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Health Sciences

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FACULTY RESEARCH DAY
ABSTRACT BOOK

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CO-CREATE, COLLABORATE, AND INNOVATE
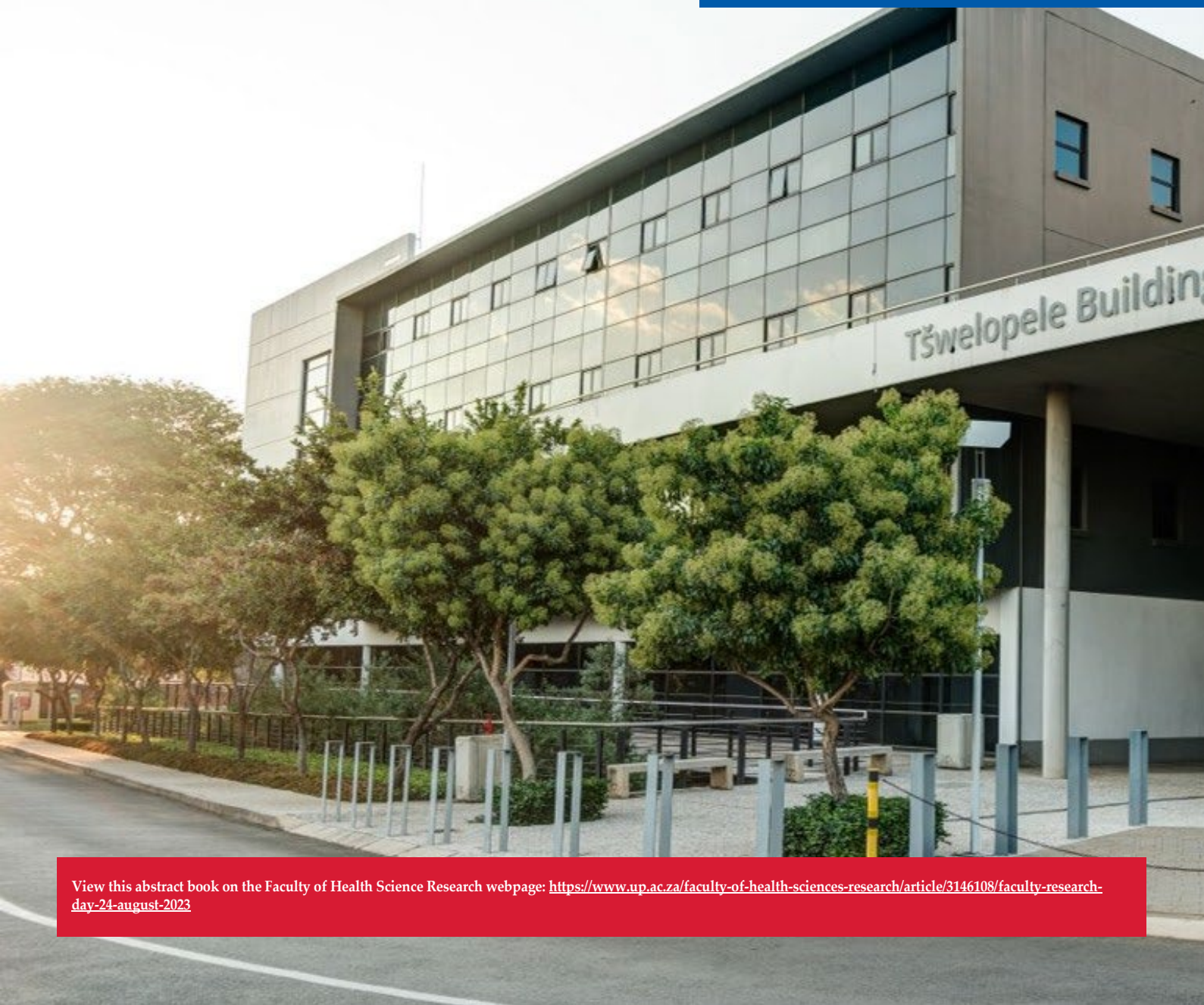
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Theme: Innovate
Methodology: Evidence Synthesis

Disclaimer:
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Abstract Detail
Title: AN EVALUATION OF THE EMOTIONAL WELL-BEING AND CLINICAL PRACTICE FACTORS OF NURSES AFTER AN INPATIENT SUICIDE AT WESKOPPIES PSYCHIATRIC HOSPITAL – A QUALITATIVE STUDY

Background
Inpatient suicide is one of the serious adverse events in both psychiatric and general wards. It can cause severe trauma to both patients and staff members. Consequently, both groups may develop maladaptation with poor coping skills. Psychiatric nurses are more prone to witness suicide than nurses in general wards.

Aim
Inpatient suicide is one of the serious adverse events in both psychiatric and general wards. It can cause severe trauma to both patients and staff members. Consequently, both groups may develop maladaptation with poor coping skills. Psychiatric nurses are more prone to witness suicide than nurses in general wards.

Method
This qualitative case study purposively sampled 12 nurses who had lost a patient from inpatient suicide at any point in their employment at Weskoppies psychiatric hospital in Pretoria. Individual in-depth interviews were audio recorded, transcribed, and analyzed using thematic analysis.

Results and discussion
This study revealed that nurses were negatively affected by in-patient suicide, resulting in a range of emotional and psychological effects, including fear, anger, depression, post-traumatic stress disorder, guilt, and maladaptation. Clinical practice factors included doubt and being extra vigilant. Participants received psychological support from the institution. In-service training about suicide was recommended by participants.

Conclusion
In-patient suicide is a serious adverse event and both patients and mental health practitioners become second victims. It is therefore important to ensure that they receive adequate training and support in preventing and handling inpatient suicide.

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Theme: Innovate
Methodology: Evidence Synthesis

Disclaimer:
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Abstract Detail
Title: FACTORS AFFECTING READMISSION OF ADOLESCENT MENTAL HEALTH-CARE USERS TO A PSYCHIATRIC HOSPITAL

Background: Adolescent mental illness is increasing worldwide, leading to more adolescents being admitted to psychiatric institutions. Many adolescents may require multiple readmissions, which is disruptive to their holistic well-being as well as costly to the healthcare sector. Identifying especially modifiable risk factors for readmission remains an important step in providing potential areas for improving patient care.

Methods: In this retrospective study, we reviewed the clinical files of 345 adolescents admitted between 2015 and 2019. The primary outcome variable was whether the patient was admitted once (n = 247) or readmitted (n = 98) during the 5-year follow up period.

Results and Discussion: Readmitted adolescents were significantly younger on first admission compared to the non-readmitted group (13.46 vs 14.26, p = 0.016). Bivariate analysis showed that the readmitted group had a much higher rate of non-adherence to treatment (10.5% vs. 38.1%, p = < 0.001). Patients where one or both parents suffered from a mental illness had a significantly higher risk of readmission (52.2% vs 37.5%, p = 0.015).

Conclusions: Adolescents were more likely to be readmitted if they had a younger age at first admission, a family history of mental illness and non-adherence to treatment. Our results can be used to identify especially modifiable risk factors for readmission to improve patient care, particularly in the South African context where there is a paucity of research on this topic. They highlight the importance of adequate post discharge planning and follow-up, including psychoeducation about treatment adherence, as well as community screening interventions.

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Theme: Collaborate
Methodology: Inter-disciplinary study

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Abstract Detail
Title: ANALYSIS OF BRAINSTEM AUDITORY EVOKED POTENTIALS IN POSTERIOR FOSSA TUMOUR RESECTION SURGERY AT AN ACADEMIC HOSPITAL IN SOUTH AFRICA

Background: Posterior fossa tumours located near the brainstem and cerebellum can impact autonomic functions and sensory perception. Brainstem auditory evoked potentials (BAEP) serve as an intraoperative neuromonitoring technique to assess cranial nerve function during posterior fossa tumour resection surgery. This research aims to analyze BAEP measurements throughout the surgical procedure, focusing on any observed changes or consistencies.

Methods: BAEP measurements of waves I, III, and V were obtained at various time intervals during surgery using the Medtronic NIM-ECLIPSE neuromonitoring system. Data were recorded on an Excel spreadsheet and visually represented on a scatterplot. Patient records were reviewed to gather information on symptoms, diagnoses, imaging results, and post-surgical recovery.

Results and Discussion: Wave I peaks demonstrated stability throughout resection surgeries, as expected, due to the absence of tumour involvement in the peripheral region of the cochlear nerve. Conversely, waves III and V peaks exhibited a consistent downward trend as tumour resection progressed. This suggests that removing the tumour positively influences the conducting velocity of the central segments of the cochlear nerve.

Conclusion: Brainstem auditory evoked potentials serve as a reliable and stable intraoperative neuromonitoring technique particularly when eloquent brain regions are involved. Further research and broader implementation of BAEP in craniotomy-related procedures are warranted to enhance patient outcomes and optimize surgical interventions.

