during pregnancy. Aim: To describe the phenomenon of drinking during pregnancy, from the perspective of pregnant women who have recently consumed alcohol, in a deeply rural town. Methods: A qualitative (descriptive, phenomenological) pilot study was undertaken to explore the perceptions and experiences around what influences mothers to drink during pregnancy. Semi-structured interviews were conducted with a total of 8 pregnant women attending an ante-natal clinic. The data were transcribed; and analysed thematically. Results: Women described reasons both to abstain from –or reduce– alcohol consumption during pregnancy, as well as reasons to continue drinking. Factors related to abstinence included knowledge that alcohol was harmful to fetal development, a belief that alcohol use was easy to stop, as well as the request of their partners. Some of the reasons to continue drinking included drinking out of habit, cravings, and a need to maintain social relationships characterised by drinking. Novel findings include how participants sought to reconcile negative emotions relating to alcohol use on their pregnancy; strategies to mediate risk while continuing to drink; and considerations about when to resume drinking after the pregnancy. Conclusion: Pregnant women who drink alcohol have multiple discourses with friends, family, partners and themselves regarding alcohol consumption during pregnancy. The co-occurrence of conflicting beliefs, ideals, and actions is common. Future interventions may employ strategies to leverage feelings of maternal responsibility, knowledge of FASD, and personal agency to effect change in drinking behaviours..

ABSTRACT NUMBER / ABSTRAKNOMMER: 4

GUIDELINES NEEDED TO IMPROVE CLINICAL AND LABORATORY DIAGNOSIS, TREATMENT AND CARE OF TB-EXPOSED INFANTS IN SOUTH AFRICA

Ananja van der Westhuizen

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BACKGROUND Tuberculosis (TB) disease is the leading cause of mortality in South Africans, and a major non-obstetric cause of maternal death, adverse pregnancy and perinatal outcomes. Even for infants with known TB exposure, perinatal TB disease presentation may be non-specific and diagnostic confirmation is difficult to obtain. CASE DESCRIPTION A preterm, low birth weight infant was born to a 30-year old G4P3M1 woman, who had received no antenatal care and had a history of substance use in pregnancy (methamphetamine and cannabis). Shortly after delivery, she was diagnosed with drug-sensitive pulmonary tuberculosis (DS-pTB); she had two previous episodes of pTB and a history of treatment interruption. The TB-exposed infant was screened for TB disease with a clinical examination, chest radiograph and abdominal ultrasound, and two gastric aspirates for GeneXpert, microscopy and culture. Although all direct TB microscopy was negative, the molecular test was indeterminate, with M.tb DNA detected in low amounts by the Xpert Ultra PCR test. After expert consultation, the infant

was commenced on isoniazid (INH) prophylaxis (10mg/kg/day) as an outpatient for 6 months. BCG vaccination was deferred until completion of prophylaxis and the infant's condition and growth parameters were closely monitored at outpatient visits. Rapid infant growth required a three-fold increase in INH dosing from prophylaxis initiation to completion. The infant remained well and all TB cultures were negative. The mother successfully completed six months of anti-TB treatment at her local clinic. CONCLUSION There are multiple challenges in the identification, investigation and clinical management of TB-exposed infants. Clear guidelines and better diagnostic tools are needed to assist clinicians with the care of TB-exposed infants in South Africa.

ABSTRACT NUMBER / ABSTRAKNOMMER: 5

CHILDHOOD CANCERS MISDIAGNOSED AS TUBERCULOSIS IN A SETTING OF HIGH TUBERCULOSIS PREVALENCE.

Jennifer van Heerden

Co-Authors: Jennifer van Heerden (Stellenbosch University), Anel van Zyl (Stellenbosch University), Prof. Pierre Goussard (Stellenbosch University), Prof. Helena Rabie (Stellenbosch University)

Introduction: Tuberculosis (TB) and childhood malignancies have overlapping presentations and, in high prevalence areas cancer may initially be diagnosed as TB. There is no data on how commonly this misdiagnosis occurs in children in South Africa. Methods: This retrospective study investigated the diagnosis of tuberculosis in children with cancer entered into the Tygerberg Hospital Tumour registry between 1 January 2008 and 31 March 2018. We identified children on anti-tuberculosis treatment (TB-Rx) at the time of cancer diagnosis. We also reviewed children initiated on tuberculosis treatment after cancer diagnosis. Results are reported as median values and 95% confidence intervals (CI). Results: Twenty seven (5,0%) of 539 children on the registry started TB-Rx before cancer diagnoses. Their median age was 5,48 years; 95% CI [3,75 to 9,56]; similar to those not diagnosed (4,78 years; 95% CI [4.44 to 5.64]). Nine of the 27 (33,33%) children continued TB-Rx after cancer diagnosis. Both pulmonary and extra-pulmonary TB were found to have overlapping clinical features with malignancies, with the central nervous system (CNS) the most common site after pulmonary TB. Haematological malignancies made up the majority of cancers treated for TB (59,26%; 16/27) (95% CI [39,91 to 76,11]) with an even distribution between leukaemia and lymphoma. The mortality burden of paediatric cancer at TBH was 38,27% (204/533) and was 62,96% (17/27) in patients on TB treatment. Three of the 4 patients diagnosed with TB after cancer diagnoses initiated TB-Rx within 1 month after the cancer diagnosis and were receiving chemotherapy at the time of TB diagnosis. Conclusions: The clinical and radiological overlap TB and cancer causes diagnostic confusion in a significant number of children with cancer. In the absence of microbiological confirmation careful review to identify misdiagnosis is essential.

ABSTRACT NUMBER / ABSTRAKNOMMER: 6

MORTALITY AND OUTCOMES OF EXTREMELY LOW BIRTH WEIGHT INFANTS IN THE FIRST YEAR OF LIFE: A RETROSPECTIVE COHORT STUDY

Grace Musiime

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Background: Neonatal deaths are a leading cause of child mortality. There is a lack of data evaluating outcomes of extremely low birth weight (ELBW) neonates in South Africa and because of regional variations existing statistics cannot be easily transposed. Objective: To describe the morbidity, mortality and neurodevelopmental outcomes at one year corrected gestational age (CGA) of ELBW infants treated at a tertiary hospital. Methods: Retrospective cohort study of live born infants treated at Tygerberg Hospital (TBH) between 1st January and 31st December 2016. Eligible infants were identified via the Vermont-Oxford Network database. Data was extrapolated from this database and patient records. Multiple logistic regression and survival analysis were undertaken to identify risk factors for mortality in STATA. Results: 256 ELBW infants were admitted during the study period. 11.3% were admitted to the neonatal intensive care unit (NICU) at any time during their hospitalisation. 83.2% had hyaline membrane disease and 93% required nasal continuous positive airways pressure (NCPAP). 63.3% of

infants survived to hospital discharge. The majority of deaths occurred in the first three days of life (19.5%; 95% CI 14.7-24.3%). Cause of death was documented as extreme prematurity in 41% of the inpatient deaths. Birth weight was a significant predictor of mortality (HR 0.99, 95% CI 0.992-0.999). 25.4% of infants survived and attended clinic follow up at one year CGA; 2.6% of these had severe neurodevelopmental impairment and 37.3% had normal development. The loss to follow up rate was 57.5%. Conclusions: Mortality and morbidity rates remain high amongst extremely preterm infants. In order to improve survival resources need to be allocated to neonatal resuscitation, surfactant therapy, NCPAP and increasing availability of NICU beds. Further research is needed to adequately assess long term neurodevelopmental outcomes of ELBW infants in this setting.

ABSTRACT NUMBER / ABSTRAKNOMMER: 7

Late preterm infants' outcomes within the first week of life, born at Tygerberg Hospital

Magriet van Niekerk

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Introduction: WHO statistics show that the number of late-premature babies (34-36.6 weeks) is on the increase. This group is recognised as having a higher rate of morbidity and mortality compared to term babies. Our objective was to document morbidity and mortality within the first week of life of these babies born at a tertiary hospital in the Western Cape. Methods: This was a prospective descriptive study of late-premature babies born between 1 March - 31 May 2018. Data was collected on day 1, 3 and 7 of life. Obstetric, demographic, morbidity and mortality data was collected. Specific medical interventions required were recorded. Results: 117 babies were enrolled (62 in the 34-34.6 week group and 55 in the 35.0-36.6 weeks group), The average weight of babies delivered in the younger group was 1977g vs 2228g in the older group. A total of 92 babies required admission to the neonatal service. The majority of the babies in both groups had respiratory distress, with 80.3% requiring nasal CPAP. 17.6% (9/51) still required respiratory support at day 7. Antibiotics were initiated in 46 of the admitted babies. Of concern is that by day 3, 57% of the babies were not able to satisfactorily breastfeed. By day 3 of life, only 3/117 babies were discharged. By day 7, 89/117 were still admitted, with 83 of these due to neonatal morbidity. Conclusion: This study emphasises the high burden of morbidity amongst the late-preterm group. It is important that similar studies are undertaken at the primary care birthing units where these babies would be discharged within 6 hours after delivery and consequences of late prematurity may not be detected or anticipated. Resource and financial planning needs to take into account the post-delivery and long term needs of this growing group of babies.

ABSTRACT NUMBER / ABSTRAKNOMMER: 8

Outcomes of infants with HIE treated with cooling or cooling plus Morphine at a tertiary hospital in South Africa.

Gugu Kali

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Introduction: Therapeutic hypothermia (cooling) improves outcomes in infants with hypoxic ischaemic encephalopathy (HIE) and is now standard of care. However, the beneficial effects are limited. One previous study, the neo.nEURO.network Trial in which all the infants received Morphine co-treatment, showed a greater effect of cooling compared to other studies. Objectives: We aimed to determine whether combining cooling with Morphine would improve intact survival at 18 months in infants with HIE compared to cooling alone. Methodology: 48 infants admitted to TBH for cooling between 2012 and 2016 were prospectively randomized to receive cooling-only (C) or cooling-plus-Morphine (M). Cooling was administered for 72 hours according to the local protocol. The Morphine group additionally received the drug at 25mcg/kg/hr during cooling. Serial morphine concentrations were measured in the serum and cerebrospinal fluid. Neurodevelopmental assessments were performed until 18 months. Results: 45 infants were included. Median maternal age was 23 years, gestational age 38 weeks, birthweight 3140g. 8.9% infants were HIV exposed; 46.7% were inborn. Median time to initiation of cooling was 4.3 hours. There were no differences in the baseline characteristics between the groups. Group C had a

higher seizure burden (13[59.1%] C vs 3[13%] M, $p=0.002$) and liver dysfunction (8[36.4%] C vs 2[8.7%] M, $p=0.035$). No differences were noted in ventilatory or inotropic support, length of admission, neurological condition at discharge nor severe MRI abnormalities. A greater proportion of infants had a normal outcome at 18 months in the morphine group (17[73.9%] M vs 9[40.9%] C, $p=0.036$). There were no differences in the number of deaths (5[22.7%] C vs 2[8.7%] M, $p=0.243$) or abnormal outcome (3[13.6%] C vs 2[8.7%] M, $p=0.665$). Morphine profile analysis is in progress. **Conclusions** In this cohort, cooling-plus-Morphine was associated with normal outcome at 18 months. The mechanism of the apparent additional neuroprotection is being explored.

ABSTRACT NUMBER / ABSTRAKNOMMER: 9

Challenges with recognition of newborns at high risk for perinatal HIV transmission in rural Western Cape, South Africa

Tracy Robyn Cummins

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Background: Despite improved prevention of mother-to-child HIV transmission (PMTCT), $\pm 5\%$ of infants born to women living with HIV (WLHIV) acquired HIV in South Africa in 2017. 2015 Western Cape PMTCT Guidelines evaluate newborns' perinatal transmission risk. High-risk criteria (unknown/unsuppressed maternal viral load (VL) <12 -weeks before delivery and certain obstetric complications) necessitate augmented infant prophylaxis. **Methods:** This retrospective cohort study investigated WLHIV and their newborns delivered at a rural regional hospital from May 2016-April 2017, using hospital records, NHLS Database and Provincial Datacentre. Labour ward-assigned infant risk was compared to actual infant risk. Antenatal factors of mothers with high/low-risk infants were compared, and factors associated with having a high-risk infant were evaluated. **Results:** 202/216 mothers were studied (unavailable records excluded). Most knew their HIV-status prior to this pregnancy (75% of high-risk and 83% of low-risk, $p=0.47$) and were already on ART (61% and 70% respectively, $p=0.17$). Fewer mothers of high- than low-risk infants first attended antenatal visit <20 -weeks' gestational age (GA) (57% vs. 77%, $p=0.01$) and received >4 antenatal visits (39% vs. 80%, $p<0.001$). Only number of antenatal visits remained associated with high-risk infants (aOR 0.62; 95%CI 0.50-0.76) after adjusting for GA at first visit, maternal age, parity, HIV-diagnosis and ART-initiation timing. Of 126 liveborn high-risk infants, 59 (47%) of these were assigned low-risk and received suboptimal infant prophylaxis. Absence of known viral suppression <12 -weeks before delivery accounted for 119/143 (83%) total high-risk exposures and 48/59 (81%) missed high-risk exposures. **Conclusions:** Unknown/unsuppressed maternal VL <12 -week before delivery accounted for most high-risk exposures. These were so frequently missed that they accounted for 4/5 missed high-risk exposures. Correct infant risk assessment requires prioritisation of VL-monitoring and availability of results. Because of the protective effect of number of antenatal visits, reinforcing visit-frequency later in pregnancy may improve outcomes.

ABSTRACT NUMBER / ABSTRAKNOMMER: 10

Hemodynamic effects of PDA closure in stable preterm infants in the first 72 hours of life: a longitudinal study using echocardiography and non-invasive cardiac output monitoring

Lizelle Van Wyk

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Introduction The pathophysiological consequences of a patent ductus arteriosus (PDA) in preterm infants are well known and management remains controversial. This study investigated the longitudinal effect of PDA on various haemodynamic parameters over the first 72 hours of life. **Methodology** A prospective observational study was performed in the neonatal service of Tygerberg Children's Hospital in neonates with a PDA. Infants underwent continuous bioreactance monitoring until 72 hours of life

with echocardiography and cranial ultrasound measurements performed 6-hourly for the first 72 hours of life. Numerous haemodynamic parameters were compared pre and post PDA closure as well as at 72 hours of life in infants with open vs closed PDA. Results: 55 infants were included for this sub-analysis. PDA closed at a mode of 18 hrs (IQR 12-30 hours) with an average PDA size of 0.17 ± 0.06 cm pre-closure. In comparing pre and post PDA closure parameters, no statistically significant factors were found in cardiovascular parameters (heart rate, blood pressure), respiratory parameters (respiratory rate, CPAP requirement, peripheral saturation, FiO₂), TTE parameters (LVO, RVO, TR jet), bioreactance parameters (LVO, SV, SVV, TPR, TFC) or cerebral perfusion parameters (PSV, RI). CUS EDV was the only significant factor ($p=0.006$) with PEEP level reaching borderline significance ($p=0.068$). In comparing the closed and open PDA at 72hrs of life groups, no significant factors were identified. LVO had borderline significance ($p=0.081$) with higher cardiac output in infants with an open PDA: LVO 147.6ml/kg/min vs 124.1ml/kg/min, respectively as well as an increased SVC flow (192.9ml/kg/min vs 138.3ml/kg/min). Conclusion: In a stable preterm infants in the first 72 hours of life, the presence of an open or closed PDA does not affect respiratory, cardiovascular or cerebral perfusion parameters. Infants with an open PDA at 72 hours of life had a higher LVO.

ABSTRACT NUMBER / ABSTRAKNOMMER: 11

An overview of the patient population presenting with Congenital Talipes Equinovarus (CTEV) at a tertiary hospital in the Western Cape

Mari Thiar

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Background: Clubfoot (or Congenital Talipes Equinovarus) is as a common paediatric orthopaedic condition. The aim of this study was to provide an overview of the demographic profile and treatment regime of the population treated for clubfoot at a high volume, tertiary level hospital in a developing world setting. Methods: A retrospective cohort study, including all patients presenting with clubfoot between November 2013 and April 2019 was conducted. Results: 246 patients (61.4% male and 37.8% female) were included over the 66 months study period at a median age of presentation of 6 weeks (IQR 0.3 – 320 weeks). Of these, 77.6% ($n=191$) of patients were diagnosed as having idiopathic clubfoot, 6.9% ($n=17$) with postural clubfoot and 11.4% ($n=28$) with syndromic clubfoot. The majority of patients (54.9%) had bilateral clubfoot with 19.5% having unilateral left and 25.6% unilateral right clubfoot. Only 11.8% reported having a positive family history. Patients had to travel a median distance of 20.5 (IQR 10.2 – 23.0) km to attend the clinic (range 2.1 – 325km) and required a median of 6 (IQR 3.0 – 8.0) casts, range (0.0 – 16.0) before the next phase of treatment. Of those diagnosed before 2019 ($n=229$), 48.5% ($n=111$) of participants did not require a tenotomy, 38.4% required a tenotomy ($n=88$) and 13.1% ($n=30$) was not reported, before commencing maintenance treatment. A total of 16.7% ($n=41/223$) of patients had relapsed clubfoot, with 15.4% ($n=38/223$) undergoing repeat Ponseti treatment and 6.9% ($n=17/223$) required a repeat tenotomy. Conclusion: Our demographic profile is in agreement with the global literature. However, we report a delayed age of presentation and a greater travel distance than would generally be expected. Of interest is a reported family history of only 11.8% compared to the literature.

ABSTRACT NUMBER / ABSTRAKNOMMER: 12

Risk-stratification of young children presenting to ambulatory pediatrics with first-onset seizures: Should we order an urgent CT brain?