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Theme: Co-Create
Methodology: Delphi Technique

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Abstract Detail
Title: A QUALITATIVE STUDY OF NURSES' KNOWLEDGE ABOUT COVID-19 WITHIN THE CONTEXT OF MANAGEMENT OF PATIENTS IN A PSYCHIATRIC HOSPITAL

Background: COVID-19 infection caused unparalleled hastening of infection transmission worldwide, commonly affecting healthcare workers' well-being. Nursing staff spend most hours caring for patients, are in closest contact with patients and are the first contact that patients utilize when reporting symptoms or receiving treatment.

Aim: This study aims to evaluate the knowledge of COVID-19 amongst psychiatric nurses at Weskoppies Hospital.

Method: We conducted a qualitative study comprising of 14 semi-structured and in depth interviews with nurses working in a psychiatric Hospital in South Africa. We used open-ended questions to facilitate the discussion and provide some structure for the interview while still allowing the participants to elaborate freely. The recordings were later transcribed into text.

Results: 20 nurses working full time at Weskoppies Hospital in different wards were recruited for the study. The nurses' knowledge about COVID-19 were summarised into five major themes, each with subthemes: signs and symptoms of COVID 19, risk of contracting the virus, the spread of COVID-19, prevention and complications. In this study the majority of participants had relatively good knowledge regarding COVID-19.

Conclusion: The majority of nurses at Weskoppies Hospital had adequate knowledge about COVID-19 but limited knowledge about the mode of transmission of the infection. Consistently improving healthcare worker's knowledge through training, supplying information and making management guidelines is crucial to prevent the spread of the COVID-19 infection.

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Theme: Collaborate
Methodology: Inter-institutional study

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Abstract Detail
Title: COMPARATIVE EFFECTS OF EFAVIRENZ AND DOLUTEGRAVIR ON METABOLOMIC PROFILES, CYTOKINES AND PLATELET ACTIVATION OF PEOPLE LIVING WITH HIV

Background: The introduction of combination antiretroviral treatments considerably reduced mortality and morbidity rates associated with the human immunodeficiency virus (HIV). In 2019 the World Health Organisation recommended the transition from efavirenz-based antiretroviral treatments to those composed of dolutegravir. This was due to the reported superiority of dolutegravir in viral load suppression, reduced drug-drug interactions and side effects as well as increased barriers to resistance. However, limited data is available following the transition and as a result the study aimed to investigate and compare the metabolic profiles, cytokine outputs, and platelet activation of efavirenz-experiences people living with HIV before and six months after transitioning to dolutegravir.

Method: Metabolites, cytokines, and platelet activation markers were identified and quantified using untargeted nuclear magnetic resonance, multiplex bead-suspension immunoassays, and enzyme-linked immunosorbent assay, respectively.

Results and Discussion: A two-fold increase in 3-hydroxybutyrate levels were observed six months after the transition. Although not observed during paired analysis, adenosine monophosphate, creatinine, formate, D-glucose, and L-lactate levels approached levels to those observed in the HIV uninfected cohort following the transition. Cytokine concentrations and platelet activation markers remained statistically insignificant after the transition, however, compared to the HIV uninfected certain cytokine and platelet activations markers approached normalcy.

Conclusion: The transition to the dolutegravir-based regimen had no significant impact on the metabolic, inflammatory, and platelet responses of participants. A slight improvement associated with energy metabolism, granulocyte-monocyte colony stimulating factor, and platelet activation were observed after dolutegravir initiation when compared to healthy, HIV uninfected individuals.

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Theme: Innovate
Methodology: Non-Randomised Controlled Trial

Disclaimer:
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Abstract Detail
Title: COMPARATIVE ANALYSIS OF MUSCLE STRENGTH AND FLEXIBILITY IN THE ELDERLY WITH AND WITHOUT JOINT PAIN

Background: Aging is associated with an increased prevalence of joint pain and declines in muscular strength (MS) and flexibility. The aim of this study was to determine the differences between upper and lower body MS and flexibility in the elderly with and without self-reported joint pain (SJP).

Methods: The data of 81 elderly (76.33±6.50 yrs; 57 ♀; 24 ♂; 45 with SJP; 36 without SJP) residing in Tshwane, was analysed. SJP (questionnaire), height (cm), mass (kg), body mass index (kg/m2), arm curl (repetitions), chair sit-to-stand (repetitions), back scratch (cm), chair sit-and-reach (cm) and straight leg raise (degree) were the variables measured. Descriptive statistics and the Independent t-test were used (p≤0.05). Ethical clearance was obtained.

Results and Discussion: SJP was reported by 56% of the elderly; with the greatest prevalence in females (65%) and in the lower-body region (64%). The knees and back were the regions mostly reported with joint pain (21% each). No significant differences (p>0.05) between upper and lower body MS and flexibility measures of the elderly with and without SJP, and of the elderly with SJP in ≤ two joints and the elderly with SJP in ≥ three joints were noted.

Conclusion: A high percentage of the elderly cohort reported having joint pain. Interestingly, the presence of SJP appeared to have no significant relationship on their MS and flexibility. To further enhance the understanding of SJP and movement in the elderly, future research should consider a larger sample and a more objective means of assessing joint pain.

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Theme: Collaborate
Methodology: Inter-disciplinary study

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Abstract Detail
Title: A QUALITATIVE ANALYSIS OF SUPPORT NEEDS IN THE ANAESTHESIA DEPARTMENT AT STEVE BIKO ACADEMIC HOSPITAL DURING THE COVID-19 PANDEMIC

Background: Physician wellness has gained traction in the medical community. This is an essential aspect of providing quality healthcare. It is not easy to achieve in a resource-constrained setting. The pandemic added to the stressors of the daily workload, and it introduced new challenges that physicians were not exposed to before. This research aimed to understand the challenges faced by physicians and identify any gaps in the support offered.

Methods: A qualitative cross-sectional study design was used. Participants were requested to submit a written reflective piece. The format of the reflection piece was a self-reported written narrative. Content analysis was employed and codes were identified. These codes were grouped into categories (sub-themes), and four central themes were identified.

Results: The age of participants ranged from 28 to 38 years old, with a mean of 32.3 years. The length of experience in anaesthesia ranged from 10 months to 9 years, with a mean of 5.4 years. Many participants did not access formal mental healthcare services but reported that support received from the department and colleagues was helpful. Disorganisation and lack of resources led to feelings of fear and uncertainty. The emotional impact of seeing patients suffering was made worse by concerns about their own families. Feelings of exhaustion and overload were common.

Conclusion: Factors that could improve wellness include debriefings on a personal level, simulated training drills, and policies and structure at an organisational level. Real improvements in wellness can be actualised by making tangible changes at multiple levels of the healthcare system.

Faculty Research Day 2023
Abstract no: 2023008

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: MEASUREMENT OF RADIATION EXPOSURE OF ANAESTHESIA PERSONNEL IN THE CARDIAC CATHETERISATION LABORATORY AND INTERVENTIONAL RADIOLOGY THEATRE: AN OBSERVATIONAL CROSS-SECTIONAL STUDY

Introduction:
The advancements in minimally invasive techniques have increased the need for anaesthesia in the cardiac catheterisation laboratory (CCL) and interventional radiology theatre (IRT). Previous studies have recorded monthly anaesthetist radiation exposure across different procedure types. We investigated radiation exposure per procedure.

Methods:
This cross-sectional observational study measured anaesthetists' radiation exposure during elective procedures in the CCL and IRT at Steve Biko Academic Hospital. Procedure type, procedure duration, and radiation exposure were analysed through multivariate regression analysis.

Results:
A total of 145 procedures were recorded. The median (IQR) paediatric CCL whole-body effective dose (ED) was 0.012mSv (0.005 to 0.29mSv), with a calculated maximum possible monthly median exposure (CMPMME) of 0.288mSv. The median whole-body ED in the adult CCL was 0.13mSv (IQR 0.36 to 0.289mSv), with CMPMME of 3.12mSv. IRT median ED was 0.0245mSv (0.005 to 0.202mSv) with a CMPMME of 0.392mSv. The difference in overall radiation exposure between diagnostic and interventional procedures was statistically significant in the adult CCL ($p=0.01$) but not in the paediatric CCL ($p=0.89$). No statistical correlation was found between procedure duration and radiation exposure ($p=0.68$).

Conclusion:
Whole-body ED in the paediatric CCL was within the recommended safety guidelines. However, the adult CCL exceeded safety limits within 6.5 months. Adjustments to registrar allocations and additional precautions are recommended for the adult CCL. The IRT demonstrated a whole-body ED within the safety limits. Endovascular aneurysm repairs had higher radiation exposures than other IRT procedures, but due to the small number of these procedures, additional research is recommended.

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Theme: Innovate
Methodology: Non-Randomised Controlled Trial

Disclaimer:
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Abstract Detail
Title: COMPARING THE MEDICATION COSTS OF TREATING PATIENTS WITH SCHIZOPHRENIA WHO USE CANNABIS TO THOSE WHO DO NOT

Background
Cannabis use is more prevalent in people with schizophrenia than the general population. It is associated with more admissions, more severe psychotic symptoms and a worse response to medication. This study investigated the impact cannabis use on the cost of pharmacological treatment of schizophrenia from the time of admission to Weskoppies Hospital until the time that patients were discharge-ready.

Method
Data was gathered from the hospital pharmacy regarding the cost paid for individual medications for the period 2018-2019. Data was collected from 114 patient records, to form 2 equal cohorts of cannabis exposed and cannabis unexposed patients, based on a urine drug screen or admission of recent cannabis use. The medication they were prescribed from admission until discharge was entered into a data capturing sheet, and the total cost calculated.

Results and Discussion:
The mean cost to treat the cannabis exposed group was R516,47 and the mean cost to treat the cannabis unexposed group was R328,69 (p=0,0519). The mean duration of admission for the cannabis exposed group was 56,57 days, and the mean duration of admission for the cannabis unexposed group was 53,05 days. There were 12 index admissions in the cannabis exposed group, and 8 in the cannabis unexposed group. The results confirmed that patients who use cannabis were costlier to treat than those who do not use cannabis.

Conclusion:
Our study found that cannabis exposure increased the cost to treat schizophrenia at Weskoppies Hospital.

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Abstract Detail
Title: SOCIODEMOGRAPHIC AND OCCUPATIONAL FACTORS ASSOCIATED WITH DEPRESSION AND ANXIETY AMONGST MENTAL HEALTH CARE WORKERS

Background
Anxiety and depression are a worldwide mental health burden with high rates and limited access to treatment, especially in low- and middle-income countries. Mental health care workers are responsible for mental health care, treatment and rehabilitation of affected individuals and are frequently facing high rates of depression and anxiety themselves.

Method
The study was conducted at a tertiary psychiatric facility in Gauteng, Weskoppies Hospital. A cross-sectional study was done using self-administered questionnaires, including a socio-demographic questionnaire, General Anxiety Disorder 7 Scale and the Patient Health Questionnaire 9. The sample size totalled 255 (ten psychiatrists, 15 psychiatry registrars, eight social workers, eight psychologists, nine psychology interns, 124 professional nurses, 36 enrolled nurses, 31 enrolled nursing assistants, nine occupation therapists and five occupational therapy assistants.)

Results and Discussion
It was found that 21.8% of participants had a prior history of anxiety and depression. This group of participants showed significant association with the severity of anxiety and depression at the time of filling the questionnaire. ($p<0.0001$). No other sociodemographic and occupational factors was significantly associated with anxiety and depression.

Conclusion
Our findings indicate mental health care workers with prior history of anxiety and depression are at increased risk of presenting with ongoing symptoms. This group of mental health care workers should receive ongoing support from occupational health services and should be a focus of future research in South Africa.

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Theme: Collaborate
Methodology: Inter-disciplinary study

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Abstract Detail
Title: THE EFFECTS OF ZINGERONE ON DIFFERENTIATION AND SIGNALING PATHWAYS IN BONE CELL LINES

Background: Abnormal activation of osteoclasts leads to the development of osteoporosis and many other bone-related diseases. This study aimed to explore the pharmacological properties of zingerone (ZO) on osteoclastogenesis using RAW264.7 cells.

Methods: The non-toxic concentration of zingerone (200 μM) was determined using resazurin and TRAP staining methods. Western blotting was used to detect the potential underlying mechanism of the inhibition of osteoclastogenesis through the expression of MAPK and NF-kB signaling pathways. The impact of ZO on osteoclast MAPK signaling was explored by incubating RAW 264.7 cells with RANKL (15 ng/ml) for 5, 10 and 15 min. Nuclear protein extraction was performed to determine the impact of ZO on Nf-kB signaling pathways by incubating RAW264.7 cells with RANKL (15 ng/ml) for 15 and 30 min.

Results and Discussion: Our findings demonstrate that treatment with ZO (200 μM) significantly reduced the number of multinucleated osteoclasts, as indicated by decreased TRAP staining and activity ($p<0.05$). Furthermore, ZO exhibited inhibitory effects on the expression levels of p-p38/p38 and p-JK/JNK, but not p-ERK/ERK, within the studied timeframe. ZO exhibited no inhibitory effects on the expression of NF-kB signaling pathway.

Conclusion: These results suggest that ZO may hold promise as a potential therapeutic intervention for osteoporosis by suppressing osteoclast formation and modulating intracellular signaling pathways associated with osteoclastogenesis. Further investigations are warranted to elucidate the precise mechanisms involved and to assess the long-term efficacy and safety of ZO in treating osteoporosis.

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Theme: Innovate
Methodology: Evidence Synthesis

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Abstract Detail
Title: REVIEW OF ANGIOEDEMA AFTER T-PA ADMINISTRATION FOR ISCHEMIC STROKE AT STEVE BIKO ACADEMIC HOSPITAL

Background and aim
Angioedema associated with t-PA use in ischemic stroke patients occurs in 1.3-5% of cases, leading to significant morbidity and potential life-threatening risks. ACE inhibitor use for hypertension has been linked to its occurrence. Our report highlights findings of angioedema post-thrombolytic therapy at Steve Biko Academic Hospital, including a correlation with insulo-opercular infarcts.

Methods
The data of all patients who developed angioedema after receiving alteplase for the management of acute ischemic stroke was reviewed by extracting it from the stroke database and patient files from January 2020 – March 2023.

Results
During the study, 117 patients with acute stroke received alteplase. Out of these, 2.5% (three patients) developed angioedema. The patients were on antihypertensive treatment prior to admission, and angioedema symptoms occurred within 30-90 minutes after infusion initiation, accompanied by a drop in blood pressure. CT scans revealed infarcts in the contralateral parietal lobe with specific involvement of the opercular area in all patients. One patient required intubation, and antihistamines were administered to all cases, with corticosteroids given to one patient. Angioedema resolved within 12-24 hours. CT perfusion studies showed penumbra (mismatch volumes) exceeding >10mL with an identifiable core of <70mL in all patients, and a mismatch ratio of >1.2 on perfusion imaging was consistently present.

Conclusion
Angioedema, occurring rarely and unilaterally, responded well to antihistamines. It was associated with contralateral parietal lesions and a drop in blood pressure at onset. Clinicians should be aware that parietal lobe infarcts with insulo-opercular involvement may predispose patients to angioedema, possibly due to bradykinin release after reperfusion, signaled by a drop in blood pressure.

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Theme: Collaborate
Methodology: Inter-disciplinary study

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Abstract Detail
Title: INCREASED NUMBER OF SYMPTOMS DURING THE ACUTE PHASE OF SARS-COV-2 INFECTION IN ATHLETES IS ASSOCIATED WITH PROLONGED TIME TO RETURN TO FULL SPORTS PERFORMANCE – AWARE VIII

Background
Factors associated with prolonged time to return to full performance (RTFP) in athletes with recent SARS-CoV-2 infection, are unknown.

Methods
Prospective cohort study with cross sectional analysis. 84 athletes with confirmed SARS-CoV-2 infection assessed at a COVID-19 recovery clinic gave a history of: age, sex, type/level of sport, co-morbidities, pre-infection training hours and 26 acute SARS-CoV-2 symptoms from 3 categories ("nose and throat", "chest and neck", "whole body"). Data on days to RTFP were obtained by structured interviews. Factors associated with RTFP were: demographics, sport participation, history of co-morbidities, pre-infection training history, acute symptoms (type, number). Outcomes were: 1) days to RTFP [median (interquartile range-IQR)] in asymptomatic (n=7) and symptomatic athletes (n=77), and 2) Hazard Ratios (HR; 95%CI) for athletes with vs. without a factor (univariate, multiple models). HR<1 was predictive of higher % chance of prolonged RTFP. Significance was p<0.05.

Results and discussion
Days to RTFP were 30 (23-40) for asymptomatic and 64 (42-91) for symptomatic participants (p=0.026). Factors associated with prolonged RTFP (univariate models) were: females (HR=0.57; p=0.014), endurance athletes (HR=0.41; p<0.0001), co-morbidity number (HR=0.75; p=0.001), respiratory disease history (HR=0.54; p=0.026). In symptomatic athletes, prolonged RTFP (multiple models that included significant co-variates) was significantly associated with increased total number of "all symptoms" (HR 0.91; p=0.001), "whole body" (HR=0.82; p=0.007), "chest and neck" (HR=0.85; p=0.017) and "nose and throat" (HR 0.84); p=0.013) symptoms.

Conclusion
Larger number of total symptoms and specifically "whole body" symptoms during acute phase of SARS-CoV-2 infection in athletes, is associated with prolonged RTFP.

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
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Abstract Detail
Title: THE EFFECTS OF LYCOPENE ON OSTEOCLAST DIFFERENTIATION IN RAW264.7 MURINE MACROPHAGES

Background
Osteoporosis is characterized by low bone mineral density (BMD) and over-active bone resorbing osteoclasts. Osteoclasts and bone-forming osteoblasts work together during the process of bone remodelling to maintain bone structure. Lycopene is a potent carotenoid containing anti-inflammatory and anti-oxidant properties and has potential protective effects against bone dysfunction. This study aims to investigate the effects of lycopene on osteoclast differentiation in vitro.