Jaanri Brugman

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Background: A computed tomography (CT) brain scan is an often-utilised emergency department (ED) imaging modality to detect emergent intra-cranial pathology in a child presenting with a first seizure. Identifying children at low risk of having a clinically-significant intra-cranial abnormality could prevent

unnecessary radiation exposure and contrast/sedation-related risks. Objective To identify clinical variables which could predict clinically-significant CT brain abnormalities and use recursive partitioning analysis (RPA) to define a low-risk group of children in whom emergent CT brain can be deferred. Methods Retrospective cross-sectional review of 468 children who underwent emergent CT brain after presenting to a low- and middle-income pediatric ED following first seizure. Results 133/468 (28.4%) of CT brain scans had clinically-significant abnormalities. Failure to return to neurological baseline and focal neurological deficit persisting longer than 36 hours had statistical significance in a multiple regression analysis. RPA, applied to a subgroup without suspected tuberculous meningitis (TBM) (n = 414), classified 153 children between the ages of 6 months - 5 years, who had a normal neurological baseline, had returned to baseline post-seizure, and were not in status epilepticus, as non-clinically significant scans and 98% were correctly classified. Conclusion Our study re-inforces the American Academy of Neurology (AAN) recommendation that children with persistent post-ictal abnormal neurological status and/or post-ictal focal deficit be prioritised for emergent CT brain. Having excluded children with suspected TBM, the remaining subgroup aged 6 months – 5 years presenting with a non-status first seizure, normal neurological baseline and return to baseline post-seizure, are at very low risk of having a clinically-significant CT brain abnormality.

ABSTRACT NUMBER / ABSTRAKNOMMER: 13

REPORTED COMPETENCIES OF JUNIOR MEDICAL DOCTORS IN MANAGING SERIOUSLY ILL AND INJURED CHILDREN IN SOUTH AFRICAN HOSPITALS

Louisa Erasmus

Co-Authors: Louisa Erasmus (Paediatrics), Lizel Smit (Paediatrics), Andrew Redfern (Paediatrics)

Background Little is known about the competencies of junior doctors in managing seriously ill and injured children in South African (SA) public hospitals. This study aimed to document the resuscitation experience, reported confidence and theoretical knowledge of South African junior doctors in managing seriously ill and injured children. Methodology Quantitative cross-sectional descriptive study. Junior doctors working in paediatric departments of all eight SA Medical Schools and its affiliated teaching hospitals were invited to participate in an anonymous, self-administered electronic questionnaire and knowledge test. Results One hundred and eighteen doctors from seven Medical Schools participated, 63 (53%) registrars, 35 (30%) medical officers (MOs) and 20 (17%) interns. Resuscitation events were common, with 71% of respondents partaking in >10 resuscitations during the preceding 2-year period. Half of interns have been expected to lead a resuscitation, but 25% have performed < 5 bag mask ventilations, 65% have never intubated, 75% have never commenced inotropes and none have placed an intraosseous line. Sixty percent of interns reported their knowledge as lacking; with only 15% passing the knowledge test. Forty nine % MOs and 74% registrars passed the test. Structured in-house training and assessment on paediatric emergencies are not provided on a regular basis with 42% of respondents never having received any formal training. Debriefing and feedback opportunities are not standard practice. Only 8% of respondents reported consistent debriefing opportunities after resuscitations, with 29% of MOs and 46% of registrars never exposed to debriefing opportunities. Forty five percent of interns and 37% registrars had never received feedback after resuscitation events. Conclusion Shortcomings in training, assessment, feedback and knowledge in the management of seriously ill and injured paediatric patients were identified in junior medical doctors which may adversely affect the quality of care in paediatric emergencies. This has implications for both undergraduate and postgraduate training programmes.

ABSTRACT NUMBER / ABSTRAKNOMMER: 14

NOVEL THERAPEUTICS TO TREAT PRE-ECLAMPSIA

Cathy Cluver (Stellenbosch University)

Preeclampsia is one of the most serious complications of pregnancy. The burden of this disease is disproportionately shouldered in low to middle income countries. Preeclampsia is directly responsible for 10-15% of all maternal deaths and for every maternal death there are 50-100 women who experience significant morbidity. Additionally, it is responsible for more than 500 000 perinatal losses every year and significant neonatal morbidity.

There is currently no treatment for preeclampsia apart from delivery. Anti-hypertensive medication can prevent intracranial haemorrhage and magnesium sulphate can prevent seizures but there is no treatment for the disease itself. An agent that could treat preeclampsia is thus desperately needed. Preeclampsia is the end result of the release of antiangiogenic factors from the placenta. These antiangiogenic factors cause endothelial damage resulting in a systemic inflammatory response and the clinical syndrome of preeclampsia. Novel therapeutics aimed at decreasing the effects of these antiangiogenic factors may prove to be a breakthrough in the field of preeclampsia therapeutics. The Preeclampsia Research Unit, based at Tygerberg Hospital, together with the Translational Obstetrics Unit from Melbourne University and Mercy Perinatal, in Melbourne Australia, have set up a pipeline to translate the most promising laboratory research into clinical trials to assess novel therapeutics. This presentation will discuss some of the research we have already completed and plans for future research in the field of preeclampsia therapeutics.

ABSTRACT NUMBER / ABSTRAKNOMMER: 15

CARDIAC MRI FINDINGS IN PATIENTS WITH PRE-ECLAMPSIA COMPLICATED BY PULMONARY OEDEMA

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Background: Pre-eclampsia complicates between 5 and 7% of pregnancies worldwide. When complicated by pulmonary oedema, it accounts for 50% of all pre-eclampsia related mortality. There is as yet no clear consensus on the pathogenesis of pulmonary oedema in this population. The degree to which the heart is directly affected by pre-eclampsia has also not been clearly defined. Purpose To characterise cardiac tissue abnormalities detected at cardiac MRI in pre-eclampsia complicated by pulmonary oedema.

Methods: The LV IMPACT MRI study is currently in the enrolment phase. Briefly, we are recruiting women over the age of 18 years old presenting with pre-eclampsia complicated by pulmonary oedema as cases. Pre-eclamptic controls without pulmonary oedema are being recruited and we plan to recruit non pre-eclamptic controls. All patients undergo echocardiography as well as cardiac MRI with native T1 mapping. Multiple blood, urine and placental samples are being collected. We report here on the interim cardiac MRI findings.

Results: To date 13 cases and 10 pre-eclamptic controls have been enrolled. Three (30%) of the controls had complicated preeclampsia – 2 presented with eclampsia and 1 with HELLP syndrome. The rest of the controls had uncomplicated pre-eclampsia. Defined as abnormal native T1 myomap values, 11 cases (84,6%) had evidence of myocardial oedema at cardiac MRI. While only 4 (40%) of the controls had evidence of myocardial oedema, three of these were the controls with complicated pre-eclampsia. Conclusions: To date there is no published data on tissue characterisation by cardiac MRI in patients with pre-eclampsia complicated by pulmonary oedema. Our findings show that patients with pre-eclampsia complicated by pulmonary oedema and indeed, complicated pre-eclampsia in general, are more likely to develop myocardial oedema. This would suggest that the heart is directly affected in pre-eclampsia and may play an active role in the pathogenesis of pulmonary oedema.

ABSTRACT NUMBER / ABSTRAKNOMMER: 16

PREGNANCY OUTCOMES OF WOMEN CONCEIVING ON ANTIRETROVIRAL THERAPY (ART) COMPARED TO THOSE COMMENCED ON ART DURING PREGNANCY

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and HIV Institute, Faculty of Health Sciences, University of the Witwatersrand), Mauricio Pinilla (Harvard T. H. Chan School of Public Health, Center for Biostatistics in AIDS Research, Boston), Katie McCarthy (FHI 360, Durham), Maxensia Owor (MUJHU Research Collaboration, Kampala), Bonus Makanani (College of Medicine-Johns Hopkins Research Project, Blantyre)

Background: Globally the number of HIV-infected women of child-bearing age conceiving on ART is increasing. Evidence of ART safety at conception and during pregnancy and adverse pregnancy outcomes are conflicting. The PROMISE 1077 breastfeeding (BF) and formula feeding (FF) international multisite trials provide an opportunity for a post-hoc analysis using robust data from varied settings of pregnancy outcome with subsequent pregnancies.

Methods: The PROMISE 1077BF/1077FF trials were open-label randomized trials designed to address key questions in the management of HIV-infected women who did not meet clinical guidelines for ART treatment during the time of the trial. Women who became pregnant during follow-up subsequent to the index pregnancy, including women with more than one subsequent pregnancy, remained in the study. The pregnancy outcomes of non-breastfeeding women randomized to receive ART following delivery (FF) or breastfeeding women randomized to receive ART following breastfeeding cessation who conceived while on ART (continue ART group) were compared to those commenced on ART when pregnancy was diagnosed.

Results: Pregnancy outcomes of 939 subsequent pregnancies of 826 mothers were recorded. The analysis by intention to treat showed significantly increased low birth weight in the continue ART group, relative risks 2.65 {(95% CI 1.20, 5.81), $p=0.02$ }. The hazard ratio for spontaneous abortion, stillbirth, or neonatal death in the continue ART group was higher {HR=1.40 (0.99, 1.98), $p=0.05$ }.

Conclusions: An increased risk for adverse pregnancy outcomes in women conceiving on ART are reported emphasising the need for improved obstetric and neonatal care for this group.

ABSTRACT NUMBER / ABSTRAKNOMMER: 17

MATERNAL SAFETY OF A SIMPLE PROTOCOL FOR INSULIN, FOLLOWING BETAMETHASONE ADMINISTRATION IN AN ANTENATAL WARD, TO WOMEN WITH DIABETES.

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Introduction: Obesity is a major health challenge. Diabetes is strongly associated with obesity and pregnant women often require early delivery. Antenatal administration of betamethasone to mothers at risk of preterm delivery dramatically reduces perinatal morbidity and mortality, but corticosteroids induce hyperglycaemia.

Objective: The primary objective was to determine the maternal safety of a simple protocol for subcutaneous insulin following betamethasone administration in an antenatal ward to women with diabetes. Secondary outcomes included the impact of diabetes type and the appropriateness of a surveillance period of 96 hours after betamethasone administration.

Methods: This retrospective study included all women with diabetes, admitted to the Obstetric Special Care ward at Tygerberg Hospital, who received two doses of betamethasone due to the prospect of preterm delivery. Maternal safety was evaluated based on hyper- or hypoglycaemia in the fasting state (02h00 and early morning) and two-hours postprandial for breakfast, lunch and supper. Blood glucose values $\geq 14\text{mmol/L}$ or $\leq 3.5\text{mmol/L}$ were regarded as unacceptable hyper- or hypoglycaemia respectively. The numbers of these events over the first 96 hours were documented.

Results: This study spanned 52 months from 01/11/2013 to 28/02/2018 and included fifty-nine women. Three cases were excluded. Eleven episodes of defined hypoglycaemia occurred in six women, all receiving insulin therapy, but none after a corrective dose of insulin. No serious hypoglycaemic incident was reported. Seventeen women experienced hyperglycaemic incidents almost entirely (47/56) within 48 hours of betamethasone administration, most often postprandially (34/56) and preceded by preprandial values $> 9\text{mmol/L}$ (29/34). Fourteen (82.4%) of these women were receiving insulin therapy. No case with gestational diabetes encountered defined hyperglycaemia. Overall compliance with the protocol was 83%

Conclusions: This study demonstrated acceptable safety of the local protocol. Enhanced surveillance is necessary for 72 hours after the first dose of betamethasone.

ABSTRACT NUMBER / ABSTRAKNOMMER: 18

EXPERIENCES OF WOMEN WHO SURVIVE MAJOR OBSTETRIC HAEMORRHAGE

Jason Bennett (University of Stellenbosch, Obstetrics and Gynaecology); Lindi Murray (University of Stellenbosch)

Severe post-partum haemorrhage is a major cause of maternal morbidity in South Africa. There is very little information about the experience of survivors of PPH in the local South African setting. This qualitative study investigated, by way of in depth interviews, the experience of 11 women who survived severe PPH at Tygerberg hospital. Several themes emerged, most notable self-blame, guilt and isolation. This information is important to ensure that future care of women with severe morbidity includes a mental health component, with appropriate referral for psychological counselling and long term follow up.

POSTER PRESENTATIONS / PLAKKAATAANBIEDINGS

ABSTRACT NUMBER / ABSTRAKNOMMER: 19

THE EFFECTIVENESS OF ABDOMINAL AND/OR PELVIC FLOOR EXERCISES TO IMPROVE DIASTASIS RECTI ABDOMINIS, LOW BACK PAIN AND PELVIC FLOOR DYSFUNCTION IN POSTPARTUM WOMEN

Liesl Gerstner (Stellenbosch University), Christel Kruger (Stellenbosch University), Liezl Pilkington (Stellenbosch University), Barbara Vente (Stellenbosch University), Hanlie Coetze (Stellenbosch University), Nadine Eddy (Stellenbosch University)

Background: Diastasis recti abdominis (DRA) is the separation between the two rectus abdominis muscles that develops due to stretching and thinning of the linea alba. A persistent DRA affects 30%-70% of women postpartum resulting in lack of stability and increasing their risk for injury, therefore, potentially negatively impacting both mother and child's wellbeing. Limited research has been conducted on the efficacy of abdominal and/or pelvic floor exercises in aiding the reduction of a pathological DRA, pelvic floor dysfunction and low back pain. Objective: To establish the effectiveness of abdominal and/or pelvic floor exercises on improving pathological DRA, low back pain and pelvic floor dysfunction in postpartum women compared to only educational advice or no intervention. Methodology: Seven computerised databases were searched, namely EBSCOHost, Cochrane Library, Science Direct, PubMed, Scopus, PEDro and Google Scholar. The search terms included: Diastasis recti, Diastasis recti abdominis, Diastasis rectus abdominis, exercises, abdominal exercises, pelvic floor exercises, physiotherapy, physical therapy, rehabilitation, postpartum women, lower back pain, pelvic floor dysfunction and inter-recti distance. The included studies had to meet specific criteria to be included in the review. The PEDro Scale was used to critically appraise the methodological value of the included RCTs. The adapted JBI Data Extraction Form was used to extract data from the selected articles. Results: Two studies met the inclusion criteria and methodological quality ranged from 6/10 - 7/10 on the PEDro Scale. Abdominal and/or pelvic floor exercises resulted in a greater and faster reduction in inter-recti distance (IRD) over 12 months. The IRD was measured using either finger widths via palpation or ultrasound imaging to report on the severity of the DRA. One study reported inconclusive findings with regard to the impact of abdominal and/or pelvic floor exercises on reducing pelvic floor dysfunction and low back pain, measured using the PFDI-20 and RDQ. Conclusion: There is level II evidence to suggest that abdominal and/or pelvic floor exercises can aid with the resolution of a pathological DRA up to 12 months postpartum. However, there is currently limited supporting evidence. No conclusion can be drawn on the efficacy of abdominal and/or pelvic floor exercises on pelvic floor dysfunction and low back pain. Further research in this field is recommended using larger, more diverse sample groups, with a holistic approach.

ABSTRACT NUMBER / ABSTRAKNOMMER: 20

LOW NICOTINE AND ETHANOL ADMINISTRATION: FRIEND OR FOE OF SPERMATOZOA?

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Tobacco smoking and alcohol consumption are amongst the highest consumed addictive substances globally, despite eminent detrimental impacts on general health including the reproductive system. It is evident that both nicotine and ethanol are associated with pathological changes in human spermatozoa. Studies have shown the adverse effect of extreme nicotine and alcohol consumption on sperm function, however, reports on the combined moderate intake of these substances are not well established. Hence, this study aimed to investigate the in vitro effects of lower concentration of nicotine and ethanol on functional parameters of human spermatozoa.

Methods: Semen samples were treated with a low concentration of nicotine (0.1mM), 0.3% of ethanol and in combination (0.1mM Nic + 0.3% ethanol). Sperm functional and advanced parameters were measured.

Results: After 30 minutes of incubation with either low nicotine or ethanol or a combination of both, there were no statistical differences in sperm motility and kinematic parameters between the groups. However, there was a significant difference in viability ($p=0.0113$). Low nicotine and Ethanol treated spermatozoa presented with reduced viability compared to control ($p<0.05$). Spermatozoa treated with the Combination of both also presented with a decrease in viability compared to control ($p<0.05$). Additionally, there was a significant increase in the percentage of spermatozoa with nuclear DNA (nDNA) fragmentation following treatment with low nicotine ($p<0.001$) and ethanol ($p<0.001$) compared to control, and a further increase was observed in the 0.1mM Nic + 0.3% ethanol group compared to control ($p<0.0001$).

Conclusions: The result of the current study showed that the independent administration of low nicotine shows no delirious effect on microscopic sperm parameters. However, there was an increase in nDNA fragmentation of spermatozoa treated with low nicotine and ethanol, which was further exacerbated when combined. Men with these habits can have normal sperm parameters but still, suffer from idiopathic infertility.

ABSTRACT NUMBER / ABSTRAKNOMMER: 21

THORACIC FLUID CONTENT AND RESPIRATORY DISTRESS IN PRETERM INFANTS: A LONGITUDINAL BIOREACTANCE STUDY

Lizelle Van Wyk

Co-Authors: Lizelle Van Wyk (Stellenbosch University), Johan Smith (Stellenbosch university), John Lawrenson (Stellenbosch University), Willem de Boode (Radboud University)

Introduction Thoracic fluid content (TFC) is an indicator of total lung fluid measured non-invasively using thoracic impedance technology. TFC correlates with various fluid overload and ventilation efficacy parameters in adults. It has also been shown to predict respiratory distress in term neonates. No data is available for preterm infants. Method TFC was continuously measured using bioreactance in preterm infants ≤ 32 weeks gestation during the first 72 hours of life. Various ventilator and hemodynamic parameters were correlated with TFC and TFCd0 at predetermined time points. Results 37 neonates were included in the study (mean GA 29 weeks, mean birth weight 1367g). TFC decreased significantly between 3-18rs of life ($p<0.05$). TFC as well as TFCd0 was significantly affected by time, surfactant replacement and CPAP. TFCd0 was also affected by a patent PDA at 72hrs of life ($p=0.011$). Time and gestational-age related reference values were determined. A TFC of 50 k Ω -1 was determined to predict respiratory distress Conclusion This is the first study of TFC in preterm infants prior to 72hours of life. TFC was shown to be time and pulmonary disease dependent as well as affected by a PDA. TFC cut-off of 50 k Ω -1 may predict respiratory distress in preterm infants.

ABSTRACT NUMBER / ABSTRAKNOMMER: 22

EARLY COMMUNICATION INTERVENTION SERVICE DELIVERY MODELS IN LOW-MIDDLE INCOME COUNTRIES AND LOW-RESOURCE SETTINGS: A SCOPING REVIEW

Carmell Pillay

Co-Authors: Susan Van Eeden (Speech-Language and Hearing Therapy IV), Bilqees Achmat (Speech-Language and Hearing Therapy IV), Zoeshia Appenteng (Speech-Language and Hearing Therapy IV), Kirsty-Sian Mcshane (Speech-Language and Hearing Therapy IV), Ayesha Salie (Speech-Language and Hearing Therapy IV), Carmell Pillay (Speech-Language and Hearing Therapy IV)

Background: Young children in South Africa experience several risk factors for poor developmental outcomes, including communication development. The negative effect of these risk factors can be prevented or reduced through Early Intervention, including Early Communication Intervention (ECI). Knowledge is needed regarding existing ECI service delivery models in low-and middle-income countries (LMICs) and low-resource settings, such as South Africa. Objectives: To map the literature around this topic; to describe existing ECI services; and to describe the results, implications and recommendations of the literature on ECI service delivery models in LMICs and low-resource settings.

Data sources: Nine electronic databases were searched. Study eligibility criteria: Studies had to be English and accessible through Stellenbosch University Library services. Data charting and synthesis methods: Selected studies were charted, followed by a process of thematic and numeric analysis.

Results: Three main themes were identified: the use of integrated/combined EI within LMICs/low-resource settings to assist in making interventions feasible, cost- and time effective; the training of community health care workers to facilitate the delivery of ECI/EI services in these settings; and the positive impact of interventions aimed at mother-infant attachment and maternal mood on a child's overall development. Limitations: Methodological limitations included broadening search terms, non-blinded cross-checking, pearl growing process after initial data extraction process yielded limited studies and problems with accessing studies. Researcher limitations included the research group's large size and lack of research experience. Conclusions and implications of key findings: Limited research is available about ECI in LMICs and low-resource settings, therefore, a clear need for future research exists..

ABSTRACT NUMBER / ABSTRAKNOMMER: 23

PRETERM INFANT CAREGIVERS' PERSPECTIVES ON BASIC INFANT LIFE SUPPORT TRAINING BEFORE DISCHARGE: A DESCRIPTIVE CASE STUDY AT A SECONDARY HOSPITAL IN THE WESTERN CAPE, SOUTH AFRICA.

ANNE BEATRICE AFRICA

Co-Authors: ANNE BEATRICE AFRICA (STELLENBOSCH UNIVERSITY), Dr Doreen Kainyu Kaura (STELLENBOSCH UNIVERSITY)

ABSTRACTBackgroundPreterm infants receive expensive hospitalisation sometimes for two to three months. Smaller preterm infants are discharged in a clinically stable condition. However, these infants still have immature systems which put them at risk of apnoea, infections, and sudden infant death syndrome (SIDS). They are discharged to socioeconomic circumstances that pose risks of smoke inhalation and unhygienic circumstances, which could result in death within the first week after discharge. Providing preterm infants' parents with BILS knowledge and skills could empower them to save their infants' lives after discharge. The purpose of this study was to explore the perspectives of preterm infant's caregivers about the pre-discharge BILS skills training at Mowbray Maternity Hospital.MethodsThe study was conducted as a qualitative descriptive single case study with two embedded units of analysis. Multimethod data collection included Individual semi-structured in-depth interviews with four parents and four health care professionals and two focus group discussions with midwives. The participants were sampled purposively at Mowbray maternity Hospital. Qualitative data analysis was done through coding categorising and theme formation. Research FindingsThree themes emerged from the first unit of analysis were: importance of BILS training, discharge information and development factors identified. The three themes that emerged from the second embedded unit of analysis included: Rationale for BILS training before discharge, BILS training provided and supporting factors. The HCPs advocated that preterm infants' caregivers need BILS training to be empowered to

save their infants' lives after discharge. Conclusion The BILS training empowered preterm infant parents. They initially felt anxious, then felt confident, competent, reassured and provided BILS to their infants successfully after discharge. Barriers and supporting factors were identified from both units of analysis to systematically improve the BILS training programme at the hospital. Key words Preterm infants, caregivers, basic infant life support, training, pre-discharge planning

ABSTRACT NUMBER / ABSTRAKNOMMER: 24

THE EXPERIENCES OF ADOLESCENT MOTHERS PROVIDING KANGAROO MOTHER CARE.

Anneline Robertson

Co-Authors: Anneline Robertson (Stellenbosch University), Dr Talitha Crowley (Stellenbosch University)

Title: The experiences of adolescent mothers on providing kangaroo mother care. Background: Kangaroo mother care (KMC) is the practice of skin-to-skin contact between an infant and parent and was introduced as a complementary approach to neonatal intensive care for low birth weight and premature infants. The most frequently reported complication of adolescent pregnancy is preterm labour. Adolescents are thus at high risk of having to provide KMC to their infants and may have difficulty in caring for an infant. Methods: A qualitative approach with a descriptive phenomenological design was utilised. Purposive sampling was applied to select participants aged 15 -19 years from two hospitals in the Western Cape. Ten individual semi-structured interviews were conducted, transcribed and analyzed using Colaizzi's framework. Findings: Three themes emerged that formed the essential structure of this phenomenon: Becoming and being a mother; KMC: Being cared for and caring for; and Ineffectual support. The adolescent mothers narrated that they had to accept the pregnancy and later accepted motherhood after they have gained self confidence in caring for their infants. Information was provided to the adolescent mothers on how to practice KMC, but no information was provided about the benefits of KMC and the specific care of a preterm infant. Interactions with the other mothers in the ward were amicable and supportive. Care and support was provided by the doctors and nurses for the infants but was either ineffective or lacking for the adolescent mothers. Conclusion: The focus of care and support within the KMC ward should be focused on the mother-infant dyad. The adolescent mothers require continuous information and holistic support to develop their skills and confidence to provide effective care for their infants while in the KMC ward, but also for when they are discharged home. Key words: Adolescent, kangaroo mother care, preterm infant, experiences

ABSTRACT NUMBER / ABSTRAKNOMMER: 25

THE PHARMACOKINETICS OF CRUSHED LEVETIRACETAM ADMINISTERED TO NEONATES.

V. Pillay-Fuentes Lorente

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Background: First-line therapy in the management of neonatal seizures remains phenobarbital however, there remains a shortage of intravenous phenobarbital in South Africa. This has led to the addition of levetiracetam as standard of care in the management of neonatal seizures in Tygerberg Hospital. However, the intravenous formulation is not registered in South Africa and Section 21 access is limited due to high cost. Levetiracetam tablets are immediate release therefore may be suitable to crush prior to administration, but the pharmacokinetics of crushed levetiracetam administered to neonates have not been studied. This study aims to evaluate the pharmacokinetics of crushed levetiracetam administered to neonates. Methods: We conducted a prospective, observational study of neonates admitted with seizures to Tygerberg Hospital. Patients received crushed levetiracetam diluted in saline given orally or via nasogastric/orogastric tube as part of standard of care in the management of neonatal seizures. At steady state, pharmacokinetic sampling were done at pre-dose, 1.5 hours, 2.5 hours and 4 hours post-dose. Results: We enrolled 15 patients for pharmacokinetic sampling to date. We are currently performing the pharmacokinetic analysis. We will use non-compartmental analysis to calculate maximum concentration (C_{max}), time to C_{max} (T_{max}), trough concentrations (C_{min}) and area-under-the-concentration-time-curve (0-4 hours). Seizures aborted in 8/15 (53.3%) patients by

day 2, 4/15 (26.7%) by day 3 and 3/15 (20%) between day 4 and day 8 of levetiracetam administration. Conclusion: Pending pharmacokinetic analysis.

ABSTRACT NUMBER / ABSTRAKNOMMER: 26

DESCRIBING THE MANAGEMENT AND RISK OF SEIZURE RECURRENCE IN CHILDREN DIAGNOSED WITH NEUROCYSTICERCOSIS IN A TERTIARY HOSPITAL IN SOUTH AFRICA

Tina Louw

Co-Authors: Tina Louw (Stellenbosch University), Dr Andrew Redfern (Tygerberg Hospital), Prof Regan Solomons (Tygerberg Hospital)

Introduction: Neurocysticercosis is a common cause of seizures and epilepsy in children. There are limited South African data describing the management or recurrence risk of neurocysticercosis (NCC). The aim of this study is to describe the management of children diagnosed with neurocysticercosis, and to determine the risk of seizure recurrence. Methods: A retrospective folder review and a prospective telephonic survey were done on children aged 0-13 years diagnosed with NCC from 2007-2018 at Tygerberg Hospital. Results: 48 patients were diagnosed with NCC, with a median age of 22.5 months and mean age of 38.4 months (range 2 months to 12 years old). 28 (58%) were male. 44 (92%) presented with a seizure, of which 52% were focal, 40% generalized and 8% unclassified. On CT scan, 19 (40%) had a single lesion, 11 (23%) had 2-5 lesions and 18 (38%) had multiple lesions on CT. 29% were viable lesions, 15% degenerating, 44% calcified and 6% were lesions in multiple states. 56% had perilesional oedema. Oral steroids were used in 33 (69%), antiparasitic agents in 45 (94%) and anticonvulsants in 38 (79%). Anticonvulsants were prescribed for less than 1 month in 12 (32%) cases, 1-3 months in 1 (3%), 6 months to 1 year in 23 (61%) cases and for more than a year in 2 (5%) cases. 31 caregivers (65%) were interviewed via telephonic survey. 77% of patients followed up. Seizure recurrence occurred in 17 (55%) patients, with 47% occurring within one month of initial presentation. 9 (29%) patients reported more than one seizure post diagnosis. Conclusion: The majority of patients were treated with oral steroids, antiparasitic agents, and anticonvulsants, despite their potential benefit being controversial. There was a high risk of seizure recurrence, with nearly third of patients experiencing more than one recurrent seizure.

ABSTRACT NUMBER / ABSTRAKNOMMER: 27

LOST IN TRANSLATION: ASSESSMENT OF PRESCHOOL CHILDREN'S STUTTERING IN AN UNFAMILIAR LANGUAGE: A SCOPING REVIEW.

Sofia Moutzouris

Co-Authors: Frances Egan (student), Maleshoane Maleke (student), Liezl Cloete (student), Sofia Moutzouris (student)

Accurate diagnosis and early identification of young children with fluency disorders by speech-language therapists (SLTs) are crucial for early planning of intervention. One of the most prevalent barriers within our multilingual, multicultural South African society is the communication gap between SLTs and their clients. South Africa has twelve official languages, but few therapists are able to provide intervention in all our clients' home languages. This study investigated the research question: What is known from the existing literature about the assessment of stuttering of children (0-18 years) when the clinician is not proficient in the child's home language? We were particularly interested in evidence-based guidelines available to support and direct SLTs in the assessment process and therapy. A scoping review was conducted using systemized searches of several databases (EBSCOhost -PubMed, CINAHL, Africa Wide Information, Academic Search Premier - Clinical Key, SCOPUS and Web of Science). Studies were selected if they focused on the paediatric population (children 0-18 years), on stuttering assessment and diagnostic procedures and were published in English/ Afrikaans between 1970-2019. Studies were identified to reflect the specific issues around assessment of stuttering and the aspects of multilingualism where the SLT is not proficient in the child's home language. Relevant articles were

identified and charted. Specific issues with regards to the impact that severity of stuttering, language familiarity, bilingualism and inter-rater reliability has on the assessment process and differential diagnosis between mild/borderline stuttering and normal disfluencies were discussed. A significant gap in research and knowledge has been identified not only within the South African context but also worldwide.

ABSTRACT NUMBER / ABSTRAKNOMMER: 28

PALATABILITY AND ACCEPTABILITY OF ROUTINELY USED FORMULATIONS OF LEVOFLOXACIN, MOXIFLOXACIN AND LINEZOLID AMONG SOUTH AFRICAN CHILDREN TREATED FOR MULTIDRUG-RESISTANT TUBERCULOSIS

JL Winckler

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Background Medication acceptability and palatability may influence adherence and treatment success. However, there are few suitable paediatric formulations of medications for multidrug-resistant tuberculosis (MDR-TB) treatment and limited data on the acceptability of existing formulations in children. Methods We studied the acceptability and palatability of the routinely available formulations of linezolid (600 mg tablets swallowed whole or 20 mg/mL suspension), levofloxacin (250 mg tablets swallowed whole or crushed with water) and moxifloxacin (400 mg tablets swallowed whole or as extemporaneous suspension) in South African children 0-17 years of age routinely treated for MDR-TB. Acceptability was defined as the overall suitability of the formulation, including dose volume or size and palatability, the overall acceptance of taste, smell, volume or size, and texture of an oral medication. For young children unable to self-report, caregivers or study team observed children's intake and documented the amount swallowed, and the child's reaction. A visual analog scale (VAS) and facial hedonic scale was used by older children to rate taste, smell, look and texture. Results 11 observed assessments were done by study staff in young children (median age 3.7 years, IQR 1.8 to 4.3). 15 older children provide self-reported assessments (median age 12.0 years, IQR 7.8-12.9). See the table for summary of the results. Conclusions Crushed tablets of levofloxacin and moxifloxacin had poor acceptability and poor palatability, which is not ideal for use in children and could lead to poor adherence, vomiting and difficulty in administration. Although the linezolid suspension was acceptable to the majority of children, it is very expensive and not widely available. Although limited by a small sample size, this study illustrates the fundamental importance of paediatric formulations of antituberculosis drugs that are palatable and easily administered to children.

ABSTRACT NUMBER / ABSTRAKNOMMER: 29

INFANTS 21-90 DAYS PRESENTING WITH A POSSIBLE SERIOUS BACTERIAL INFECTION – ARE EVALUATION ALGORITHMS FROM HIGH INCOME COUNTRIES APPLICABLE IN THE SOUTH AFRICAN PUBLIC HEALTH SECTOR?

Juanita Lishman

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Background: Young infants with a possible serious bacterial infection (SBI) are a common presentation to paediatric emergency departments (PEDs). It is often difficult to distinguish clinically between self-limiting viral infections and a SBI. Available evaluation algorithms to assist clinicians are mostly from high income countries. Data to inform clinical practice in low and middle income countries are lacking. Objectives: To determine the period prevalence of SBI and invasive bacterial infection (IBI) and describe current practice in the assessment and management of young infants aged 21-90 days presenting with a possible SBI to a PED in Cape Town, South Africa. Methods: A retrospective cross-sectional review of infants 21-90 days old presenting to the Tygerberg Hospital PED between 1 January 2016 to 31 May 2016. Results: A total of 248 infants 21-90 days were included in the study. Sixty-two patients (25%, 95% CI 20-30) had a SBI and 13 (5.2%, 95% CI 3-8) had an IBI. One hundred and sixty five infants had a possible SBI based on IMCI criteria. The sensitivity of the IMCI criteria in

detecting SBI was 82.3% (95% CI 70.5-90.8) and the specificity 38.7% (95% CI 31.7-46.1). More than half (51.2%) of the infants received antibiotics within the 48 hours prior to presentation, of which 33.5% included intramuscular injection of Ceftriaxone. Only 20 (8.0%) patients in this age group were discharged home after initial evaluation. Of the infants who did not have a SBI, 96 (51.9%) received intravenous antibiotics. Conclusion: Period prevalence of SBI and IBI was much higher compared to that published in the literature. Evaluation algorithms to stratify risk of SBI are needed to assist clinicians in diagnosing and managing infants appropriately in low and middle income settings.

ABSTRACT NUMBER / ABSTRAKNOMMER: 30

COULD A GLUCOCORTICOID RECEPTOR POLYMORPHISM BE PROTECTIVE AGAINST HYPOTHALAMIC-PITUITARY-ADRENAL AXIS SUPPRESSION IN ASTHMATIC CHILDREN ON CORTICOSTEROIDS?

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Background: Homozygotes for the single nucleotide polymorphisms (SNPs) rs242941 and rs1876828 of the CRHR1 gene were previously associated with lower stimulated and basal cortisol levels (C) respectively in asthmatic children. Heterozygotes for rs41423247 of the glucocorticoid receptor (NR3C1) gene were found to have higher basal C levels. Objectives: To determine whether the SNPs rs242941 and rs1876828 of the CRHR1, and rs41423247 of the NR3C1 gene are associated with hypothalamic-pituitary-adrenal suppression (HPAS) in asthmatic school children on corticosteroids. Methods: DNA was extracted from saliva obtained from 96 asthmatic children, 5.2-15.6 years old, treated with inhaled and nasal corticosteroids, who had previously undergone basal C and metyrapone testing. HPAS was diagnosed if C was <83 nmol/l or the post-metyrapone ACTH (PACTH) level <106 pg/ml. Thirty-six children were classified as suppressed. Non-suppressed children were sub-classified according to their PACTH into a middle (106-319 pg/ml) and a high (>319 pg/ml) ACTH response group, comprising 29 and 31 subjects respectively. TaqMan PCR assays were utilized. ANOVA, linear, logistic and multinomial logistic regression analysis were performed. Results: Only rs41423247 was associated with HPAS ($p = 0.005$). Mean difference of PACTH of the CC compared to GG genotype was 278.5 (19.5-537) pg/ml. The difference of GC compared to GG genotype was 143.5 (11.6-275.5) pg/ml ($p=0.030$ and 0.032 respectively). The C allele of this SNP is less likely to be associated with HPAS (odds ratio [OR] = 0.38 [0.18-0.82]) and appears to be dominant (OR = 0.33 [0.13-0.83]). On linear regression, the effect was both additive ($b = 137.7$, SE = 42.7, $p = 0.002$) and dominant ($b = 162.0$, SE = 53.0, $p = 0.003$). Dominance was confirmed on logistic regression ($p = 0.032$). Conclusions: rs41423247 (CC) of the NR3C1 gene was associated with higher PACTH levels and is less likely to be associated with HPAS.