Methods
RAW264.7 murine macrophages were employed to investigate the impact of lycopene (10–50 μM) on cell viability using the resazurin assay. The effect of lycopene on osteoclast differentiation was assessed using tartrate-resistant acid phosphatase (TRAP) staining. Osteoclast formation was induced by 15 ng/mL of the receptor activator of nuclear factor-κB (NF-κB) ligand (RANKL).

Results and Discussion
Lycopene did not have a significant effect on cell viability. However, it appeared to decrease osteoclast differentiation with increasing concentrations. These preliminary results suggests that lycopene may have positive effects on bone health.

Conclusion
In conclusion, our findings indicate that lycopene exhibits a dose-dependent decrease in osteoclast differentiation. This observation suggests the potential of lycopene as a therapeutic agent for osteoporosis, a condition characterized by excessive osteoclast activity leading to bone loss. By inhibiting osteoclast differentiation, lycopene may help mitigate osteoporosis progression and contribute to the preservation of bone density. Further investigations and clinical studies are warranted to validate the efficacy of lycopene as a promising intervention for osteoporosis management.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: WEST NILE VIRUS, A MISSED CAUSE OF ACUTE FEVER OF UNKNOWN CAUSE AND NEUROLOGICAL DISEASE AMONG HOSPITALIZED PATIENTS BEFORE AND THROUGHOUT THE COVID-19 PANDEMIC IN SOUTH AFRICA

Background: West Nile virus (WNV) is a vector-borne arbovirus is endemic to South Africa yet remains understudied. To address this gap, we sought to investigate the association of WNV with neurological disease in hospitalized patients.

Method: Molecular and WNV IgM serological screening was performed in two cohorts of hospitalized patients in South Africa. The first cohort focused on retrospectively collected CSF specimens sent to the Tshwane NHLS lab for viral testing in 2017. The second cohort focused on prospective enrolment of patients with acute febrile or neurological at the urban Kalafong Hospital, and the rural Matikwane and Mapulaneng hospitals in 2019 to 2021. Demographic and socioeconomic risk factors for WNV infection were investigated.

Results and discussion: Retrospectively, WNV was identified in 8/219 patients (3,65%). Prospectively, WNV was identified in 40/441 (9,07%) AFDUC patients, of which 72,50% had neurological signs. An increase in percentage positivity was observed from 2019 (8,55%) to 2021 (10,90%) suggesting WNV was a missed cause of febrile and neurological disease in patients hospitalized in South Africa through the COVID-19 pandemic. Immunocompetent females, adolescents, and residents of the Mpumalanga province had a higher likelihood for WNV infection.

Conclusion: The findings identified WNV as the etiological agent in up to 10,90% of hospitalized patients experiencing acute febrile and neurological disease in South Africa. This study lays the groundwork for defining the true burden of WNV amongst undiagnosed cases of febrile and neurological disease in hospitalzed patients in South African and suggests a significant disease burden not previously known.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: MOLECULAR CHARACTERISATION OF FLAVIVIRUSES DETECTED IN MOSQUITOES FROM LIMPOPO PROVINCE IN SOUTH AFRICA, 2021

Background: Flaviviridae is a family of arboviruses that are important causes of diseases globally and can be transmitted by mosquitoes. Multiple mosquito vectors for arboviruses have been detected in Vhembe, the northernmost district of Limpopo Province. This study aimed to provide information on circulating flaviviruses in mosquitoes in Limpopo during 2021.

Method: Mosquito samples were collected in Vhembe during 2021 with CO_2-baited light traps and tent traps, followed by morphological identification. Mosquitoes were pooled by species, date, site, and the homogenised supernatant used for RNA extraction. Mosquito pools were screened using a published flavivirus reverse transcription polymerase chain reaction (RT-PCR). Sanger sequencing followed by sequence-independent single primer amplification (SISPA) on the Illumina platform was performed on flavivirus positive RT-PCR products. Phylogenetic analysis was done with the sequences obtained from Sanger sequencing.

Results and Discussion: Eight of the 129 (6.2%) adult mosquito pools tested positive for flavivirus which clustered with mosquito flavivirus isolated from Culex antennatus in Mozambique. For cost effectiveness, only five pools were subjected to SISPA from which some viral reads were obtained with high coverage to other known insect specific viruses.

Conclusion: Mosquito-borne and insect-specific arboviruses are known to replicate and persist in the same ecosystems. The co-circulation of insect-specific arboviruses can influence the secondary infection of mosquito-borne arboviruses. Arboviruses have epidemic potential. Due to their high mutation rates, there are many unidentified strains that may be pathogenic. Differential diagnosis of human febrile cases caused by arboviruses may potentially be overlooked in areas with high malaria cases such as Limpopo.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: IMMATURE CIRCULATING HAEMATOPOIETIC STEM AND PROGENITOR CELLS IN A TREATMENT NAÏVE HIV POSITIVE COHORT

BACKGROUND AND OBJECTIVES: The human immunodeficiency virus (HIV) has been hypothesized to have a negative impact on haematopoiesis in the bone marrow (BM). A small fraction of haematopoietic stem and progenitor cells (HSPCs) which mediate haematopoiesis, is released from the BM into the peripheral circulation. Our study aimed to determine the impact of HIV on the frequency and functionality of circulating HSPCs.

METHODS: Peripheral blood was collected from treatment-naïve HIV positive patients and HIV negative patients after obtaining informed consent (Sefako Makgatho Ethics: SMUREC/M/86/2020: IR; UP Ethics: 664/2019). Peripheral blood mononuclear blood cells (PBMNC) were isolated and the frequency of CD34+ HSPCs as well as the distribution of various CD34+ HSPC sub-populations were determined using flow cytometry. The potential impact of HIV on HSPC function was investigated by performing the colony-forming unit (CFU) assay.

RESULTS: HIV positive treatment naïve patients showed a significantly lower number of circulating HSPCs compared to the HIV negative patients. No differences were observed in the phenotypic profiles, sub-population distribution and differentiation capabilities of circulating HSPCs from HIV positive patients compared to HIV negative patients. Circulating HSPCs, from both HIV positive and negative patients, mainly differentiated into CFU-granulocyte, erythroid, macrophage, megakaryocytic (GEMM)- and CFU granulocyte, macrophage (GM) colonies.

CONCLUSION: In vivo HIV exposure has a negative impact on circulating HSPC frequency but does not affect the differentiation capabilities and sub-population distribution of these cells.

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: IN VITRO INFLUENCE OF NUTRIENT DEPRIVATION AND PAPAVERINE EXPOSURE IN BREAST CANCER CELLS

Background: Tumorigenic cells upregulate mitochondrial complex I, an enzyme essential for oxidative phosphorylation, in order to withstand the antiproliferative effects of nutrient deprivation. Recently, Papaverine (PPV), an ergot alkaloid was found to inhibit mitochondrial complex I and oxidative phosphorylation.

Methodology: Thus, the effects of nutrient deprivation and PPV exposure were investigated in this study on proliferation, cell morphology and oxidative stress in breast tumorigenic cell lines by means of spectrophotometry, light microscopy and fluorescent microscopy.

Results and Discussion: Spectrophotometry revealed that nutrient-deprived MCF-7- and MDA-MB-231 cells exposed to 100 µM PPV demonstrated decreased cell proliferation to 58% and 51%, respectively. Morphology studies revealed that nutrient-deprived MCF-7- and MDA-MB-231 cells exposed to PPV showed an increase in enlarged morphology to 14% and 21%, respectively. Fluorescent microscopy revealed that nutrient-deprived MCF-7- and MDA-MB-231 cells exposed to PPV possessed significantly increased hydrogen peroxide production to 140% and 113%, respectively. Nutrient-deprived MCF-7- and MDA-MB-231 cells exposed to PPV significantly decreased superoxide production to 91% and 77%, respectively.

Conclusion: This study provides further insight regarding the effects of nutrient deprivation and mitochondrial complex 1 inhibitor in breast tumorigenic cells.

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Theme: Collaborate
Methodology: Inter-disciplinary study

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Abstract Detail
Title: DIETITIANS' KNOWLEDGE AND PERCEPTIONS OF FOOD-DRUG INTERACTIONS AND FACTORS AFFECTING IT

Abstract
Dietitians ensure patients receive tailored therapeutic nutrition that effectively and safely integrates with pharmacotherapeutic strategies. This necessitates a basic understanding of pharmacology to prevent and mitigate detrimental food-drug interactions. The study aimed to investigate dietitians' knowledge of food-drug interactions and their sourcing of information related to it.

Methods
Registered dietitians' knowledge was assessed cross-sectionally using an online questionnaire after circulation via the Association for Dietetics in South Africa. The questionnaire comprised four sections: participant demographics; food-drug interaction knowledge; timing of food intake relative to drugs knowledge; and sourcing of information.

Results and Discussion
Out of 70 responses, most participants were female and over 30 years old. Most dietitians dealt with chronic/lifestyle disorders (75.7%) in outpatient (41.4%) settings. Knowledge deficiencies were observed for fundamental food-drug interactions with a cumulative mean score of 38.3%. Drug package inserts (55.7%) and clinical websites (68.6%) were primarily used; however, the former reportedly had insufficient food-drug interaction information. Participants proposed further education, and the use of applications and summarised resources to overcome deficiencies.