ABSTRACT NUMBER / ABSTRAKNOMMER: 31

LABORATORY MARKER PROFILE OF PATIENTS WITH JUVENILE IDIOPATHIC ARTHRITIS IN A PAEDIATRIC RHEUMATOLOGY OUTPATIENT CLINIC SERVICE AT TYGERBERG HOSPITAL.

Leigh-Ann Wood-Pottle

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Background: Juvenile idiopathic arthritis (JIA) is the most commonly occurring chronic rheumatic disease of childhood. The diagnosis is currently a clinical one with the only laboratory markers included in the International League of Associations for Rheumatology's (ILAR) classification being rheumatoid factor (RF) and HLA B27 antigen. Aim: The primary aim of the study was to examine the laboratory marker profile of patients with JIA at entry in to the clinic. The secondary aim was to describe the distribution of the 7 sub-categories. Method: A retrospective, descriptive study was done at Tygerberg Hospital. It

included all patients who met the diagnostic criteria (ILAR) for JIA seen at the paediatric rheumatology clinic between the clinic's inception in 1995 to July 2017. Exclusion criteria were age older than 16 years, HIV infection or another rheumatological condition. Results: There was a total of 165 patients, with a predominance of female gender (58.2%), however there was a higher male to female ratio for the sub-categories of Enthesitis Related (ERA), Psoriatic and unspecified JIA. Polyarticular rheumatoid factor negative JIA, at 23.6%, made up the largest sub-category, closely followed by Oligoarthritis JIA, which made up 23% and which also had the youngest median age of presentation at 5 years. Patients diagnosed with systemic JIA had significantly raised median C-reactive protein levels with 50% having both a raised CRP and Erythrocyte sedimentation rate, 21.4% had a positive ASOT, 28% raised Alanine aminotransferase, all had raised platelet counts. For patients with ERA, 53.8% tested positive for HLA-B27 antigen. Conclusion: JIA is frequently a polyarticular, rheumatoid factor negative disease in our cohort, with systemic JIA demonstrating a significant inflammatory profile. Further studies are needed to elucidate the impact of high infection burden of our population on the appropriate baselines of autoantibodies, namely rheumatoid factor, anti-nuclear antibodies and Antistreptolysin O titre.

ABSTRACT NUMBER / ABSTRAKNOMMER: 32

DELAYED REPAIR OF UNCOMPLICATED INGUINAL HERNIAS IN INFANTS IS SAFE

Stefan Botes

Introduction/Background: Incarceration with potential strangulation and bowel necrosis of infant inguinal hernias is the main indication for urgent repair. Lack of theatre time delays inguinal hernia repair, resulting in prolonged hospitalization. To offset this prolonged, often unnecessary in hospital management, infants are discharged to be operated on an elective list. The concern with delaying the repair, is the risk of incarceration. Aim(s): We report a series of patients with uncomplicated hernias who were discharged home to have their elective surgery at a later stage (mean 8.78 weeks) and assessed the safety of this approach. Methods: After ethical approval (HREC nr S16/10/218), A retrospective audit was performed of all infants with an inguinal hernia from Jan 2010 to June 2015. Incomplete records and infants operated after their first birthday were excluded. Two groups were identified; immediate surgery for infants with uncomplicated hernias, and delayed surgery for infants with uncomplicated hernias. Incarceration/strangulation rates in the interim period were documented for the delayed group, and comparison made between the groups regarding perioperative and anaesthetic complications. Length of hospital stay post-operatively was also documented. Results: The incarceration rate after being discharged home was 4.1%. There was, however, no significant difference in the peri-operative complications between the two groups, including in the incarcerated hernia group. Length of hospital stay post-operatively was similar. Conclusion/Recommendations: Delayed repair, up to 2 months later, for uncomplicated infant hernia is safe.

Theme 6 / Tema 6
Perioperative Sciences /
Perioperatiewe Wetenskappe

ORAL PRESENTATIONS/ REFERATE

ABSTRACT NUMBER / ABSTRAKNOMMER: 1

APPLICATIONS OF LOW COST 3D PRINTING IN ORTHOPAEDIC SURGERY

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Introduction: Medical 3-Dimensional Printing (3DP) or Additive Manufacturing (AM) describes a process where a physical representation of a digitally designed object is created in a layer-by-layer fashion. Medical 3DP is a rapidly developing field as decreasing costs and increased accessibility is changing the way this technology can be applied to everyday orthopaedic practice. Until recently it has been difficult to justify the acquisition of 3DP models because of high costs. Background: The current standard of pre-operative planning in orthopaedic surgery involves manipulating 2-dimensional (2D) digital images of the patient's bony anatomy and overlaying templates of the proposed implants. Because of the nature of the surgical exposures used in orthopaedic surgery, usually only a small part of the bony structure being operated on is directly visible. This produces a situation where the surgeon relies heavily on integrating the intra-operative tactile input with a mental image of 2D pre-operative planning to navigate the anatomy being operated on. Methods: Using 3D Slicer (open source software, www.slicer.org), Meshmixer (Autodesk Inc., www.meshmixer.com) and printing on a Leapfrog Bolt Pro printer, we produced several physical models from patients' computed tomography (CT) and magnetic resonance imaging (MRI) that was done for traditional pre-operative planning. Examples of how the technology was implemented included: Haptic Maps: The model is sterilized, and taken to theatre as a palpable reference of the patient's bony anatomy. Surgical rehearsal: The surgical procedure is planned and physically executed on a model, determining the levels of osteotomy and the sizes of implants to be used. Conclusion: Now that both the cost and accessibility of 3DP is no longer a barrier, we are exploring ways to implement it into everyday orthopaedic practice. Future directions include producing patient specific instrumentation and patient specific implants. *Ethics approval number: n/a*

ABSTRACT NUMBER / ABSTRAKNOMMER: 2

3D PRINTED MODELS: AN EXCITING ADDITION TO ANATOMICAL EDUCATION

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Introduction: The use of three-dimensional (3D) printers in universities is becoming a reality as printers and materials become more affordable. 3D printing has applications in anatomical education. Models can be made of complicated patient anatomy, allowing students to physically hold and understand the anatomy in a way that is not possible from two-dimensional images. Considering a global trend to digitise anatomy specimens, models can be made of specimens housed in museums from across the globe, essentially bringing these specimens to any university. Aims: to highlight the practicality of 3D printing in health sciences education by printing a model of a museum specimen. Methods: A famous museum specimen, physically housed at Harvard Medical School, was printed on a fused deposition 3D printer (Leapfrog Bolt Pro) after downloading the scan (3DPX-003118) from the National Institute of Health (NIH) 3D Print Exchange. Results: A high quality model showing the anatomical features of interest was produced. Printing time was approximately 30 hours, with material costs of R100. Students at Stellenbosch University were able to study the model of the famous specimen, of whom many may not have otherwise had this opportunity. Examining the model facilitated understanding of the medical history of this famous case. Conclusion: Using 3D printed models, normal and pathological anatomy,

as well as museum specimens, can be used as teaching tools for both undergraduate students, registrars and consultants. *Ethics approval number: X19/06/012*

ABSTRACT NUMBER / ABSTRAKNOMMER: 3

THE BONY ANATOMY OF THE RADIUS AND ULNA: A COMPUTED TOMOGRAPHY STUDY FOR IMPLANT DESIGN AND RELATED RESEARCH

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Objectives: CT scans were utilized to measure multiple anatomical dimensions of the radius and ulna in a reproducible manner. The specific objectives of the study will be to evaluate the radius and ulna, the radius curvature and the canal diameters of both bones. No current comparative studies are available in the literature. Methods: 100 CT forearm scans with unaffected radius and ulnas measuring the length, radius of curvature, canal width and head measurement in both planes. Results: The length of the radius shows a mean of 238mm. The mean curvature will be an arc with a radius of 558.27mm. The radial head diameter in two planes are 23.84 and 23.24 respectively. The canal size shows a mean of 5.48mm. Radial inclination, radial styloid length and volar tilt show a mean of 21.57°, 10.47mm and 12.8° respectively. The maximum distal radius height 20.56mm. The length of the ulna shows a mean of 259.7 mm. The ulna head diameter show means of 19.48 and 16.76 mm respectively. The canal size in the ulna shows mean of 5.28. Radial length predicts ulna length, and both radius and ulnar length predict radius curvature. Radial head diameter and ulna head diameter predicts radius/ ulna length. Radial canal maximum diameter predicts ulnar canal minimum diameter. Discussion: This anatomical measurements will aid with implant design and ranges. Radius: Implant length of 230-240 mm cover 95% of patients. Radius curvature can be set at the mean for most forearms at 558mm and this would correct the arc within 19mm for 95% of the patients. A 4 mm rod diameter nail locking block will fit into the radius. Ulna: The ulna is consistently 20 mm longer than the radius which has prosthesis design implications. The ulna will accommodate a 6mm reamer and a nail of diameter of 4 mm. *Ethics approval number: N17/10/097*

ABSTRACT NUMBER / ABSTRAKNOMMER: 4

THE EFFECT OF AN INFORMATION SESSION ON IONIZING RADIATION EXPOSURE IN ORTHOPAEDIC SURGEONS

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Background: The health risks of ionizing radiation exposure for orthopaedic surgeons are considerable due to the routine of working with medical imaging devices. Although all surgical staff are required by law to wear thermoluminescent dosimeter (TLD) devices for health monitoring and personal protective equipment being available in surgical theaters, information about the dangers of radiation exposure, how to wear protective gear and the TLD are not provided on a formal, regular basis. Therefore, the aim of this study was to determine the effect of an ionizing radiation information session on ionizing radiation exposure in orthopaedic staff. Study design: A non-randomized controlled intervention study where deep- and skin ionizing radiation levels of 15 orthopaedic surgeons was collected over 12 months before, and 4 months after an radiation information session, was performed. Results: No significant changes were observed in deep and skin radiation levels before and after the information session ($p>0.05$), yet clinically relevant improvements were observed after the intervention. Deep radiation levels before the information session were detectable in 3 units (arthroplasty, paediatrics and trauma),

with ionizing radiation levels becoming undetectable in all surgical units after the intervention. Similarly, skin radiation levels were detectable in 4 orthopaedic units (arthroplasty, paediatrics, spine and trauma) before compared to detectable radiation levels in only one unit (sport) following the intervention. Additionally, the radiation level in this unit was related to a single orthopaedic surgeon, with an radiation level of 0.19mSv during the course of one month -still well below the maximum monthly 1.67mSv that is allowed. Conclusion: Although observed ionizing radiation levels before and after the information session were well below the recommend exposure and did not change after the information session, clinically relevant reductions in radiation exposure were observed, which highlights the importance of regular information session of radiation safety in surgical staff. *Ethics approval number: S16/03/056*

ABSTRACT NUMBER / ABSTRAKNOMMER: 5

THE EFFECT OF AN INFORMATION SESSION ON IONIZING RADIATION EXPOSURE IN ORTHOPAEDIC SURGEONS

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Background: Violence and injuries are a significant global public health concern, and have a substantial emotional, physical, and economic impact on society. No more so than in South African and specifically the Western Cape. Western Cape Injury Mortality Profile shows that homicide increased from 38 deaths per 100 000 in 2010 to 52 deaths per 100 000 in 2016. The increased homicide rate was due to an increase in firearm-related homicides, which doubled between 2010 and 2016. A 2012 study estimated the average cost per gunshot wound (GSW) related orthopaedic patient at USD 2 940, >3 hours of theatre time per operation, and necessitated a hospital bed for an average period of 9.75 days. Total GSW related patient numbers as well as treatment costs have escalated exponentially over the last few years. We aim to calculate the average cost of treating orthopaedic gunshot victims in a tertiary level hospital setting. Methods: After ethics approval, a retrospective review of all GSW patients seen in the emergency unit over a 12-month period (2017) at a tertiary level hospital was undertaken. Patient record review yielded data that allowed analysis of cost, number and type of implants, theatre time, duration of admission, diagnostic imaging performed, laboratory studies ordered and medications and blood products administered. Results: A total of 400 (370 males and 30 females) patients, average age of 42 years were treated for orthopaedic gunshot injuries in the study period. 182 patients required surgical fixation (203 procedures), including 75 nails, 68 Plates 16 circular external fixators. Final costs will be calculated using a bottom up technique. Conclusion: This study will provide an up to date analysis of the costs involved in managing these patients. It will add to understanding the current epidemic of orthopaedic firearm injuries in South Africa. Improved understanding of the costs incurred will help the state healthcare system better prioritise orthopaedic trauma funding and training, while also supporting cost-saving measures, including primary prevention initiatives.

ABSTRACT NUMBER / ABSTRAKNOMMER: 6

PERIOPERATIVE CARE OF ELECTIVE PATIENTS WITH MORBIDLY ADHERENT PLACENTA—FOUR CASE REPORTS AND A REVIEW OF THE LITERATURE

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Morbidly adherent placenta is a leading cause of massive hemorrhage at cesarean delivery. The incidence is increasing with the increase in cesarean deliveries. Varying degrees of placental invasion exist, greater invasion being associated with greater morbidity and mortality. Mortality is mostly due to massive (up to tenfold greater than usual) blood loss at cesarean section. The need for peripartum hysterectomy complicates surgery, aggravates hemorrhage and contributes to maternal death. Our tertiary hospital has managed 37 patients with morbidly adherent placenta over the last 48 months, with four representative cases being described. This article aims to improve understanding and make recommendations for the anesthetic management of these cases.

ABSTRACT NUMBER / ABSTRAKNOMMER: 7

EVALUATING THE DIFFERENCES IN THE EARLY LAPAROSCOPIC DONOR NEPHRECTOMY LEARNING CURVES OF A SWISS HIGH VOLUME TRANSPLANT PROGRAM AND A SOUTH AFRICAN LOW VOLUME TRANSPLANT PROGRAM AFTER KNOWLEDGE TRANSFER

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Purpose: To describe the retroperitoneoscopic donor nephrectomy learning curve differences between a high volume (training) hospital in Basel, Switzerland and a low volume (trainee) hospital in Cape Town, South Africa, after knowledge transfer. Materials and Methods: Techniques for performing the surgery were near identical. Databases were prospectively maintained in both units. Comparisons were made of the first 74 cases in each database. Variables compared include operating time, warm ischemic time, blood loss, graft function, and hospital stay. The first and last 25 cases of each series were analyzed. Subgroup analysis of a single Basel surgeon was conducted. Results: Donor age and gender differed widely. More left-sided operations were done in Basel (72% vs. 58%). Operative times, blood loss and donor creatinine did not differ. Warm ischemic time was significantly shorter in the Basel group. There was double the number of graft failures in the South African group (six vs. three). Both groups showed a decline in operating times, plateauing at 30 – 34 cases. Conclusions: There are statistically significant differences in the aspects of the learning curves of the Swiss (training) and South African (trainee) hospitals. These differences are clinically not pronounced and the knowledge transfer was worth the effort. *Ethics approval number: S14/02/047*

ABSTRACT NUMBER / ABSTRAKNOMMER: 8

TREATMENT AND OUTCOMES OF PAEDIATRIC PATIENTS WITH AGGRESSIVE FIBROMATOSIS OF THE MANDIBLE

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Introduction Aggressive or desmoid fibromatosis is a very rare, benign but locally aggressive monoclonal fibroblastic proliferation. Though unable to metastasize, these tumours show an infiltrative and extremely rapid growth pattern with a tendency for local recurrence. Treatment modalities include

surgery, radiotherapy and chemotherapy with a multidisciplinary team approach and must be individualized for each patient. Material and methods: Between 2010 and 2019 we treated 4 children (3 girls and 1 boy) between the ages of 2 to 6 years with desmoid fibromatosis of the mandible. In all cases the body of mandible was involved requiring hemi-mandibulectomy and reconstruction with a free fibula flap. In 3 children a skin island was used to reconstruct a skin or mucosal defect. Once a double barrel fibula flap without a skin island was utilized. Results: The follow up ranged from 1 to 105 months. No recurrence was detected. All children showed a very good cosmetic and functional result. Minor complications include a marginal mandibular branch palsy in two patients, one small area of submental full thickness local skin necrosis and one superficial ear skin necrosis due to a pressure injury in the post-operative ICU period. No donor site morbidity was observed. Conclusions: Wide local resection including the involved mandible is a potentially mutilating procedure for a tumour which does not metastasize. The aggressive nature and fast growth of the tumour is often not sensitive for chemotherapy though and therefore requires surgical intervention. A free fibula flap is an excellent reconstructive option in these children. *Ethics approval number: 9885*

ABSTRACT NUMBER / ABSTRAKNOMMER: 9

THE EFFECT OF PERI-OPERATIVE FLUID THERAPY ON HAEMATOCRIT IN SPINAL FUSION SURGERY

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Background: It is hypothesized that many patients undergoing first time single level lumbar spinal fusion surgery in our unit experience a haemodilutional effect from excessive intra- and post-operative fluid therapy resulting in falsely depressed levels of both haemoglobin and haematocrit and the erroneous interpretation thereof. This is of concern as post-operative anaemia, though an accepted potential complication in spinal surgery, is associated with many unwanted consequences. Anaemia has been identified as a significant risk factor in the patient undergoing surgery and has showed increased post-operative infection rates and ultimately higher mortality in this group. This is of concern as post-operative anaemia, though an accepted potential complication in spinal surgery, is associated with many unwanted consequences. Anaemia has further been demonstrated to result in a prolonged duration of admission for these patients. Avoiding prolonged hospital stays, though arguably the least threatening complication, remains of the utmost importance in our resource constraint setting. The aim is to evaluate a sample of patients undergoing first time lumbar fusion surgery in our unit to assess their pre- and post-operative haematocrit values and to provide an observation on the most relevant factors resulting in haematological variance. Methods: A retrospective analysis is to be conducted on patients giving knowing consent and undergoing first time single level lumbar fusion surgery at Tygerberg Hospital. BMI, whether hypertensive or not, pre-operative haematocrit, haematocrit values for 11 time periods hereafter, peri-operative blood loss, drain loss, urine output and intravenous fluids received. All data will be statistically analysed. Results: Patients received an average of 42% of their unique blood volume as intra-operative maintenance fluid encompassing a wide range from 19% to 71%. Pre- and post-operative haematocrits differed by a statistically significant 2.55% ($P < 0.001$). *Ethics approval number: M15/09/039*

ABSTRACT NUMBER / ABSTRAKNOMMER: 10

PREVALENCE OF A PERI-OPERATIVE TROPONIN LEAK IN PATIENTS UNDERGOING HIP ARTHROPLASTY FOR A NECK OF FEMUR (NOF) FRACTURE IN A SOUTH AFRICAN POPULATION

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Background: Patients undergoing arthroplasty are mostly older with various co-morbidities. The additional physiologic stress associated with a NOF fracture increases their risk for myocardial injury after noncardiac surgery (MINS). MINS, detected using troponin testing, is underdiagnosed in arthroplasty patients and the South African population. Previous research reported a 42% post-operative troponin leak prevalence among different types of hip and knee arthroplasty. Of these, patients with NOF fractures had the highest prevalence (67%). The aim of this study was to compare the peri-operative prevalence of a troponin leak in patients with a NOF fracture. **Methods:** A prospective, longitudinal study of patients undergoing arthroplasty for a NOF treated at Tygerberg Hospital was conducted from April 2018 – July 2018. Troponin levels were recorded on admission and on day one and three post-surgery using a highly sensitive cardiac troponin T assay (hs-cTnT). A level of >15ng/L was considered abnormal and termed positive troponin leak whilst >100ng/l is suspected in acute coronary syndrome (ACS). **Results:** Thirty-nine patients (n=39) were included. Twenty-three (n=23) patients (59%) recorded a positive peri-operative troponin leak of which twenty (n=20) patients (87%) had a positive leak on admission. Two (n=2) patients (5%) had a suspected ACS. **Conclusion:** Patients with NOF fractures are at risk for MINS with a high one-year mortality rate. Previous work from our unit reported a high post-operative troponin leak prevalence among NOF patients whilst in the current study we report most patients (87%) had raised levels on admission already and potentially at greater risk for cardiac events prior to surgery. The additional stress associated with a NOF fracture is an important risk factor. Troponin surveillance is an inexpensive and essential measure to diagnose MINS. Early detection before surgery allows for improved patient optimisation. We recommend routine peri-operative testing for all NOF fracture patients in South Africa. *Ethics approval number: S17/02/042*

ABSTRACT NUMBER / ABSTRAKNOMMER: 11

DYNAMIC RISK STRATIFICATION AND AUDIT OF PATIENTS WITH PAPILLARY THYROID CARCINOMA SEEN AT TYGERBERG ACADEMIC HOSPITAL

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Introduction: Thyroid carcinoma is reportedly the most common endocrine malignancy, with the most prevalent sub-type being papillary thyroid carcinoma (PTC)¹. Tygerberg Academic Hospital (TBAH) provides management to patients presenting with PTC in the Western Cape Province of South Africa. There is, however, a lack of evidence-based guidelines to the approach of follow-up management of PTC at TBAH. Local studies are required as a foundation to formulate risk-stratified follow-up of those patients with PTC that present to TBAH. **Aim and Methods:** The aim of the study was to risk stratify patients with PTC according to the American Thyroid Association (ATA) and the British Thyroid Association (BTA) guidelines. The study was a retrospective audit of patient case records. The variables specified in the ATA and BTA guidelines provided the variables of interest for the collection of data. **Results:** The study includes 29 patients with a mean age of 50 years and a 1:4 male to female ratio. According to the ATA risk stratification guidelines, 20.7%, 37.9%, and 41.4% of patients were categorised into low, intermediate, and high risk groups, respectively. There was insufficient data to risk stratify according to BTA guidelines for risk stratification of PTC. The mean tumor size of the sample population at diagnosis was 3.95 cm and radioactive iodine scan uptake (in local and distant metastases) in 81.3% of patients. In addition, there was a 62.5% prevalence of local metastases in contrast to a 29.2% prevalence of distant metastases as shown on radiological studies. The vast majority of patients with PTC (94.1%) required adjuvant therapy. **Conclusion:** According to the ATA guidelines, the majority of patients with PTC were categorized as being at high risk for recurrence, justifying the high utilization of adjuvant therapy in this sample. The statistical risk stratification

currently attained from this study for TBAH should be used for improvement of future follow-up management.

ABSTRACT NUMBER / ABSTRAKNOMMER: 12

CONSERVATIVE MANAGEMENT OF UNCOMPLICATED APPENDICITIS IN A RESOURCE-CONSTRAINED ENVIRONMENT: FEASIBLE PRACTICE?

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Introduction: Acute appendicitis is one of the most common causes of the acute abdomen and emergency abdominal surgery. Fear of perforation, coupled with the introduction of laparoscopic surgery, has led to a low threshold for operative intervention. This has contributed to a high negative appendectomy rate, high surgery-related morbidity and increased cost of care. In a resource-constrained environment, negative appendectomy incurs significant losses from relative loss in theatre time, cost of procedure, management of possible complications, and hospital bed occupancy. There is evidence, mostly from the advanced economies, to suggest that uncomplicated appendicitis (UA) can be effectively and safely treated with antibiotics to reduce overall costs of treatment and economic losses. However, there is very little evidence that similar management guidelines can be instituted in an emerging economy where resources are scarce. Aim(s): To assess the outcomes of antibiotic treatment as an option for UA, compared with appendectomy, in a resource-constrained setting. Methods: This was a retrospective study conducted at a single tertiary care center. Results: 118 patients presented with UA. Eighty patients (67.8%) underwent surgery (SG), while the remaining 38 patients (32.2%) were managed with antibiotic alone (AG). Length of hospital stay was significantly longer in the SG patients. At 6 weeks, the recurrence rate of acute appendicitis in the AG patients was 5.3% (2 patients). These were successfully treated with appendectomy. Recurrence in AG patients was not evident at 1 year. Overall, significantly higher costs were associated with SG. Conclusion/Recommendations: Even though preliminary evidence seems to be in favour of medical management of UA, further studies need to be conducted to aid in the formulation of appropriate guidelines in our setting. *Ethics approval number: IRB0005239*

ABSTRACT NUMBER / ABSTRAKNOMMER: 13

THE EFFECT OF BMI ON OPIOID EFFICACY IN THE IMMEDIATE POST-OPERATIVE PERIOD FOR SPINAL SURGERY

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Introduction: Opioids are often prescribed after single level spinal fusion surgery. Morphine's target receptor, the μ -receptor is found in peri-aqueductal grey matter as well as pre- and postsynaptic sites in the dorsal horn of the spinal cord. Morphine's hydrophilic nature makes it difficult to cross the blood brain barrier and can accumulate in adipose tissue. Morphine's efficacy and toxicity has been shown to have great individual variation. To reach adequate morphine analgesia in obese patients is often difficult as morphine is less effective in obese patients. The authors propose that intravenous morphine is less effective in obese patients (BMI > 30) due to challenges reaching the target receptors than compared to intrathecal and BMI < 30. Methods: Prospective double-blind randomized control study comparing a weight-dependent intrathecal morphine dose to morphine Patient-Controlled-Analgesia (PCA). VAS scores (lying still and moving) across the groups are compared including BMI as variable over 48 hours and statistically analysed. Results: VAS lying still and moving had no statistical difference between the groups. VAS difference was larger at 24 hours in the PCA group ($p=0.057$)(mean 2.6 vs 1.6). When BMI < 30 was removed, the difference was significantly higher ($p=0.03$)(mean 2.78 vs 1.36). No

adverse effects were noted in either group. Discussion: Morphine's largely hydrophilic nature makes it difficult to cross the blood brain barrier. In the presence of obesity, factors such as volume of distribution, liver metabolism, increased extracellular water and cardiac output, makes it even harder for morphine and its metabolites to reach target receptors. Intrathecal morphine is delivered in the correct space and accurate dosages is easier to determine. Conclusion: For morphine based post-operative analgesia, intrathecal morphine is more effective than PCA morphine in obese patients at 24 hours. *Ethics approval number: M15/03/039*

ABSTRACT NUMBER / ABSTRAKNOMMER: 14

BIOACTIVE GLASS AS DEAD-SPACE MANAGEMENT FOLLOWING DEBRIDEMENT OF TYPE 3 CHRONIC OSTEOMYELITIS

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Background: Chronic osteomyelitis is a challenging condition to treat and although no exact treatment guidelines exist, the surgical management strategy includes wide resection of necrotic and infected bone followed by dead space management. This study evaluates the use of bioactive glass as a single stage procedure for dead space management following surgical debridement. Methods: A consecutive series of 24 patients with Cierny Mader type 3 osteomyelitis, treated between March 2016 and June 2018, were identified and evaluated retrospectively. Patients were managed with bioactive glass as dead space management following surgical debridement. Results: Of the patients who completed more than 12 months follow-up, all fourteen (100%) showed complete resolution of symptoms. Of the remaining ten patients with less than 12 months follow-up, eight had complete resolution of symptoms resulting in a preliminary result of 22 out of 24 (91.65) having resolution of symptoms following debridement and dead space management with bioactive glass. One patient experienced a complication related to the use of bioactive glass. This manifested as prolonged serous wound drainage that resolved with local wound care. Conclusion: The use of bioactive glass appears to be effective for dead space management following debridement of anatomical type 3 chronic osteomyelitis of the appendicular skeleton. *Ethics approval number: N18/08/082*

ABSTRACT NUMBER / ABSTRAKNOMMER: 15

INDOCYANINE GREEN HIGHLIGHTING THE PATH TO A DRY INGUINAL LYMPH NODE BED

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Introduction and Objective: Ongoing lymphatic leaks after radical inguinal lymph node dissection (LND) are a challenge to manage. We were presented with a patient who was cured of his penile cancer after a radical penectomy and bilateral radical LND. The patient underwent 13 aspirations over a period of 6 months. Indocyanine green (ICG) lymphangiography has become increasingly useful in the management of similar cases elsewhere. We document our experience with this novel tool. Materials and Methods: A combined Urology and Plastic Surgery team managed this patient. An incision was made directly over the lymphocoele on the upper medial left thigh. The lymphocoele was excised. We then injected ICG in 3 areas distal to the incision site. The thigh was massaged to expedite lymphatic flow proximally. The area was monitored using the Novadaq/Stryker Endoscopy Unit in a darkened field in order to visualise the lymphatic flow. Once lymph entered the wound, it was possible to identify open

lymphatic channels. These were isolated and clipped using ligaclips. The thigh was massaged after clipping of the vessels. No further lymph leak was noted. A Blake drain was inserted, which remained in-situ for 5 days. A compression bandage using a standard Cling bandage was placed on the left thigh overnight. Standard anticoagulation was used post-operatively. The patient was mobilised on day 1 post-surgery. **Results:** No lymph leak was observed intra-operatively. Post-operatively there has been no further lymph leak after clipping of the vessels. The patient is free of drains and will be followed up as per protocol for his penile carcinoma. **Conclusion:** Indocyanine green lymphangiography is a useful adjunct in the surgical armamentarium when treating patients with ongoing lymphatic leaks after radical inguinal lymph node dissection. The potential for using it intra-operatively to ensure adequate tying off of lymphatic vessels exists. *Ethics approval number: C19/06/021*

ABSTRACT NUMBER / ABSTRAKNOMMER: 16

ENDOSCOPIC ASSISTED EXTRADURAL HAEMATOMA EVACUATION - A CADAVERIC STUDY

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Introduction: Surgical management of extradural hematomas is most commonly performed utilising an open craniotomy technique. We investigate the feasibility of a previously published approach by utilizing an endoscopic technique to evacuate acute extradural hematomas in the laboratory setting. [1] **Methods:** Human blood was drawn from donors and mixed with contrast. Three cadaver heads were used. A craniotomy was done for each and a blood clot of 35ml was introduced into the extradural space which was created by applying pressure on the brain. The cranial flap was then replaced and skin approximated. An O arm was used for imaging. A 4cm incision was then made at the centre of the clot and a disc craniotomy performed. A regular suction, 0 degree and 30 degree endoscope where used to evacuate the clot. Regular bipolar was introduced to cauterise the vessels. Size 11 craniofix was used to replace the bone flap. Vicryl 1 was used for galea and skin clips for skin. An O arm was used to measure total evacuation. **Results:** More than eighty percent reduction in clot was achieved in all. The operation was doable but is technically more challenging than the open procedure. Experience with endoscopy is beneficial in making the operation easier. Cutting time for clot evacuation was 45 minutes on average. **Conclusion:** Our pilot study demonstrates that endoscopic evacuation of acute extradural hematoma in a laboratory setting appears a viable option. In the live patient, advantages may include improved cosmetic result, less wound pain, smaller incisions, lower bone flap sepsis rates, shorter hospital length of stay. A learning curve is expected especially when surgeons are not familiar with the endoscope. *Ethics approval number: 7665*

ABSTRACT NUMBER / ABSTRAKNOMMER: 17

3D-GAIT ANALYSIS IN ADULTS WITH CEREBRAL PALSY; A 6-YEARS FOLLOW-UP STUDY POST ORTHOPAEDIC INTERVENTIONS

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Background: Walking deterioration has been frequently reported by adults with cerebral palsy (CP) during ageing. To improve and/or maintain gait function, orthopaedic interventions are commonly performed during childhood. However, no studies objectively quantified whether gait function changes during ageing in individuals with CP who underwent orthopaedic interventions during childhood, by using 3D-gait analysis. Objective: To investigate changes in gait kinematics over a 6-years follow-up

period in adults with CP, who underwent orthopaedic interventions during childhood. Methods: 3D-gait analysis was performed in 29 adults with CP at baseline (2011) and at 6-year follow-up (2017) (mean age (SD)=39.1 (7.8) years; 17 females; GMFCS I/II/III: n=12/12/5). Joint angles in sagittal plane and temporal gait parameters (walking speed, stride length, cadence) were calculated. Changes in gait kinematics over the gait cycle were tested with paired samples t-tests using statistical parametric mapping (SPM) and changes in temporal parameters were investigated using paired samples t-test. Results: Adults with CP reduced walking speed (baseline: 0.89m/s; 6-year follow-up: 0.74m/s; $p=0.006$). SPM showed more anterior pelvic tilt in early stance ($p=0.047$), less hip extension during early swing ($p=0.016$), more knee extension during the early stance ($p=0.009$) and late swing ($p=0.027$) and more ankle planter flexion throughout the gait cycle ($p=0.004$). Discussion: No uniform deterioration of gait was observed over a 6-year period in adults with CP who underwent orthopaedic interventions during childhood. Although knee flexion and ankle plantar flexion improved with time, walking speed, pelvic tilt and hip extension deteriorated. These changes in gait pattern could be related to a decrease in abdominal core stability, which is frequently reported during ageing. These findings highlight the importance to prevent deterioration of gait in adults with CP and to maintain and/or improve physical status to promote healthy ageing. In addition, it supports the need for objective longitudinal studies. *Ethics approval number: 013-2017*

ABSTRACT NUMBER / ABSTRAKNOMMER: 18

ENHANCED RECOVERY AFTER SURGERY VERSUS CONVENTIONAL CARE FOR ELECTIVE COLORECTAL SURGERY AT TYGERBERG HOSPITAL

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Background: Colorectal surgery is associated with prolonged hospital stay and complication rates of 15 to 20%. Enhanced recovery after surgery (ERAS) is an established multidisciplinary approach aimed at optimising post-operative patient recovery. Despite the published data about the efficacy of ERAS programmes, few such programmes have been implemented in Africa. This study aimed to retrospectively compare outcomes of ERAS and conventional care in patients who underwent elective colorectal surgery at Tygerberg Hospital (TBH). Methods: The records of adult patients who underwent elective colorectal surgery from January 2016 to July 2019 at TBH, who received either ERAS or conventional care protocols, were reviewed. This study was approved by the Health Research Ethics Committee of Stellenbosch University. Results: In total, 50 patients with a mean age of 57.9 years (SD=11.54, range: 36-80 years) were included and followed either conventional care (n=25) or ERAS care (n=25) protocols. The 2 groups did not differ in terms of age ($p>0.05$) or gender ($p>0.05$). Indication for surgery (i.e. low rectal cancer or mid rectal cancer) was comparable across the groups ($p>0.05$). Significantly more patients in the conventional group had open surgery [19/25 (76%) vs. 3/25 (12%)] and more in the ERAS group had laparoscopic surgery [22/25 (88%) vs. 6/25 (24%)]. Compared with conventional care, patients in the ERAS group demonstrated a significantly shorter length of hospital stay and significantly less time to mobilize. No differences were evident between the groups in terms of time to enteric feeds or time to pass stool/flatus ($p>0.05$). Post-surgical complications (i.e. whether they occurred or not) were comparable across the groups ($p>0.05$), as were re-admission surgical complications ($p>0.05$). Conclusion: Application of enhanced recovery protocols is associated with reduced length of hospital stay and time it takes to mobilise post-surgery without increasing the risk of morbidity and mortality. *Ethics approval number: S18/09/192*

ABSTRACT NUMBER / ABSTRAKNOMMER: 19

CAREGIVER ANXIETY AND THE ASSOCIATION WITH ACUTE POST-OPERATIVE PAIN IN CHILDREN UNDERGOING ELECTIVE AMBULATORY SURGERY AT TYGERBERG AND KARL BREMER HOSPITAL

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Background and aims: The successful management of children's postoperative pain requires a biopsychosocial approach. The purpose of this cross-sectional study was to examine caregiver's pre-operative anxiety and children's post-operative pain and to test for an association between these variables in a South African setting. **Methods:** Included in the study were 76 children aged 4 to 12 years undergoing elective ambulatory tonsillectomy or adenotonsillectomy and the primary caregiver accompanying them. Caregivers completed measures of anxiety before surgery. Children's post-operative pain was measured 4 hours after surgery. **Results:** Nearly a third of caregivers were anxious before their children underwent surgery. 51% of children had moderate post-operative pain. Spearman's rank correlation and quantile regression showed that caregiver anxiety was associated with post-operative pain ($p < 0.0001$). This is a correlation of moderate strength. **Conclusions:** These findings suggest that presurgical assessment of caregiver anxiety predicts greater pain intensity in children undergoing elective, ambulatory surgery. Preoperative assessment of caregiver anxiety will help identify children at an elevated risk for severe postoperative pain. *Ethics approval number: S18/01/002*