Conclusion
Although the low response rate does not allow for generalisation, knowledge deficiencies and uncertainty were identified for seminal food-drug interactions. Further investigation is required to determine their origins and affecting factors. As dietitians' scope of practice requires knowledge of such interactions, educational aspects should be strengthened/supplemented with appropriate resources.

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Theme: Innovate
Methodology: Evidence Synthesis

Disclaimer:
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Abstract Detail
Title: PERFORMANCE OF EQUATIONS FOR CALCULATED LDL-C IN HYPERTRIGLYCERIDAEMIA: WHICH ONE CORRELATES BEST WITH DIRECTLY MEASURED LDL-C?

Background
The gold standard for measuring LDL-C is impractical and direct measurements have numerous shortcomings. Older predictive equations are used only with triglycerides (TG's) below 4.52mmol/L. We evaluated the newer equations validated for use in hypertriglyceridaemia by comparison with direct LDL-C.

Method
Datasets from two platforms (Abbott Architect and Roche Cobas) comprised of a large cohort of 64765 individuals were used to compare the Sampson-National Institutes of Health 2 (S-NIH2) and Extended Martin-Hopkins (E-MH) equations for LDL-C with direct LDL-C (dLDL-C) assays.

Results and discussion
With TG's of 4.52-9.04 mmol/L the S-NIH2 equation tended to calculate lower values(negative median bias) and the E-MH equation showed positive median bias over the dLDL-C assay. Both equations correlated better with the dLDL-C measured on Abbott than Roche with the E-MH equation having more values falling within acceptable bias levels on both platforms.

Conclusion
The E-MH equation correlates better with dLDL-C than the S-NIH2 on both platforms with TG levels up to 9.04mmol/L. With hypertriglyceridaemia, the E-MH equation is less likely than the S-NIH2 equation to underestimate LDL-C when compared to the dLDL-C and will be less likely to underdiagnose patients with LDL-C levels requiring treatment according to current guidelines.

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Theme: Collaborate
Methodology: Inter-disciplinary study

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Abstract Detail
Title: THE ROLE OF OXIDATIVE STRESS IN THE EFFECTS MEDIATED BY A GARLIC CONSTITUENT (DIALLYL TRISULFIDE) IN CERVICAL- AND PROSTATE CANCER CELL LINES.

Diallyl trisulphide (DATS) is an organosulfur compound found in garlic that exerts antiproliferative- and antimitotic activity. In the current study, the role of reactive oxygen species (ROS) were evaluated in the activity exerted by DATS in tumorigenic cells.

Materials and methods
Cervical cancer cells (HeLa) and prostate cancer cells (DU145) were exposed to DATS in the presence and absence of N-acetyl cysteine (NAC), a ROS scavenger. Subsequently, effects were evaluated on proliferation, using spectrophotometry, morphology using light microscopy, cell cycle progression using flow cytometry and oxidative stress utilising fluorescence microscopy.

Data showed that DATS exposure for 48- and 72 hours decreased cell growth to 53% and 39% in the HeLa cell line and 42% and 26% in the DU145 cell line; however, the antiproliferative effect was completely abrogated by NAC. Light microscopy revealed that 150 µm DATS exposure for 48- and 72 hours decreased cell density and increased cell rounding to 44 and 42 in the DU145 cell line. Flow cytometry demonstrated that an increased percentage of HeLa cells occupy the G2M phase after exposure to DATS. All of the above-mentioned effects were abrogated by NAC. In addition to this, fluorescence microscopy confirmed that DATS exposure increased hydrogen peroxide production.

This study shows that the effects of DATS on proliferation, cell rounding, cell death are inhibited by NAC in both cell lines, which suggests that DATS exerts a ROS-dependent mode of action. This study adds to what is currently known about the role of oxidative stress in the effects induced by DATS in tumorigenic cell lines.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: ONE HEALTH APPROACH INVESTIGATING SHIGA TOXIN-PRODUCING ESCHERICHIA COLI SEROTYPES FROM HUMAN STOOL SPECIMENS AND CATTLE RUN-OFF WATER SAMPLES IN SOUTH AFRICA

BACKGROUND: There is a lack of data regarding the prevalence of Shiga toxin-producing Escherichia coli (STEC) serotypes in clinical and environmental settings in South Africa. The aim of this study was to use a One Health approach to investigate the prevalence and pathogenic potential of STEC isolates from cattle run-off water samples and human stool specimens in South Africa.

METHODS: Thirty-nine STEC isolates were collected from a private diagnostic laboratory and eight STEC isolates were isolated from 30 run-off water samples collected from 10 beef abattoirs and 20 cattle feedlots. Total genomic DNA was extracted followed by multiplex polymerase chain reaction assays to screen for Shiga toxins, O-antigens and virulence factors. Repetitive extragenic palindromic polymerase chain reaction (REP-PCR) typing method was used to determine the genetic relatedness of the STEC isolates.

RESULTS AND DISCUSSION: Shiga toxin-2(stx2) gene [42.55% (20/47)] was more prevalent than Shiga toxin-1 (stx1) gene [31.91% (15/47)] and two STEC isolates tested positive for both stx1 and stx2. These isolates have a greater potential to cause severe disease since stx2 is considered more cytotoxic. The REP profiles indicated a high genetic diversity with the most prevalent serotypes [31.91% (15/47)] detected: O26 followed by O157 [12.77% (6/47)] in stool and water samples. Both serotypes have been associated with past outbreaks.

CONCLUSION: The environment is an important reservoir of pathogenic STEC which poses a public health risk, especially to users of untreated water. Increased surveillance and improvements in wastewater treatment and decontamination at farms and abattoirs need to be implemented.

Faculty Research Day 2023
Abstract no: 2023023

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: INVESTIGTING THE HIV-1 P24 EXPRESSION OF BONE MARROW-DERIVED HAEMATOPOEITIC STEM AND PROGENITOR CELLS

Background:
Direct infection of haematopoietic stem and progenitor cells (HSPCs) is one of the causative mechanisms suggested for HIV-1-associated cytopenias and morphological changes frequently observed in the bone marrow (BM) of infected individuals. The HIV-1 structural capsid protein, p24, is often used to detect early HIV-1 infection. We investigated what frequency of HSPCs, isolated from the BM aspirates of HIV-1 positive individuals, had detectable levels of intracellular HIV-1 p24 protein.

Method:
BM aspirates without malignant disease were obtained from both HIV-1 positive and negative patients through the National Health Laboratory Services (NHLS) - Tshwane Academic Division (TAD) (Ethics approval number: 396/2021). Mononuclear cells were isolated, stimulated for 24 hours using cytokines and processed in order to perform the p24 HIV-1 flow assay on a CytoFLEX flow cytometer.

Results and discussion:
A higher proportion of CD34+/p24+ HSPCs were present in HIV-1 positive (1.22%) BM aspirates compared to negative (0.18%) aspirates. The majority of these p24 expressing CD34+ HSPCs had an intermediate expression of lineage markers suggesting a more mature phenotype. In addition, majority of these HSPCs expressed CD4 and co-expressed CXCR4 and CCR5. The small proportion of CD34+/p24+ HSPCs that lacked the expression of lineage markers did not express CD4 but expressed CXCR4.

Conclusion:
Our data strongly suggests that CD34+ haematopoietic progenitors may be susceptible to infection by X-tropic or R-tropic HIV-1 strains. These results will however need to be confirmed using other techniques as it provides insight into the manifestation of HIV-1 associated haematological abnormalities and may have implications for the development of HIV-targeted cell-based therapies.

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: IN VITRO INFLUENCE OF PAPAVERINE ON PROLIFERATION AND MORPHOLOGY IN CERVICAL TUMOURIGENIC CELLS

Background:
Papaverine (PPV) is a benzylisoquinoline alkaloid extracted from the Papaverine somniferum plant which has been shown to selectively induce cell death and inhibit cell growth in various tumourigenic cells. However, biochemical signalling pathways induced by PPV have not yet been extensively defined. The aim of this project was to investigate the effects of PPV on the proliferation and morphology of cervical tumourigenic (HeLa) cells.

Methods:
The effects of PPV on proliferation and morphology were investigated by means of spectrophotometry (crystal violet staining), polarization-optical transmitted light differential interface contrast (PlasDIC) and light microscopy (haematoxylin and eosin staining).

Results and discussions:
Spectrophotometry data showed that PPV induces antiproliferative activity in a dose- and time-dependent manner, with exposure to 10-, 100- and 125 µM PPV reducing cell growth to 88%, 76% and 70% after 48 h, 92%, 78% and 60% after 72 h and 84%, 55% and 43% after 96 h. Furthermore, light microscopy (H & E staining) and PlasDIC confirmed that PPV decreased cell density in addition to inducing abnormal morphology including cell rounding.