ABSTRACT NUMBER / ABSTRAKNOMMER: 20

PREDICTORS OF POST PARATHYROIDECTOMY HYPOCALCEMIA IN THE TREATMENT OF PRIMARY HYPERPARATHYROIDISM AT TYGERBERG HOSPITAL

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Introduction: Primary hyperparathyroidism (PH) is defined as autonomous parathyroid hormone (PTH) production, characterised by elevations in serum calcium (Ca) and PTH levels. Hypocalcemia is a complication of parathyroidectomy and seen in 15-30% of cases. **Aims:** To identify pre-operative predictors of hypocalcemia in our population, with the aim to revise the post-parathyroidectomy protocol at Tygerberg Hospital (TBH). **Methods:** Retrospective review of all patients that underwent parathyroidectomy for PH at TBH between Jan 2010 and Mar 2019. Approval was granted by the Health Research Ethics Committee of Stellenbosch University. Due to the short retrospective study period, only data from 137 patients was available for review. Of these, 87 (64%) underwent parathyroidectomy for PH, whilst incomplete, post-operative Ca levels were available for 80 patients. Patients were divided into 2 groups based on post-operative Ca levels (Group 1: >1.99 (n=69); Group 2: <1.99 (n=11). Baseline characteristics were compared. **Results:** Variables compared in Group 1 and 2: Age (mean, SD) 58.01 (16.27) vs 59.36 (8.63), Gender: female (n, %) 54 (78.3) vs 9 (81.84), Pre-op Alkaline phosphatase (ALP) (mean, SD) 114.74 (42.92) vs 311 (347.12), Pre-op PTH (median, IQR) 18.70 (14.45-31.5) vs 33.60 (15.80-112.50), Pre-op Vitamin D (mean, SD) 38.20 (16.80) vs 33.69 (13.27), Pre-op Phosphate (mean, SD) 0.85 (0.23) vs 0.86 (0.26), Pre-op Ca (median, IQR) 2.92 (2.80-3.06) vs 2.97 (2.89-3.28), Symptomatic hypocalcemia: yes (n, %) 42 (38.2%) vs 6 (54.5%), Gland weight in grams (M, SD) 2.45 (3.38) vs 3.73 (3.49), Dexa T-score (M, SD) 1.56 (1.34) vs 2.07 (1.98). **Conclusion:** Patients in Group 2 demonstrated higher pre-operative ALP, PTH and Ca levels. Despite no significant differences seen between the 2 groups, certain pre-operative trends were noted. Due to incomplete data, we recommend that a prospective study be conducted. *Ethics approval number: S18/08/161*

ABSTRACT NUMBER / ABSTRAKNOMMER: 21

WHAT THEY SAY VS. WHAT THEY DO: ASSESSING PHYSICAL RECOVERY AFTER TOTAL KNEE ARTHROPLASTY COMPARING WEARABLE MOTION SENSORS AND SELF-REPORTED PROMS

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Following primary total knee arthroplasty (TKA), patients experience pain relief and report improved physical function and activity. However, there is paucity of evidence that patients are truly more active following TKA. The primary aim of this study was to prospectively measure physical activity with a wearable motion sensor before and after TKA and compare the data to patient-reported levels of physical activity before and after TKA, gathered using previously validated PROMS. Methods: 22 patients undergoing primary TKA were measured preoperatively and 1-3 years postoperatively. Patient-reported outcome measures (PROMs) included KOOS-PS and SQUASH. Physical activity was assessed during 4 consecutive days wearing an accelerometer-based activity monitor (AM) at the thigh. Data was analysed using algorithms in Matlab. AM-derived parameters included walking time (s), sitting time (s), standing time (s), sit-to-stand transfers, step count, walking bouts and walking cadence. Objective physical function was assessed by motion analysis of gait, sit-to-stand (STS) transfers and block step-up (BS) transfers using a single inertial measurement unit (IMU) worn at the pelvis. Results: PROMs demonstrated significant improvement of perceived physical function (KOOS-PS=68±21 vs. 34±26; p<0.001) and physical activity (SQUASH=2584 ±1945 vs. 3038 ±2228; p<0.001) following TKA. AM-based parameters of physical activity demonstrated no significant differences between pre- and postoperative quantitative outcomes. Only walking cadence improved (81.41 ±10.86 (steps/min) vs. 94.24 ±7.20 resp.; p<0.001). There was moderate correlations between self-reported levels of physical activity and objectively assessed levels of after TKA (Pearson's r=0.36-0.43; p<0.05). Outcomes of physical activity after TKA were moderately correlated to IMU-based outcome measures of gait, STS-transfers and BS-transfers (Pearson's r = 0.31 - 0.48; p<0.05). Conclusion: Post TKA, patient reported and objective physical performance tests show improved function. However, the self-perceived higher activity level is not supported by objective measure. This may have implications for general health, rehabilitation and patient communication and expectations. *Ethics approval number: 10-N-72*

ABSTRACT NUMBER / ABSTRAKNOMMER: 22

SHIFTING THE PARADIGM IN ADRENAL SURGERY: A CASE SERIES OF POSTERIOR RETROPERITONEOSCOPIC ADRENALECTOMIES AT TYGERBERG HOSPITAL

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Introduction: Globally, laparoscopic adrenalectomy (LA) is considered the gold standard for the removal of benign adrenal tumours and has expanded further with the introduction of the posterior retroperitoneoscopic adrenalectomy (PRA) technique. The posterior technique has been regarded a paradigm shift in adrenal surgery considering the prospect of direct access to the gland. Direct access has been linked to favourable outcomes and improved risk-benefit ratios internationally. Local evidence

has not been documented, likely due to infrequent utilization of the PRA technique in South African surgical centres. This study aims to present the outcome of the first 14 PRA cases performed at Tygerberg Academic Hospital (TBH). **Methods:** The records of patients who underwent a PRA procedure from Sep 2016 to Feb 2019 were reviewed. Participants were eligible to undergo PRA if tumors were less than 7-8 cm in diameter, adrenocortical cancer was excluded on radiological and clinical grounds, and body mass index (BMI) was acceptable (i.e. <45kg/m²). **Results:** 14 PRA's were performed over the 2,5 years and four were incidentalomas by definition. Of the adenomas removed by PRA, the median tumor diameter was 15 mm (7-55mm). Most adrenal adenomas (n=8; 57%) were located on the right. Over two-thirds were hormonally active lesions (n=10; 71%) and four (29%) were non-functional (3 adrenocortical adenomas, 1 cyst). The functional lesions comprised equal numbers of cortisol producing adenomas (n=4; 29%) and aldosterone producing adenomas (n=4;29%) and two pheochromocytoma's. No major adverse events occurred. Average duration of surgery was 95 minutes (SD 45.2) with no conversion to an open procedure required. Post-operative pneumaturia with urinary retention (n=1) and a minor intra-operative bleed (n=1) were the only reported complications. **Conclusion:** PRA is a feasible alternative to the LA approach in patients with clinically benign functional and non-functional adrenal tumours <7cm. Minor challenges were easily overcome in this series. *Ethics approval number: N18/10/115*

POSTERS / PLAKKATE

ABSTRACT NUMBER / ABSTRAKNOMMER: 23

OUTCOMES OF COMPLICATED APPENDICITIS IN A RESOURCE LIMITED SETTING: IS CONSERVATIVE MANAGEMENT A BETTER OPTION?

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Introduction/Background: Recent data and studies seem to be favouring the conservative management of complicated appendicitis. The World Society of Emergency Surgery (WSES) Jerusalem guidelines on the management of complicated appendicitis (CA) recognizes that appendicectomy is a safe treatment option if performed by an experienced surgeon, but ultimately supports the use of conservative management. That said, the management of patients with CA remains controversial, with very little available data, particularly in terms of resource constrained health systems. **Aim(s):** This study aimed to compare the efficacy of treatment, length of hospital stay (LOS) and overall cost of treatment of patients with CA who either underwent surgery or were managed conservatively. **Methods:** This was a retrospective study conducted at a single tertiary care center. **Results:** 141 patients presented with CA during the study period. Ninety-two patients (65.2%) underwent surgery (SG) and the remaining 49 (34.8%) were managed non-operatively (CG). SG patients demonstrated a significantly longer hospital stay than CG patients. Complications during admission (number) were evident in only the SG patients. 23 patients had complications on initial admission and were in SG. Despite there being no significant difference in complication rate at 1-year follow up, SG had a 27.2% readmission rate compared with a 20.4% rate in CG. Significantly higher costs were associated with SG. **Conclusion/Recommendations:** CA is a common presentation in the state health system. Our findings, in terms of length of stay, complications and overall cost of treatment, provide some evidence that conservative management of CA can be considered as appropriate in an emerging economy. Further studies are however recommended. *Ethics approval number: IRB005239*

ABSTRACT NUMBER / ABSTRAKNOMMER: 24

A LITERATURE REVIEW OF ILIOCAPSULARIS: THE FORGOTTEN MUSCLE.

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Introduction: Iliocapsularis is a muscle overlying the hip joint that few anatomists have heard of. There is no mention of iliocapsularis in modern anatomical textbooks, with the exception of Gray's Anatomy: The Anatomical Basis of Clinical Practice. Although recent attention is being given to this muscle by orthopaedic surgeons who encounter it during anterior approaches to the hip, it remains hidden in the anatomical literature. **Aims:** To determine the morphological information reported on iliocapsularis by searching the literature for anatomical studies. **Methods:** Electronic databases, included Pubmed and Google Scholar were searched with the terms "iliocapsularis", "iliacus minor", "iliotrochantericus", and "ilioinfratrochantericus" to identify anatomical studies. Articles describing the morphology of iliocapsularis were included. **Results:** Only six studies examining the anatomy of iliocapsularis have been published. The sample sizes of these studies were small, ranging from 11-115 hips. Attached to the anteromedial capsule along its entire length, iliocapsularis has the largest capsular contribution of any of the hip muscles. Thus, it is an important landmark in anterior surgical approaches to the hip joint. Although its function is still to be elucidated, iliocapsularis may play a role in stabilizing the hip joint. The nerve supply has only been stated in one case report, while the blood supply is described in a study as being from the deep femoral and lateral femoral circumflex arteries. The muscle fiber type is unknown. **Conclusion:** Few anatomical studies have described iliocapsularis, which has become an important surgical landmark in anterior approaches to the hip joint.

ABSTRACT NUMBER / ABSTRAKNOMMER: 25

ANAPHYLACTIC EVENTS FOLLOWING CYSTOSCOPY UNDER LOCAL ANESTHESIA: A REVIEW OF 8 CASES

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Background: Ortho-phthalaldehyde (Cidex OPA) or Glutaraldehyde (Cidex®) is a commonly used solution for rapid sterilization of flexible endoscopic equipment. Only a handful of such reactions have been reported in the published literature, the majority of which are in the bladder cancer population undergoing surveillance cystoscopy. In cases where cystoscopies are used under local anesthesia, an anaphylactic reaction can be fatal. **Patients and methods:** We reviewed the clinical presentation of 8 cases of anaphylaxis following flexible cystoscopy with instruments sterilized with Cidex® between July 2011 until February 2012. We investigated the specific batch of the supplier. We further describe their subsequent evaluation by an allergy and immunology specialist who performed skin testing to confirm a suspected Cidex, Remicaine, Betadine and Latex allergy. **Results:** All cases received Cidex® from the same batch. All cases were investigated with flexible cystoscopy. The 8 patients had different degrees of anaphylaxis, 2 of these had No reaction on previous scopes. 4 cases were admitted for observation. 3 patients required ICU and inotropes. 1 patient died. 5 cases received skin allergy tests testing for Latex, Cidex, Betadine, and Remicaine. 4 cases were skin test positive to Cidex antigen. One of these was mildly positive for latex. RAST test was used in one case only and was significantly increased. **Conclusions:** Cidex®-sterilized cystoscopes have been associated with anaphylactic/ allergic reactions. The resuscitation equipment and medications must be available and ready when using local anesthesia. Physicians and co-medical workers need to be aware of potential allergens to which patients may be exposed during routine medical procedures. *Ethics approval number: C19/06/018*

ABSTRACT NUMBER / ABSTRAKNOMMER: 26

PREDICTORS OF 1-YEAR SURVIVAL IN SOUTH AFRICAN TRANSCATHETER AORTIC VALVE IMPLANT CANDIDATES

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Background: Transcatheter aortic valve implant (TAVI) is undergoing rapid expansion internationally. In lieu of resource constraints locally, a major challenge in applying this technology is the identification of patients most likely to benefit. The development of risk prediction models has proven elusive with reported area-under-the-curve (AUC) of 0.6 - 0.65. The available models were developed in a first world setting and may not be applicable to South Africa. The purpose of the study is to evaluate unique South African parameters in TAVI outcome prediction. **Methods results:** Factors found not to correlate with outcome included: age, renal function, aortic valve gradients as well as the commonly used surgical risk prediction models - the STS and Euro SCORE. Factors best associated with 1 year survival were: left ventricular end-diastolic dimension (LVED) (mm), body mass index (BMI) (kg/m²), and ejection fraction (EF)(%) (favoring smaller LVED and higher EF and BMI), absence of atrial fibrillation (AF), as well as three novel parameters: independent living, ability to drive a car, and independent food acquisition/self cooking. Discriminant analysis of these factors yielded an AUC of 0.8 (CI 0.7-0.9) to predict 1-year survival with resubstitution sensitivities and specificities of 72% and 71% respectively. **Conclusion:** Apart from existing predictors, we identified three novel risk predictors (independent living, ability to drive a car, and self/independent food acquisition) for 1-year survival. In this early evaluation, these parameters performed well with an AUC higher than the parameters used in many international studies. The parameters are inexpensive and easily obtained at the initial patient visit. If externally validated they may be valuable in assessing prospective South-African TAVI candidates. *Ethics approval number: N16/01/005*

Theme 7 / Tema 7
**Violence, Injuries, Trauma and
Rehabilitation/
Geweld, Beserings, Trauma en
Rehabilitasie**

Oral Presentations/ Referate

ABSTRACT NUMBER / ABSTRAKNOMMER: 1

"IPE Tour de Circuit": Interprofessional collaboration during an integrated circuit group activity with stroke patients at BLRC

Adnil Titus, Maatje Kloppers, Faeza Bardien, Juanita Bester, Gakeemah Inglis-Jassiem

Background: It is increasingly recognized that current healthcare context needs professionals to work collaboratively to provide patients and their family with the best possible care. Traditionally, group-based intervention follows multi-professional approaches. Inter-professional circuit-based group therapy for people with stroke could be used to counter so-called profession/professional tribalism. However, there is no evidence on the potential value of this IPE community-based stroke intervention on student learning in the health professions. Methods: This qualitative research study followed a phenomenological, explorative and descriptive design. Twelve participants were purposively sampled from final year health sciences divisions (PT, OT & SLHT) at SU. Audio-recorded semi-structured interviews were transcribed verbatim. Thematic content analysis was used to delineate emerging themes. Ethical approval (N18/02/019) and SU institutional permission were obtained. Results & Discussion: Three themes emerged; i) IPE wheel; ii) tandem riding and iii) rolling effects. The overall findings of the study revealed that this IPE opportunity beneficially impacted the students' collaborative competencies in their knowledge, attitudes, skills and behaviours. While placed at this community-based rotation, students are immersed in a service-delivery environment where patient interventions are coordinated by a representative rehabilitation team. Within this already rich IPE learning and clinical context, the integrated stroke circuit group activity was nested to enhance further interconnectedness. The scaffolding of the students' collaborative competencies has brought them closer to future collaborative professional practice. This cohort of undergraduate students has been primed in their practice-readiness as health care professionals for the 21st century that will promote quality care, embrace teamwork and be centered around the interests of patients. Students who are exposed to this integrated circuit group activity may develop an understanding of (i) patients and their unique contexts, (ii) own role development and complementary overlapping between professions, and (iii) the value joint interventions offer patients and rehabilitation teams in resource-constrained settings

ABSTRACT NUMBER / ABSTRAKNOMMER: 2

A five year clinical audit of concussive injuries in collegiate male rugby players- a Stellenbosch University experience.

L. Kunorozva, J. C. Brown, P. L. Viviers and E. W. Derman

Background: Concussion is a common injury occurring mostly in contact sports, and results from an impulsive blow to the body or head, producing a functional injury to the brain. This results in a variety of non-specific symptoms such as headaches, confusion, balance and visual problems. More importantly, concussions are a salient health concern for male collegiate rugby players because at least one concussion is reported in every two games. Thus, a regular clinical audit of concussive head injuries is warranted in order to provide objective data pertaining to the injury so that pattern recognition can be studied. Aims: The purpose of this study was to clinically analyze and report on the concussion rate and symptom patterns from concussive head injuries in collegiate male rugby players for the period 2013-2018. Methods: A retrospective analysis of head injuries in a cohort of Stellenbosch University collegiate male rugby players (n=367), age (mean±SD; 24.6±4.3), height (mean±SD; 1.83±0.07), weight (mean±SD; 90.7±14.4) and BMI (mean±SD; 26.5±5.7) for the period 2013-2018. Each of the players with a suspected concussion returned for a clinical assessment performed using the Sports Concussion Assessment Tool (SCAT)-3 (n=252) and/or SCAT-5 (n=45). The SCAT questionnaire

evaluates both cognitive and physical symptoms based on a scale of 0-6, where 0 indicates the absence of symptoms, while 6 indicates the highest severity. The symptoms and symptom scores are added to give a symptoms (of 22) and severity (of 132) scores, respectively. Results: There were 0.2 concussions player-1·year-1 during the study period. Of the reported symptoms, headaches (59.9%) and amnesia (42.4%) were the most frequently reported with balance deficits (22.2%) the least reported. The mean symptoms (9.5/22) and severity (22.5/132) scores were highest during the first SCAT post injury. The third SCAT symptoms and severity scores were comparable to those of the sixth SCAT (2.3/22) and (2.5/132). While the time elapsed before the first SCAT ranged from 0-10 days, the majority of players reported for their first SCAT within 2 days (2.2±1.9). Conclusion: The results of this study indicate i) On average 86.8 concussions per year were treated by the medical staff; II) headache and amnesia are the most common presenting symptoms associated with concussion in collegiate rugby players and iii) these findings provide valuable information for planning purposes as well as players education.