Conclusion:
This study demonstrated that PPV decreased cell proliferation and caused aberrant morphological characteristics in HeLa cells. Future studies will include effects of PPV on reactive oxygen species formation by utilizing fluorescent microscopy (2,7-dichlorofluorescein diacetate and hydroethidine). This study contributes to the understanding of how this phytomedicinal compound may potentially be utilized in anti-cancer strategies.

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Theme: Collaborate
Methodology: Inter-disciplinary study

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Abstract Detail
Title: RELATIONSHIPS BETWEEN CHANGES IN SINGLE-ITEM SELF-REPORT MEASURES OF WELL-BEING AND CHANGES IN EXTERNAL LOAD IN FEMALE STUDENT HOCKEY PLAYERS DURING COMPETITION

Background: Athlete monitoring is employed to guide preparation and recovery strategies, and inform support staff of changes in athlete well-being. Research on the well-being and external load demands of congested tournament play in student female hockey players is scarce. This study aimed to assess changes in pre-match well-being and changes in running performance in a team of female hockey players during the University Sports South Africa tournament (n = 16; 20 ± 1.8 y; 163 ± 5.9 cm; 63 ± 9.4 kg).

Method: At 9am, players rated their well-being on a scale of 1 (low) - 5 (high). Global positioning system metrics included: player match time (min), total distance (m) and >16 km.h-1 running distance (m). Changes were analysed using the Wilcoxon signed ranks test, and associations between variables determined using Spearman's correlation coefficient.

Results and Discussion: No significant associations were found between increased (i.e. worse) pre-match well-being (fatigue, stress, soreness and total well-being) and increased external load either mid-tournament or on the last day. From the Day 1 to Day 3, worse stress and soreness were associated with worse total well-being ($p = 0.002$, $r = 0.72$; $p = 0.005$, $r = 0.67$); from Day 1 to Day 5, worse fatigue and stress were associated with worse total well-being ($p = 0.003$, $r = 0.70$; $p = 0.018$, $r = 0.58$).

Conclusion: The single-item self-report measure of stress may be useful in monitoring overall well-being during competition. Results concur with literature reporting unclear associations between pre-match well-being and external load.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Abstract Detail
Title: DEVELOPMENT OF A PORTABLE THERMAL SENSATION DEVICE FOR OBJECTIVE ASSESSMENT OF SENSORY DYSFUNCTION

Background: Pain and temperature sensory function assessment play a critical role in understanding underlying disease states. However, current methods predominantly rely on subjective evaluations, which may not accurately reflect the true condition. This study aimed to develop a portable thermal sensation device that objectively evaluates thermal sensation thresholds, including cold and hot sensations.

Methods: The prototype device was built using a Peltier element, enabling both heating and cooling capabilities. To ensure affordability and rapid iteration, the prototype was developed using a combination of open-source electronics and 3D printing techniques. A low-cost microcontroller was employed to control the device, measure the patient's skin temperature, and ensure precise heating or cooling. The enclosure and structural elements of the device were 3D printed.

Results and Discussion: Before clinical application, the device will undergo calibration and validation in a laboratory setting. This process will involve the use of high-accuracy temperature sensors and a custom-built testing facility, leveraging the expertise of the Department of Mechanical and Aeronautical Engineering's heat transfer laboratories. Calibration will ensure accurate temperature measurements and reliable device performance for subsequent patient assessments.

Conclusion: The development of the portable thermal sensation device holds significant promise for objectively assessing sensory dysfunction. By objectively evaluating thermal sensation thresholds, including both cold and hot sensations, this device can provide valuable insights into disease progression and facilitate early detection of neuropathy. Offering an objective measure of sensory function, the device has the potential to enhance patient care and improve treatment outcomes for individuals with various conditions affecting sensory perception.

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Theme: Collaborate
Methodology: Inter-disciplinary study

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Abstract Detail
Title: THE EFFECTS OF CHRYSIN ON OSTEOCLASTOGENESIS IN RAW264.7 MURINE MACROPHAGES AND BONE METABOLISM IN SPRAGUE DAWLEY RATS

Background
Bone is a metabolically active tissue that is continuously resorbed/reformed by osteoclasts and osteoblasts respectively. Excessive osteoclast activity can lead to bone degeneration. Receptor activator of nuclear factor κB (RANK) signalling is crucial for osteoclast formation and function. The aim of this study was to investigate the potential bone protective effects of a bioactive phytochemical, chrysin.

Methods
Tartrate resistant acid phosphatase (TRAP) staining was conducted to determine the effect of chrysin on osteoclast differentiation. TRAP-positive cells of three or more nuclei were counted. qPCR was conducted to determine the effect on key osteoclast genes. Western blotting was conducted to determine the effect on the RANK signalling pathways. MicroCT was used to evaluate length and area of the tibia bones and their midpoints in Sprague-Dawley rats.

Results
TRAP staining showed that chrysin (5-100μM) significantly decreased the number of osteoclasts formed compared to the positive control. The IC50 (14μM) was determined. qPCR analysis showed the NFATc1 expression was significantly inhibited at day 5, and TRAP expression at day 3 and 5. Western blot analysis showed a decrease in the phosphorylation of ERK and an increase in the phosphorylation of p38 at 5 min. The analysis of the tibia bones showed no significant changes in the length-to-mass ratio, the average midpoint radius-to-mass, or robusticity index of the bones.

Conclusion
The results indicate that chrysin inhibits osteoclastogenesis through the inhibition of NFATc1 and TRAP genes and the phosphorylation of ERK. These findings demonstrate the potential of chrysin as a viable therapeutic agent in bone degenerative disorders.

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Theme: Innovate
Methodology: Non-Randomised Controlled Trial

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Abstract Detail
Title: OBSTETRIC PERIOPERATIVE DOCUMENTATION QUALITY IN AN ANAESTHESIOLOGY DEPARTMENT

Introduction: Perioperative documentation is essential in anaesthetic practice. Incomplete anaesthetic records may result in adverse treatment outcomes and pose medico-legal risks which may result in financial and criminal implications for clinicians.

Methods: This was a retrospective, descriptive cross-sectional study between January 2019 to December 2020, reviewing caesarean section perioperative anaesthetic records. The objectives were to evaluate the completeness of obstetric perioperative records during the perioperative period against the American Society of Anaesthesiologists policy statement on perioperative anaesthesia care documentation. An association was explored between record completeness and experience of the anaesthesia trainees and complications resulting from record incompleteness.

Results: The study population comprised 1000 patients. A sample of 278 obstetric records was randomly collected from the medical records; each fourth file was analysed, and 276 data items were collected. The analysis revealed a poor anaesthetic record completion rate with Medical Officers (MO) at 51.3%, compared to registrars at 42.9%. Both trainee levels adequately completed intraoperative monitoring, blood loss, and intravenous fluids but poor documentation of endotracheal tube size was observed by registrars and MO. Postoperative variables were completed poorly with crucial information such as block height recorded by 12.2% MO and 10.6% registrars.

Conclusions: Perioperative anaesthetic record documentation did not comply with the prevailing standard of care. Ongoing orientation of new trainees and incorporation of recordkeeping and documentation in the academic curriculum are recommended. Random annual audits and electronic recordkeeping could enhance accuracy and ease of storage, ultimately improving patient care and minimising medico-legal risk.

Keywords: Anaesthesia; medical officers; obstetric patients; perioperative notes; registrars; recordkeeping

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Theme: Innovate
Methodology: Non-Randomised Controlled Trial

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Abstract Detail
Title: MOLECULAR DETECTION OF POTENTIALLY ZOONOTIC RUBULAVIRUSES IN THE EGYPTIAN ROUSETTE BAT OF LIMPOPO, SOUTH AFRICA

Background
Bats have been implicated as hosts to diverse paramyxoviruses, some of which are related to known human pathogens. The emergence of the zoonotic Sosuga virus (SOSV) from Egyptian rousette bats (ERBs) aetiological agent of acute febrile illness reported in a human, attracted attention to the Rubulavirinae subfamily. Previous research detected human parainfluenza 2 (HPIV2) and mumps related viruses in ERBs from South Africa, though not SOSV. The aim of the study was to expand on rubulavirus biosurveillance in ERBs from Limpopo, South Africa.

Methods and Materials
Retrospective spleen, intestine and population-level faecal samples collected from the Matlapitsi cave, Limpopo were tested for SOSV RNA using a SOSV specific qRT-PCR. Population-level faecal were additionally tested for rubulavirus RNA using a broadly reactive hemi-nested RT-PCR targeting the polymerase gene of rubulaviruses. Positive samples were confirmed with Sanger sequencing and temporal excretion was assessed.

Results and Discussion
No SOSV RNA was detected which suggests that the virus is not currently circulating in the ERB population or is present at a very low prevalence. Diverse rubulaviruses were detected in population-level faecal including the HPIV2 and mumps-related virus sequences among additional pararubulaviruses. Periods of increased detection for HPIV2-related viruses were found to be during autumn and winter for the pararubulaviruses. This coincides with limited food availability in winter and the presumed waning of maternal antibodies in autumn.

Conclusion
The study identified periods of higher risk of viral spillover for bat-associated viruses closely related to known human pathogens.