ABSTRACT NUMBER / ABSTRAKNOMMER: 3

Community assault, an underestimated injury mechanism with costly consequences: can qSOFA scoring predict risk?

Anel Prinsloo, Elmin Steyn, Anke Verwey, Vuyiswa Biotumelo Kubeka

Mob violence is utilized in poor communities to achieve rapid and brutal social justice. The term Community Assault (CA) describes a mechanism which produces a diverse range of injuries. Few studies have assessed the epidemiology, predictors of severity and disease burden of Community Assault. We aim to characterize the injury pattern and assess the value of early qSOFA scoring. Methods: 65 of the victims of CA presenting to Tygerberg Hospital between June and December 2018 were recruited. Informed consent was obtained, admissions data and clinical outcomes were collected from notes and the electronic records system (ECM). The qSOFA parameters are systolic blood pressure (BP) < 100mmHg, respiratory rate (RR) > 22 breaths/min and altered mentation. Results: Of 69 patients identified, 4 were excluded for age and mechanism of injury. More than 50% arrived on Saturdays, Sundays and Mondays. Mechanisms included whipping (53.7%), stoning (62.96%), stabs (22.2%), assault (7.41%) and burns (3.70%). Injuries such as abrasions (77.6%), lacerations (75.5%), bruises (63.3%) and tramline injuries (30.6%) were present. Facial fractures (37.2%), TBI (37.5%), and limb fractures (42.2%) were commonly seen, whilst crush injuries were invariably present. The median hospital stay was 5 days (absolute range = 1 to 56). Twelve patients required ICU admission (median 6 days). The hospital mortality rate was 6.2%. There was a significant association between mortality and high qSOFA (p = 0.007), intubation (p = 0.0014) and surgical airway requirement (p < 0.001.) Parameters associated with poor outcomes were tachycardia, GCS < 13 and urea > 10 mmol/L. Conclusions: Community assault is costly and predisposes to mortality and morbidity. The qSOFA scoring system may predict poor outcomes. The cycle of crime and retribution exhausts public health resources and perpetuates violence in communities. Community Assault must urgently be addressed and prevented.

ABSTRACT NUMBER / ABSTRAKNOMMER: 4

Efficacy and patterns of use of antimicrobial prophylaxis for gunshot wound infection in Tygerberg Hospital: a prospective study using propensity score-based analyses

J Botes; MC Visbeek, JJ Taljaard, MGJ de Boer, E Steyn

Background: Limited evidence supports the efficacy of antimicrobial prophylaxis (AP) in prevention of gunshot wound (GSW) related infection in resource restricted areas. At Tygerberg Hospital, South Africa, it is standard care for GSW patients to receive one dose of broad-spectrum AP. For various reasons, this protocol is not consistently followed. This study aimed to assess the efficacy of AP in the reduction of in-hospital GSW-related infection and to identify opportunities for practice improvement.

Methods: Over a three-month period, all patients admitted with GSW were prospectively included. Data regarding the injury, the type and timing of AP, surgical interventions and infective complications were obtained. Patients were monitored for 30 days or until discharge for GSW-related infections. Propensity score matching (PSM) and inverse probability weighting (IPW) methods were utilized to assess the effect of AP on the prevention of GSW-related infection.

Results: A total of 165 consecutive patients were included. One hundred and three patients received AP according to protocol within 12 hours of admission, 62 patients did not. PSM showed a reduction of in-hospital GSW infection risk of 12% (95% CI, 0.2-24%, $p=0.046$) with AP. IPW showed that AP reduced the risk for infection by 14% (95% CI, 3-27%, $p=0.015$).

Conclusions: Providing AP to GSW patients in a civilian setting appeared to result in a modest but clinically relevant lower risk of in-hospital GSW-related infection. In this study setting, optimization of AP for all patients with GSW's should significantly lower the burden of wound infection.

ABSTRACT NUMBER / ABSTRAKNOMMER: 5

Evaluating trauma scoring systems for patients presenting with gunshot injuries to a district-level urban public hospital in Cape Town, South Africa

Amalia Liljequist Aspelund, Mohamed Q. Patel, Lisa Kurland, Michael Mccau, Daniël J. Van Hoving

Introduction: Trauma scoring systems are widely used in emergency settings to guide clinical decisions and to predict mortality. It remains unclear which system is most suitable to use for patients with gunshot injuries at district-level hospitals. This study compares the Triage Early Warning Score (TEWS), Injury Severity Score (ISS), Trauma and Injury Severity Score (TRISS), Kampala Trauma Score (KTS) and Revised Trauma Score (RTS) as predictors of mortality among patients with gunshot injuries at a district-level urban public hospital in Cape Town, South Africa. Material and Methods: Gunshot-related patients admitted to the resuscitation area of Khayelitsha Hospital between 1 January 2016 and 31 December 2017 were retrospectively analysed. Receiver Operating Characteristic (ROC) analysis were used to determine the accuracy of each score to predict all-cause in-hospital mortality. The odds ratio (with 95% confidence intervals) was used as a measure of association. Results: In total, 331 patients were included in analysing the different scores (abstracted from database $n=431$, excluded: missing files $n=16$, non gunshot injury $n=10$, <14 years $n=1$, information incomplete to calculate scores $n=73$). The mortality rate was 6% ($n=20$). The TRISS and KTS had the highest area under the ROC curve (AUC), 0.9 (95%CI 0.83-0.96) and 0.86 (95%CI 0.79-0.94) respectively. The KTS had the highest sensitivity (90%, 95%CI 68%-99%), while the TEWS and RTS had the highest specificity (91%, 95%CI 87%-94% each). Conclusions: None of the different scoring systems performed better in predicting mortality in this high-trauma burden area. The results are limited by the low number of recorded deaths and further studies are needed.

ABSTRACT NUMBER / ABSTRAKNOMMER: 6

High concussion rate in Stellenbosch University's 2018 koshuis rugby tournament

James Craig Brown, Lindsay Toyah Starling, Keith Stokes, Pierre Viviers, Esme Jordaan, Sean Surmon, Elton Wayne Derman

Collision sports, such as Rugby Union ('Rugby') have a particularly high risk of injury. Concussions have received the most attention due to the potentially negative cognitive effects in the short- and long-term. Despite non-professional Rugby players comprising the majority of the world's playing population, there is relatively little research in this population. Stellenbosch Rugby Football Club ('Maties'), the official rugby club of Stellenbosch University, represents one of the world's largest non-professional Rugby clubs, making this an ideal cohort for community level injury surveillance. The aim of this study was to describe the incidence and events associated with concussion in this cohort. Baseline demographics were obtained on the 807 male student Rugby non-professional players who registered for the seven-week long 2018 season, which comprised 101 matches and 2,915 of exposure hours. All

match-related injuries were captured by the university's medical staff on an electronic form developed from the consensus statement for injury recording in Rugby. The average age, height and weight of this cohort was 20 ± 2 years, 182 ± 7 cm and 88 ± 14 kg, respectively. Overall, there were 89 time-loss injuries, which equated to an injury rate of 31 per 1000 match hours (95% CIs: 24-37). The most common injury diagnosis was "concussion" ($n=27$ out of 90 injuries, 30%), at a rate of 9 per 1000 match hours (95% CIs: 6-12). The three most common mechanisms of concussion in the present study were performing a tackle (33%), accidental collision (30%) and being tackled (11%). Concussion was the most common injury in this population, at a rate that was six times higher than a comparable cohort in the UK. This might be explained by the training and vigilance of the club's first aiders observing all matches for concussion. Future studies should try to explain this higher rate and subsequently reduce these concussions.

ABSTRACT NUMBER / ABSTRAKNOMMER: 7

Open tibial shaft fractures: the effect of management delays on infection rates: a retrospective cohort

TR Basson, N Ferreira, J Du Toit, M Burger

Background: Open tibial fractures, a multifaceted and challenging clinical scenario are still laden with controversies. The timing of the different treatment strategies plays an important role in the eventual outcome of these patients. First world guidelines have strict time standards that governs the treatment of these injuries. In the developing world, these time constraints cannot always be adhered to, causing uncertain secondary sequela, outcomes and complications. The aim of this study was to investigate the effects of time delays of basic surgical principles on the risk of infection in open tibia shaft fractures within a developing world setting. Methods: Records was reviewed for 82 open tibia fractures in 77 patients. The time interval from arrival to antibiotic administration (< 3 hours vs > 3 hours), first surgical debridement (< 24 hours vs > 24 hours), definitive skeletal fixation (< 5 days vs > 5 days) and soft tissue reconstruction (< 7 days vs > 7 days) was measured. Results: No association between infection and antibiotic administration was observed when patients were treated within or after three hours ($p=0.503$) or if surgical debridement was done before or after 24hrs ($p=0.211$). A significant association between a skeletal fixation time of less than 5 days and reduced risk of infection was observed ($p=0.006$). Temporary fixation had a higher association with developing infection ($p<0.001$). Soft tissue closure within 7 days had a significantly lower risk ($p<0.001$) of infection compared to those who had soft tissue closure after 7 days. Conclusion: Time delays in the treatment of open tibial fractures has detrimental effects on rates of infection. Delaying definitive skeletal fixation and soft tissue reconstruction beyond the predefined times is associated with significant increased risk for developing infection. Delaying of antibiotic administration and surgical debridement beyond the prescribed times had minimal effect on infection rates.

ABSTRACT NUMBER / ABSTRAKNOMMER: 8

Patients' perceptions of barriers and facilitators influencing ability to return to work post-stroke

Saleema Kriel, Gakeemah Inglis-Jassiem, Linzette Morris

Stroke is a neurological condition that impacts on the functional ability of the individual and affects participation in everyday activities, including returning to work. Various factors resulting from a stroke that impact the individual's ability to return to work is not fully clarified in the South African context. This study therefore sought to understand the patients' perceptions of barriers and facilitators affecting return to work post-stroke in the Western Cape. A qualitative retrospective study was conducted with participants recruited from three communities in the Western Cape; Delft, Elsies River and Bishop Lavis. Individual interviews were conducted with adult male and female participants from the age of 18, who had a stroke within the last two years affecting their ability to engage in gainful employment. Additional data collection tools included the Modified Rankin scale (mRS), a self-developed sociodemographic

questionnaire and Stroke Specific Quality of Life Scale (SS QoL Scale). Data from the sociodemographic form, mRS and SS-QoL were analysed using frequency tables. Atlas.ti. (Version 6.2.15; 2011) software was used to code and analyse the qualitative data from the interview transcriptions. Six participants aged between 51 to 71 years, completed semi-structured interviews. None of the participants had returned to work at the time of the interviews. Environmental barriers related to weather, uneven terrain and transport difficulties were reported. Physical barriers were linked to functional difficulties, residual impairments and symptoms post-stroke, psychological and social factors. Return to work is influenced by several factors including the functional ability of the individual, their environment, socio-economic status and psychological well-being. It was surprising to unravel the extent stroke participants' psychosocial well-being impacted on their perception of barriers and facilitators to return to work. Based on the findings of this study, various recommendations can be made for rehabilitation post stroke. Based on the findings of this study, various recommendations can be made. A recommendation for holistic treatment to ensure that the physical needs, as well as the psychosocial needs of the patient are met during treatment and rehabilitation. A recommendation for ongoing health promotion and education regarding the treatment of risk factors can also be made. Continuous health promotion is important to ensure ongoing education to the patient regarding the risk factors of their condition. The importance of identifying the patients' rehabilitation needs was also noted during this study. A recommendation for a focused approach during rehabilitation can therefore be made.

ABSTRACT NUMBER / ABSTRAKNOMMER: 9

Primary to secondary school transition of learners with traumatic brain injuries in the Cape metropolitan area: a learner perspective

Kauthar Ally, Salmah Khan, Asmaa Begum Mustapha, Marizaan Moolman, Misqah Parker, Lee-Ann Jacobs-Nzuzi Khuabi

School participation is a life situation in which adolescents spend a significant amount of time and it contributes to their personal development and overall well-being. However, there is limited literature on school participation of adolescent learners post TBI, specifically from an insider's perspective i.e. the learner with a TBI perspective. Existing studies are more inclined to focus on the hospital to school transition post TBI but does not explore other important school transitions, such as the transition from primary to secondary school. For a learner with TBI, it is of value to examine the transition through the different school phases as the impact of the impairments associated with TBI may become more noticeable as the scholastic demands increase within each phase. This may in turn affect the ability of the learner to optimally perform at school. This study therefore aimed to explore adolescent learners with TBI's lived experiences of their primary to secondary school transition within a developing context i.e. the Cape Metropolitan area. A qualitative approach was utilised while incorporating a phenomenological design. Four participants were purposively selected. Data was collected by means of semi-structured interviews and analysed inductively. Four overarching themes emerged from the data: 1) Changes in functioning, 2) Personal resources, 3) Enabling support structures, and 4) Gaps in support structure. This study provided insight into the enablers and barriers within the person and the environment which currently impacts on the adolescent learner with TBI ability to transition between two prominent school phases and optimally participate in school.

ABSTRACT NUMBER / ABSTRAKNOMMER: 10

Prospective randomised study of routine, early JJ ureteric stenting in patients with high-grade renal lacerations.

Andre van der Merwe, Marthin Els, Heidi van Deventer, Amir Zarrabi

Purpose: The indications and timing for the use of a ureteric stent in renal trauma are controversial. The purpose of this study is to determine whether routine, early insertion of a JJ ureteric stent improves

the clinical outcomes and decreases the complications caused by urinary extravasation in patients with grade four and grade five renal lacerations. No prospective studies have been done on this topic.

Materials and Methods: The study is a prospective, randomised, comparative study. Patients presenting at Tygerberg Hospital with grade 4 or grade 5 renal lacerations (confirmed on CT scan) who are haemodynamically stable, are able to provide informed consent, and are willing to participate are included in the study. All patients who meet the inclusion criteria are randomised into either Group 1: early insertion of a JJ stent, i.e. within 24 hours of hospital admission, or Group 2: no insertion of a JJ stent.

Results: We have enrolled 38 patients to date. Twenty-five in Group 2 (not receiving a JJ stent) and 13 in Group 1 (receiving a JJ stent). The mechanism of injury was either a gunshot wound n=11/38 (29%); stab wound n=23/38 (60.5%) or blunt trauma n=4/38 (10.5%). In Group 1, there was a complication rate of 23% (3 of the 13 participants required additional intervention after receiving the JJ stent). In the group not receiving a JJ stent, 11 of the 25 patients (44%) experienced complications and subsequently required intervention. An intention to treat analysis was done.

Conclusions: At this early analysis it appears that early placement of a JJ stent in major renal trauma has beneficiary effects.

ABSTRACT NUMBER / ABSTRAKNOMMER: 11

Sarcopenia in patients presenting with fragility fractures of the hip at a tertiary facility in South Africa.

Burger Marilize, Charilou Johan, Conradie Magda, Eagar Riana, Jordaan Jacobus, Laubscher Cornelius
Background. Changes in body composition, including a decrease in muscle and bone mass, accompany aging. Sarcopenia is defined as the degenerative loss of skeletal muscle mass, quality, and strength associated with aging. The aim of this study was to assess the prevalence of sarcopenia in patients that present with fragility fractures of the hip (FFH). **Methods.** In this cross-sectional study, all patients presenting with a FFH were invited to participate. Traumatic hip fractures, pathological hip fractures or patients with an acute concomitant disease were excluded. The European Working Group on Sarcopenia in Older People (EWGSOP) criteria of a) low muscle mass together with b) evidence of impaired muscle function was used to diagnose sarcopenia. Muscle mass was determined using a Dual-Energy X-Ray Absorptiometry (DEXA) scan and hand grip strength, measured with a JAMAR hand dynamometer, was used to assess muscular function. Routine blood sampling for calcium, inorganic phosphate, ALP & 25-OH Vitamin D was performed. **Results.** Over the 16 weeks study period, 65 of 100 patients that presented with a FFH were recruited. A total of 44 out of the 65 patients (68%) were sarcopenic. **Conclusion.** This study reports a high prevalence of sarcopenia in our local FFH population. Sarcopenia is associated with poor patient outcomes following surgical intervention and South African orthopaedic surgeons should be cognisant of the presentation and associated risks of sarcopenia as our patient population ages.

ABSTRACT NUMBER / ABSTRAKNOMMER: 12

Three months in Tygerberg orthopedic trauma- What is a registrar worth?

Hentas van Zyl, Nando Ferreira

Background: Tygerberg hospital is a tertiary hospital with a drainage area population of about 3.6 million people. The orthopaedic department manage about 6000 trauma patients per year. The registrar training program consist of three month rotations through the different subspecialties of orthopaedics. There is a large discrepancy in the number of surgeons/training surgeons per population between public and private sectors. Due to budget and theatre time constraints, the trauma waiting list often exceeds 50-60 patients needing urgent and emergent surgery. This is worsened by other surgical disciplines using orthopaedic theatre time for life threatening injuries due to lack of theatre availability. One of the proposed solutions to this problem is outsourcing of some of the cases to private medical facilities. **Methods:** A retrospective review, of surgical records kept during the three-month rotation (14 January

2019 to 14 April 2019) of all the surgeries in which the registrar was involved either as leading surgeon or assistant, was done. The surgeon fees were then calculated according to current medical aid rates at 100%. No emergency or BMI codes were added. The implant cost was calculated at the average tender cost of the type of implant. No suture or dressing materials were included. Results: During the 3-month period 154 procedures was done ranging from total hip arthroplasty to septic hand debridements. 11 procedures were done per week. 60 of 154 were done after 19:00. Surgeon fees amounted to R172101,40/month; three times the net salary of a registrar. Total implant costs amounted to over R1,250,000. These number becomes significant when taking into account that there are 6 registrars in the trauma rotation. Conclusions: Although a very small scale study this shows the significant amount of trauma work done at a tertiary institution. With increasing budget constraints, pressure on theatre time and growing population, expansion of resources is needed but in a cost-effective way. It seems that increasing capacity in the state sector could be a cheaper option compared to private out sourcing although more in-depth analysis needs to be done.