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Theme: Innovate
Methodology: Non-Randomised Controlled Trial

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Abstract Detail
Title: INVESTIGATION OF THE GRAVITATIONAL VALVE SHUNT IN PAEDIATRIC PATIENTS WITH HYDROCEPHALUS

Background: This study investigates the survival rate of gravitational valve shunts in paediatric patients with hydrocephalus, characterized by the accumulation of fluid in the brain's ventricles.

Method: Patient data were collected from files following ethical approval. Inclusion criteria encompassed patients aged 0-12 years who received gravitational valve shunt insertion between January 2019 and December 2021. Data collected includes age, gender, hydrocephalus cause, admission and discharge dates, implantation surgery date, revision/replacement surgery date, hospital stay duration, and shunt survival. All data was stored in a password-protected Excel spreadsheet on a USB drive within the neurosurgery department at Steve Biko Academic Hospital.

Results/Discussion: Fourteen patients underwent a total of 33 surgeries, with 19 being revision surgeries. Shunt survival probability was determined to be 93% two days post-initial surgery, declining to 67% after 122 days. As the number of revision surgeries increased, the probability of shunt survival decreased, reaching 25% after the fourth shunt insertion.

Conclusion: This study demonstrates the beneficial impact of gravitational valve shunts on patients with hydrocephalus. Patients with brain haemorrhage, cysts, and brain tumours necessitate more frequent revision and replacement surgeries, highlighting the individual patient's influence on shunt survivability.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: CHALLENGES AND INSIGHTS IN THE INVESTIGATION OF VARIANTS ASSOCIATED WITH NEONATAL ENCEPHALOPATHY WITH SUSPECTED HYPOXIC ISCHEMIC ENCEPHALOPATHY

Neonatal encephalopathy with suspected hypoxic ischemic encephalopathy (NESHIE) is diagnosed shortly after birth and frequently results in severe disability including cognitive defects, seizures, and cerebral palsy. Identifying genetic variants associated with NESHIE could be used to predict risk of developing the condition and/or identify genetic pathways that could increase the understanding of the condition or identify new targets for drug discovery.

This study forms part of an ongoing national study on NESHIE. Whole genome sequencing and variant calling have been completed on 191 NESHIE neonates and 399 ancestry-matched controls by study collaborators. This study determined which of the neonate's genetic variants are found at a frequency of less than 1% in global reference populations, as common variants are less likely to have a deleterious effect. Subsequently, association testing was performed with the aim of identifying which of these variants are significantly associated with NESHIE.

Extensive quality control and statistical analysis were conducted, which resulted in the identification and removal of poor-quality variants and samples. Additionally, this process identified significant batch effects and other inherent data errors that necessitate correction. Provisional results revealed the presence of certain genetic variants that warrant further investigation.

Initial results suggest a potential association between genetic variants and the presence of NESHIE. Further work will involve further troubleshooting, verifying initial results, identifying additional variants, and expanding the study through genome- and phenome-wide associated studies.

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
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Abstract Detail
Title: A COGNITIVE LOAD THEORY PERSPECTIVE OF THE UNDERGRADUATE ANAESTHETIC CURRICULA FOR PRACTICE IN SOUTH AFRICA

Background:Junior doctors in South Africa (SA) are expected to provide anaesthesia with limited supervision. Graduating doctors report a low self-perceived competence, suggesting the need for standardised national undergraduate Anaesthesia training outcomes. Cognitive Load Theory (CLT), comprising Intrinsic- (ICL), Extraneous- (ECL), and Germane (GCL) Loads, offers a lens through which to understand student experiences of the undergraduate Anaesthesiology curriculum.

Methodology:Following a national survey, this study explored the qualitative factors that influenced students' self-perceived preparedness after undergraduate Anaesthesiology training at eight medical schools in SA. Two investigators coded the data independently. An emerging theme of lack of time to achieve the expected outcomes, prompted the use of CLT as a conceptual framework for data analysis.

Results and discussion:The 1336 respondents (79% participation) reported challenges in these CLT areas; ICL: Task quantity, complexity and interactivity. ECL: Ineffective instructional methods, external- and internal distractors. GCL: Programme design, metacognition, and learner motivation. The contribution of ECL was higher than reported in other disciplines, potentially due to the nature of anaesthetic practice with multiple distractions in theatre, and the urgent nature and high stakes of required actions. Contrary to previous work, our study included theoretical and workplace-based training and investigated cognitive load at programme level, as opposed to individual tasks. Our study shows that curriculum reform requires consideration of curricular systems, in addition to content.

Conclusion:ECL is high in undergraduate Anaesthesia training. Measures are required to reduce ECL while optimizing ICL, to enable capacity for GCL. This could enhance learning in an inherently complex curriculum.

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Theme: Innovate
Methodology: Evidence Synthesis

Disclaimer:
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Abstract Detail
Title: INVESTIGATING THE OPTIC NERVE SHEATH DIAMETER MEASUREMENT BY ULTRASOUND AS AN INDICATOR FOR INCREASED INTRACRANIAL PRESSURE IN PATIENTS WITH BRAIN TUMOURS

Background: Intracranial pressure (ICP) is a measure of the pressure created by the contents of the cranium. Brain tumours disrupt the contents of the cranium causing ICP to increase. The gold standards for measuring ICP are lumbar punctures or intraventricular catheters. However, these invasive methods cannot be used in every hospital, are intrusive, and increase the risk of infection and haemorrhage. The goal of this study was to determine whether the measurement of the optic nerve sheath diameter (ONSD) using ultrasound is successful in ICP identification and management.

Materials and methods: A retrospective study was conducted to determine whether the ONSD pre- and post-operative measurements correlated with ICP breakpoints in brain tumour patients. A total of 28 patients had pre-operative ONSD measurements that were measured and analysed using the Phillips Epiq Elite ultrasound machine. Pre-operative and post-operative ONSD measurements were compared between 5 patients.

Results and discussion: Both the left and right pre-operative mean ONSD measurements were larger than 0.5 cm suggesting that we can objectively determine elevated ICP using ultrasound of the ONSD. The left pre- compared to left post-operative measurements showed a significant difference (p=0.0016), and all pre- versus all post-operative measurements were statistically significant (p=0.0049). The right pre- and post-operative measurement did not differ significantly which was an unexpected result.

Conclusion: The measurement of the ONSD using ultrasound is a promising tool that can be used to identify elevated ICP levels in patients with brain tumours. However, ultrasound should be used in conjunction with the gold standards to evaluate ICP.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: EVALUATION OF HIV-1 GROUP-SPECIFIC ANTIGEN MUTATIONS ASSOCIATED WITH PROTEASE INHIBITOR RESISTANCE IN TREATMENT NAIVE PARTICIPANTS

Background: Mutations in the group-specific antigen (gag) gene have been reported to contribute to protease inhibitor (PI) resistance. The aim of this study was to evaluate HIV-1 Gag mutations associated with PI resistance in treatment naïve participants.

Methods: Complete HIV-1 Gag and polymerase (Pol) Sanger sequences from a study that screened for early HIV infections were analysed. These sequences are from treatment naïve participants sampled at two time points at a median interval of 4 weeks (IQR: 3 – 8 weeks). Baseline and follow-up Gag sequences were aligned and analysed for mutations associated with PI resistance. Pol sequences were analysed for PI mutations using the Stanford HIV database.

Results and discussion: This study enrolled 47 adults. No major PI mutations were identified in all participants, except for two participants who had PI accessory mutations. All participants had at least one drug-resistance Gag mutation at baseline and follow-up and these were identified in the cleavage and non-cleavage sites. There were no mutations in the Gag capsid (CA) and CA/P2 cleavage site at baseline, but these were observed at follow-up in some (11%) sequences. This shows that CA is more conserved, and mutations are a result of viral evolution. Majority (96%) of the Gag mutations were located within cytotoxic T-lymphocyte epitopes, this could mean these mutations were selected by immune pressure.

Conclusions: This study identified Gag mutations known to be associated with PI resistance in treatment naïve participants. These findings show that these are not compensatory mutations that appear after PI drug pressure.

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Theme: Innovate
Methodology: Non-Randomised Controlled Trial

Disclaimer:
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Abstract Detail
Title: CHANGES IN INCIDENCE OF PATIENTS NEWLY DIAGNOSED WITH CERVIX CANCER BEFORE AND DURING COVID-19

Background:
COVID-19 posed a significant risk to individuals with compromised immune systems (including patients with cervix cancer), and added a heavy burden to the public health system.

Method:
A retrospective cohort study examining demographic, stage and histological data of newly diagnosed cervix cancer cases prior to the pandemic (2018-2019) [Group 1] versus during the pandemic (2020 – 2021) [Group 2] seen in the Department of Medical Oncology.