ABSTRACT NUMBER / ABSTRAKNOMMER: 13

“It would have helped to have support”: Support needs for re-entrance and participation in high school post TBI

Lee-Ann Jacobs-Nzuzi Khuabi, E. Swart, M.S. Soeker

Traumatic brain injury (TBI) may disrupt an adolescent’s progress and participation in school. Post TBI, an adolescent not only has to deal with the expected associated adjustments of their development stage, but also has to adjust to a range of impairments and increased dependency resultant of the TBI. This combined with contextual factors, may have implications for their preparedness to re-enter and participate in school post TBI. A qualitative multi-case study was undertaken to explore and describe the enablers and barriers to school re-entry and participation of high-school learners post TBI. The study specifically explored the insider perspective of eight adolescent learners’ with TBI and the perspectives of other key role players involved in the school transition process, i.e. the care-giver, a teacher (the learner identified as knowing them best) and the principal of the school they attend. The main data collection methods included semi-structured interviews, document analysis and semi-structured observation. Findings indicate that numerous personal, multisystem environmental and occupational factors served as both enablers and barriers to the learner’s school transition post TBI. This paper will focus on a central theme in the research namely the nature and extent of support needed to facilitate school re-entry and school participation of adolescents with traumatic brain injury. Support refers to various stages, levels and role-players including the learner, the family and the school. The findings of this study could inform the specific components of service provision that aims to provide support needed to prepare learners with newly acquired disabilities to re-enter and participate in school as well as the ongoing support they require for their year to year progression throughout school.

ABSTRACT NUMBER / ABSTRAKNOMMER: 14

Indications for limb amputation in the humanitarian setting: A descriptive study from *Medecins Sans Frontieres*

Priyanka Naidu, Lynette Dominguez, Miguel Trelles, Kathryn M. Chu

Background: Limb amputations (LA) are a common surgical procedure worldwide and usually a result of diabetes, atherosclerosis, infections, or traumatic injury. Médecins Sans Frontières (MSF) provides surgical care in areas of conflict (CON), natural disaster (ND), or other settings with poor surgical systems (PSS). The objectives of this study were to describe indications for LA and their associated risk factors in the humanitarian setting. Methods: Data from MSF-Operational Center Brussels from January 1, 2008 to December 31, 2017 were analyzed. Surgical sites that performed LA were classified according to CON, ND, and PSS. LA was classified into emergency and non-emergency procedures. Results: There were 1621 LA in 1188 patients from 17 countries. 73% were males and the median age was 30 years.

Trauma was the most common indication for LA (n=1219,75%) with 51% (n=826) from unintentional trauma. Infection accounted for (n= 289, 18%). On multivariate analysis, age<30 years (OR=2.83, p<0.001), male gender (OR=2.23, p<0.001), CON setting (OR=3.98, p<0.001) and emergency procedure (OR=5.6, p<0.001) were associated with intentional trauma. CON setting was less likely to be associated with unintentional trauma (OR=0.67, p>0.001). Age ≥30 years (OR=3.09, p<0.001), female gender (OR=2.09, p<0.001), and non-emergency procedure (OR=4.53, p<0.001) were associated with infectious indications. Discussion: Trauma was the leading cause of LA in the humanitarian setting and improved post-amputation rehabilitation are needed in these contexts. Prevention of unintentional trauma, which was a most common indication, must be a focus on humanitarian organizations in addition to addressing surgical care.

POSTERS / PLAKKATE

ABSTRACT NUMBER / ABSTRAKNOMMER: 15

A retrospective review of paraquat exposures reported to a poison control centre in South Africa over a 3-year period.

Carine Marks, C Wium, C Du Plessis

Introduction Paraquat is a commonly used herbicide in South Africa and accidental or intentional ingestion is associated with high mortality rates. If patients survive the acute phase, which is usually associated with corrosive injury and multi-organ failure, pulmonary fibrosis and respiratory failure develops. Unfortunately the magnitude of the problem is unknown, hence the importance to document and analyse all cases of paraquat poisoning. **Aim and methods** Epidemiological data was analysed with regard to paraquat exposures, as telephonically managed by the Poison Information Helpline (PIH) in the Western Cape, serving the whole of South Africa, over a 3 year period (1 June 2015 to 31 May 2018). **Results** During the 3-year period, 28,561 human-related poisoning calls were received by the PIH. Of these 55 (0.2%) included paraquat exposures. Most enquiries were received from KwaZulu-Natal (n= 31; 56.4%) and the Western Cape (n=12; 21,8 %) province. Most exposures were deliberate self-harm (67.2%) and the sex was predominantly male (72,7%). Most cases included adults (n=55; 90.9%), with only two reported cases involving infants (0-5 years) and three cases of parasuicide concerning older children (6-13years). The majority of calls were received from public hospitals (78,1%) and four of these cases were made from the same hospital in KwaZulu-Natal. In most cases the route of exposure was oral (n=46; 83.6%), followed by skin (9.1%), inhalation and ocular (3.6% each). Only the oral route had severe consequences where two deaths were recorded. Ten patients (32.6%) presented with severe or life-threatening symptoms and ten (21.7%) with pronounced or prolonged symptoms. **Conclusion** Despite the low incidence of paraquat poisoning, the high risk associated with exposures validate further research. Retrospective data does not reveal all the clinical features and prognosis of paraquat poisoning and a prospective study with a proper follow-up is needed

ABSTRACT NUMBER / ABSTRAKNOMMER: 16

A retrospective review of potassium permanganate exposures reported to a poisons control centre in South Africa.

Carine Marks, Cherylunn Wium, Catharina Du Plessis, Cindy Stephen

Introduction Potassium permanganate (KMnO₄) is a powerful oxidising, highly corrosive and water-soluble chemical, with both medical and non-medical uses. It is readily available as an over-the-counter medication for use as an antiseptic or dermal anti-infective. Due to its alkaline corrosive effect, KMnO₄ can cause liquefaction necrosis, resulting in gastrointestinal tract oedema, burns and ulcerations. **Aim and Methods** The aim was to investigate KMnO₄ exposures, as telephonically managed by the Poisons

Information Helpline (PIH) of the Western Cape, which services the whole of South Africa. Data were retrospectively analysed, (1 June 2015 to 31 May 2018) by extracting the information from an electronic database. Results During the 3-year period, 28,561 human-related poisoning calls were received by the PIH. Of these 366 (1.3%) were related to KMnO₄ exposures. Most calls were received from two of South Africa's nine provinces, KwaZulu-Natal (n=169; 46.2%) and Gauteng (n= 90; 24.6 %). Most exposures were accidental (n= 288; 78.7%) and occurred in children between 0 and 12 years of age (n=268; 73.2%). The majority of calls were received from health care professionals (n= 359; 98.1%) and the route of exposure was mostly oral (n=358; 97.8%). The majority of patients presented with no or minor symptoms. (n=306; 83.6%). Ninety-two patients (25.1%) presented with vomiting, 64 (17.5%) presented with corrosive injuries of the mouth e.g. swollen tongue or lip, 41(11.2%) presented with dysphagia and/or odynophagia, and 35 (9.6%) experienced epigastric discomfort. Eight patients (2.2%) were in respiratory distress, three (0.8%) were unconscious and one had a seizure. Discussion and Conclusion Although most of the enquiries involved patients with no or minor symptoms, the majority of KMnO₄ exposures were reported in children. Authorities should flag KMnO₄ poisoning as a public health concern, with particular emphasis on legislation for child-proof packaging to prevent harmful exposures in this vulnerable age group.

ABSTRACT NUMBER / ABSTRAKNOMMER: 17

A retrospective review of sodium cacodylate exposures reported to a Poison Information Helpline in South Africa over a 3-year period

Catharina du Plessis, Carine Marks, Cindy Stephen, Cherylynn Wium

Objectives: Arsenic is widely used in pesticides, wood preservatives and in glass manufacturing. Sodium cacodylate is an organic, pentavalent arsenical compound used in AnTrap®. Although the pentavalent form is considered less toxic than the trivalent form, it is advisable to treat all arsenic compounds as highly toxic. Because of the potential toxicity, the aim of this study was to analyse data reported to a poison information centre to establish the extent of exposure. Methods: Data from the Poison Information Helpline, Western Cape (PIHWC) was analysed for calls regarding AnTrap® poisoning. Data collected was for the period June 2015 to May 2018. Results: During the 3-year period, 28 561 patient related calls were received by the PIHWC. Of these 163 (0.6%) were AnTrap® exposures, including 80 male patients, 72 female patients and 11 dogs. The amount of AnTrap® ingested was mostly unknown (60%) and in 49 cases it was quantified as a lick or taste. In 146 (89.6%) cases the time of ingestion was known and in 86 (58.9%) of these, the call was received within 30 minutes of ingestion. 93% of the patients were asymptomatic at the time of call. Vomiting was the most common symptom (n=7). In humans the 1 - 5 year age group (n=113, 74%) was mostly responsible for exposures and the majority of calls was received from parents (n=91, 59.9%). Although presenting late, arsenic levels were determined in only one symptomatic patient. Chelation therapy was not indicated. Six patients were followed up and none of these showed any signs of toxicity. Conclusions: The majority of patients were asymptomatic at the time of call, however an extensive follow-up study should be conducted to determine the true extend of poisoning.

ABSTRACT NUMBER / ABSTRAKNOMMER: 18

A retrospective survey of marine envenomations and poisonings as managed telephonically by a poisons center in South Africa, over a 20 year period.

Carine Marks, C Wium, C Du Plessis, G Muller, H Reuter, D Sachno, N Van Hoving

Introduction The long South African coastline has an abundance of marine life, with an enormous diversity and complexity of venoms and poisons in marine animals. The potential for hazardous exposure to marine life in South Africa is thus high. To our knowledge, this is the first epidemiological review regarding marine toxicity that has ever been conducted in sub-Saharan Africa. Methods Marine toxicology cases were retrospectively analyzed for a 20-year period (1 January 1995 to 31 December

2014). Data were extracted from archived consultation forms. Descriptive statistics are presented and post hoc analyses compared age, sex, province, and caller's background with severity and type of toxicology. Results The Tygerberg PIC processed 84,558 telephonic consultations during the 20-year study period, of which 311 (0.4%) related to marine toxicology exposures. The 311 calls involved 392 marine toxicology patient related cases. Most calls involved adults (n = 317, 81%) and males (n = 214, 55%), and presented with no or minor symptoms (n = 242, 62%). Poisoning from ingestion (n = 239; 61%) was more commonly encountered than marine envenomation (n = 153; 39%), with paralytic shellfish poisoning (n = 118; 30%) and scombroid poisoning (n = 93; 24%) occurring often. Most patients (n = 242, 62%) presented with no or minor symptoms, while moderate to severe toxicity occurred in 129 patients (33%). Four deaths (1%) were recorded at the time of the call. Conclusion The relative burden of marine toxicology cases reported to Tygerberg PIC (in relation to the total number of calls managed) was low, and mostly related to adults. The ability to identify and manage marine-related toxicology cases is important for providers of acute care, and future poison center studies should focus on robust data collection, including follow-up calls and patient-centered outcome data.

ABSTRACT NUMBER / ABSTRAKNOMMER: 19

Cytotoxic Spider Bites – Cases of Mistaken Identity

Catharina Du Plessis, Helmuth Reuter

Background and Objective: In South Africa medically important cytotoxic spiders include the Cheiracanthium and Loxosceles spiders. The diagnosis of necrotic arachnidism is difficult, because bites are often unwitnessed and lesions nonspecific. The objective was to establish if a new classification for the grading of aetiological certainty of spider bites could be determined and secondly to illustrate misattributions of skin lesions to spider bites. Method: An assessment of poison centre data regarding cytotoxic spider bites from January 2005 to December 2017 was performed. Patient demographics, geographical locations and symptoms experienced by patients were extracted. Spider bites were classified as definite, probable or unlikely based on positive identification, clinical features recorded and geographical locations. Prospectively collected cases initially reported as a spider bite were identified and the clinical progression monitored. Results: Only 5 (2.1%) of the 242 possible cytotoxic spiders bites reported were positively identified: namely two sac, two violin and one six eyed sand spider. Another 27 (11.2%) were classified as probable cytotoxic bites due to geographical location and clinical features. The majority of reported bites can be regarded as unlikely, 211 (86.8%). Swelling (22.4%), redness (17.0%) and pain (15.8%) were the most common clinical features. Medical conditions misdiagnosed as necrotic arachnidism included folliculitis, varicose eczema, cellulitis and atypical ulcers. Conclusion: Although swelling, redness and pain are features of early necrotic arachnidism, these features are non-specific and are observed in various other illnesses. The majority of reported skin lesions are unlikely to be caused by spider bites. A distribution map of cytotoxic spider bites highlighted the geographic areas in which these could be concerned. The poison centre data was insufficient to fully describe necrotic arachnidism, however, certain categories for the diagnosis of cytotoxic spider bites can be suggested, namely definite, probable and unlikely.

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Epidemiology Of Puff Adder (Bitis Arietans) Bite As Dealt With By The Tygerberg Poison Information Centre Over A 29 Year Period: 1985 – 2014

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Introduction: Puff adders (*Bitis arietans*) are found throughout South Africa. They are bad-tempered, excitable snakes with very long fangs and a potent cytotoxic venom. Puff adder bite is generally considered to be responsible for most serious snake envenomings in South Africa. Aim: The objective was to evaluate the spectrum of puff adder bite consultations dealt with by the Tygerberg Poison

Information Centre (TPIC) from 1985 – 2014. Methods: Telephonic snakebite related consultations dealt with by the TPIC were analyzed. Results: The Centre dealt with 105775 consultations of which 3942 (3.7%) were related to snakebite. 1796 of these inquiries were actual bites. The puff adder was responsible for 279 (15.5%) cases followed by Cape cobra (13.0%), Mozambique spitting cobra (6.7%) and rhombic night adder (4.5%). 90.4% of the puff adder bite consultations were from medical professionals. 77.6% were in adults, 7.3% in adolescents and 15.1% in children, respectively. Most bites occurred in males (79.4%). The geographic distribution of calls were Western Cape 52.5%, Eastern Cape 16.9%, KwaZulu Natal 8.5%, North West Province 4.6%, Northern Cape 3.8%, Gauteng 3%, Limpopo 3%, Mpumalanga 3%, Freestate 2.1%. Most of the bites occurred on the foot or lower leg (47.5%). Prominent symptoms reported were swelling of the bitten limb (82.2%), ecchymosis (22.4%) and pain at the bite site (19.6%). Polyvalent antivenom was given in 58.5% of cases and an allergic reaction was reported in 5.5%. One death was recorded. Conclusion: The most frequently encountered serious snakebites dealt with by the TPIC was puff adder bite. Most patients presented with prominent cytotoxic effects.

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The Effectiveness Of Lower Limb Strength Training With Whole Body Vibration Training, Compared To Lower Limb Strength Training Alone, On Lower Limb Muscle Strength, Functional Exercise Capacity, Pulmonary Function And Quality Of Life In Adults With COPD

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Background: Chronic obstructive pulmonary disease (COPD) is a leading cause of death and disability worldwide. People with COPD experience various pulmonary and extra-pulmonary impairments; ultimately reducing quality of life (QoL). Rehabilitation modalities that do not elicit dyspnoea, such as strength training, are recommended to improve patient outcomes and combining such training with Whole Body Vibration Training (WBVT) may be even more effective. However, evidence for the effectiveness of such combined training remains insufficient. Objective: To systematically review and update evidence for the effectiveness of lower limb strength training combined with WBVT (intervention), compared to lower limb strength training alone (control), in adults with COPD for improving functional exercise capacity (FEC), QoL, lower limb muscle strength (LLMS) and pulmonary function (PF). Methodology: Eight databases were searched (inception to May 2019): Scopus, Pubmed, PEDro, Science Direct, Ebsco Host: SPORT DISCUSS, Ebsco Host: CINAHL, Cochrane Library and ProQuest. Only randomised controlled trials (RCTs) with PEDro scores >5 were eligible for inclusion. Heterogeneous data were described narratively and homogeneous data using forest plots. Results: Six RCTs (mean PEDro score: 6/10) were included. Besides a significant improvement in leg press peak force at 12 weeks, the intervention was not superior to the control for improving LLMS. FEC improved significantly more in intervention versus control groups at 3 and 6 weeks, and meta-analysis demonstrated a significantly superior effect of intervention versus control at 6-12 weeks ($p < 0.001$). PF changes were similar in intervention and control groups. Besides one study showing significantly improved QoL at 12 weeks, and another significantly improved emotional function (12 weeks), QoL improvements were similar for intervention and control. Conclusion: Level II evidence suggests that combining strength training with WBVT has significantly beneficial short-term effects on FEC in adults with COPD, compared to strength training alone.

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The Perceptions of Persons With Aphasia With Regards To Their Experiences Of Group Therapy: A Scoping Study

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Aphasia is a neurogenic communication disorder primarily caused by stroke which impairs

language modalities. Aphasia therapy has shifted to a more client-centered approach aimed at addressing long term psycho-social consequences of aphasia by focusing on reintegrating people with aphasia (PWA) into their community. Previous literature focused on perceptions of caregivers and third-party stakeholders in the speech therapy intervention of PWA. Gaining insight into the perceptions of PWA will enable clinicians to have a better understanding of their preferences in a group therapy setting. The objective of this scoping review was to evaluate existing literature of the perceptions of PWA regarding speech therapy intervention in a group context. The aim being to gain greater insight into and explore their point of view constituting their experiences and preferences to service provision to establish and inform common goals between the client and the speech-language therapist. The Arksey and O'Malley's (2005) framework was employed and the search included four databases and generated 126 potential studies of which nine met the study inclusion criteria. The results included descriptive information and emerging themes found through content analyses. The three overarching themes which emerged related to the aspects of attitudes, communication and knowledge. Overall the groups were experienced positively by its participants due to its accepting and friendly environment. Negative perceptions led to reduced feelings of inclusivity, due to personal emotional factors or lack of skill of the PWA. The findings indicated limited research for this specific target group. It is recommended that further empirical studies be conducted that can be specifically applied to the South African context to inform service delivery that encompasses the goals of the PWA and further fosters a more meaningful patient-clinician relationship.