Results and Discussion:
Twelve patients were seen in Group 1, versus 79 patients in Group 2. Differences were seen in residential province with more patients residing in Mpumalanga in Group 1 (42% vs 27%) vs Gauteng in Group 2(63% vs 50%). Time from referral to first seen was higher in the patients seen between 1-9 days (17% vs 10%) and 30 to 39 days (25% vs 9%) in Group 1 versus those seen with a 9-29 day delay in Group 2 (16% vs 38%). Patients in Group 1 presented with a higher performance status of 2 (17% vs 5%) and 3 (8% vs 5%). Histological subtype showed marked differences with Group 1 reporting neuroendocrine (42% vs 8%) and Group 2 reporting squamous cell carcinoma (85% vs 50%). Stage at presentation favoured Group 1 in Stage I disease (17% vs 4%); but showed increased disease burden amongst Group 2 : stage III (8% vs 14%); Stage IV (67% vs 78%).

Conclusion:
The study identified differences between the two groups, but not favouring either time period throughout which confirmed that the healthcare system's adjustments resulted in optimal care for patients with cervical cancer, ensured timely diagnosis and treatment.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: SORGHUM BRAN POLYPHENOLS AND THEIR POTENTIAL IN VITRO EFFECTS AGAINST METABOLIC SYNDROME

Sorghum is an underutilised nutritious cereal grain rich in polyphenols, that are concentrated in the outer layers of the grain (sorghum bran) and in South Africa is considered as milling waste that has the potential to be developed as a nutraceutical product. The known health benefits of sorghum polyphenols include among others antioxidant, anti-inflammatory and antidiabetic properties. Thus, the current study aimed to explore the phytochemical rich waste product in combating oxidative stress propagated diseases such as metabolic syndrome.

As such, high tannin sorghum was decorticated to obtain the sorghum bran from which polyphenols were then extracted. The extract was then dried to obtain the crude polyphenol extract powder. The total polyphenol, flavonoid and tannin content as well as the antioxidant activity of the extract was quantified in vitro.

The bran and crude extract yield was 17.78 ± 0.02% and 10.53 ± 0.25%, respectively. The extract presented with 297.48 ± 19.37 mg gallic acid equivalents/g total polyphenol and 510.20 ± 26.90 mg catechin equivalents/g total flavonoid contents, respectively. Potent dose dependent antioxidant activity was observed with a strong correlation coefficient between the total polyphenol content and the antioxidant activity. A strong correlation implies that the antioxidant activity is attributed to the presence of polyphenols.

Cellular models including nitric oxide and oxidative damage inhibition in macrophage and colon cell models as well as the lipid accumulation inhibition and glucose uptake induction in muscle, liver and fat cell models are at present being used to further identify the polyphenol associated cellular effects

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: INVESTIGATING THE UTILITY OF AN ARYL HYDROCARBON RECEPTOR ANTAGONIST ON T CELL EXPANSION

Background: The aryl hydrocarbon receptor (AhR) plays an important but poorly understood role in T cell differentiation and has a variety of small-molecule ligands. The utility of an AhR antagonist, StemRegenin-1 (SR1), in the expansion of T cells for adoptive cell therapy purposes, was investigated.

Method: Frozen peripheral blood mononuclear cells were thawed, activated, and cultured in complete medium supplemented with interleukins (IL)-2, IL7+IL15, and IL2+IL7+IL15 cytokine combinations in the presence and absence of SR1. After 10 days of culture, cells were enumerated and subject to immunophenotypic analysis using the DuraCLONE IM T cell subset panel to identify effector, memory, naïve, and exhausted T cell proportions. Data analysis included one-way analysis of variance using GraphPad Prism v.9, Uniform Manifold Approximation and Projection (UMAP) dimensionality reduction and Kruskal-Wallis H test in Cytobank.

Results and discussion: This preliminary study revealed that SR1 decreased cell counts in the presence of IL2, and slightly improved viability across all conditions. Predictably, differences in T cell subpopulations were observed both between cytokine cocktails, and in the presence of SR1. Decreased central memory cells, but increased cytotoxic, effector memory, exhausted, and naïve T-cells were apparent in culture conditions with SR1 to varying degrees. Although visual trends are apparent, statistical analysis revealed no significant differences, possibly due to biological variation and small sample size.

Conclusion: These findings suggest that using SR1 in ex vivo culture may allow customisation of the expanded T cell subpopulation structure, offering a promising approach to tailor T cell adoptive therapies.

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Theme: Collaborate
Methodology: Inter-institutional study

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Abstract Detail
Title: PILOT INVESTIGATION INTO PLACENTAL PATHOLOGIES ASSOCIATED WITH MODERATE-SEVERE NEONATAL ENCEPHALOPATHY WITH SUSPECTED HYPOXIC ISCHAEMIC ENCEPHALOPATHY

Background: Several placental pathologies, including vasculopathies and ascending or descending infections, have been associated with neonatal encephalopathy with suspected hypoxic ischaemic encephalopathy (NESHIE). In this study, a pilot investigation into the placental pathologies associated with neonates with moderate-severe NESHIE was conducted as part of the 'NESHIE study'.

Method: Following participant consent, placentas from participants enrolled into the NESHIE study underwent histological evaluation according to standard protocols. Findings were reported according to REC-approved study-associated reporting formats. Following initial reporting, sample QC was performed by dedicated study-associated QC officers.

Results & Discussion: When considering moderate-severe NESHIE participants enrolled from May 2019 to January 2021, 45 (30.8%) placentas were sent for histological examination, while 101 were not (69.2%). Of those sent for examination, only 32 (71.1%) underwent QC analysis. In total, 17 (53.1%) reports passed QC, while 7 reports (21.9%) passed QC with minimal differences in observations. Chorioamnionitis was the most prevalent pathology observed amongst those placentas to pass QC (52.9%). The most common reasons noted for placentas not being sent for histology include (1) it is not standard practice to send placentas for histological examination (37.6%); (2) the patient was outborn (26.7%); and (3) on-site staff did not send the placenta.

Conclusion: Given the known NESHIE-associated risk of chorioamnionitis and its high prevalence in this pilot NESHIE cohort, it is strongly suggested that placentas be sent for pathological investigation in instances where NESHIE is observed. Further research into this observation is however required.

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: COMPARISON OF INTRAOPERATIVE ULTRASOUND WITH POST-OPERATIVE MAGNETIC RESONANCE IMAGING IN BRAIN TUMOUR SURGERY

Background: Various neuro-navigation tools are used to evaluate brain tumours. Intraoperative ultrasound (IOUS) is an accurate tool when combined with MRI scans for diagnosis and treatment. However, IOUS is underutilized. This study aims to determine the utility of IOUS and compare diagnostic accuracy with postoperative MRI in brain tumour surgery.

Method: 56 patients who underwent ultrasound-assisted brain tumour surgery at the department of neurosurgery unit in Steve Biko Academic Hospital from January 2019 to December 2021 were included in the study. Data from radiology reports, operative notes and pathology reports were retrospectively collected and assessed. Both postoperative subjects were included in the study sample. All surgeries were performed by the same experienced neurosurgeon.

Results and discussion: The results showed that IOUS had a substantial agreement with postoperative MRI, with a Cohen's kappa coefficient of 0.66. IOUS correctly identified residual tumour in 47 cases and correctly identified the absence of residual tumor in six cases. False-negative results were observed in nine percent of cases, while no false positive results were detected. The IOUS demonstrated a positive predictive value of 100% and a negative predictive value of 54.55%. The sensitivity and specificity of IOUS were calculated to be 90.38% and 100.0%, respectively. The area under the curve (AUC) for the predictive model (IOUS) was estimated to be 0.77, indicating good discrimination

Conclusion: Intraoperative ultrasound is a useful tool for brain tumour surgery, aiding in tumour identification and assessment of resection. Increased exposure to ultrasound during residency could enhance its utility, potentially improving surgical outcomes and patient prognosis.

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: BIOCIDE RESISTANCE PROFILES AND GENETIC RELATEDNESS OF MULTIDRUG RESISTANT PSEUDOMONAS AERUGINOSA ISOLATES FROM PUBLIC HOSPITALS IN GAUTENG, SOUTH AFRICA

BACKGROUND: The resistance of multidrug resistant P. aeruginosa strains against biocides are increasing. This study aimed to investigate the biocide resistance gene profiles of multidrug resistant P. aeruginosa isolates and to determine their genetic relatedness.

METHODS: A total of 80 isolates were obtained and genomic DNA was extracted using the boiling method. Multiplex polymerase chain reaction (M-PCR) assays were performed targeting the genus specific 16S rRNA gene and species-specific oprL gene and to screen for the following biocide resistance genes: (i) fabV, (ii) cepA, (iii) qacEΔ1, (iv) qacE, (v) qacG and (vi) fabl. Enterobacterial repetitive Intergenic consensus (ERIC) PCR was performed and a dendrogram was constructed to determine the genetic relatedness of the MDR P. aeruginosa isolates.

RESULTS AND DISCUSSION: The results confirmed that 95% (76/80) of the isolates were P. aeruginosa. Prevalence of the biocide resistance genes were: 100% (n=76/76) for the fabV, 98.75% (n=75/76) for the cepA ,94.5% (n=74/76) for the qacEΔ1 and 2.5% (n=2/76) for the qacE genes. No qacG and fabl genes were detected. Biocide resistant profiles revealed that qacEΔ1, cepA and fabV were more prevalent. Following ERIC PCR, the P. aeruginosa isolates were grouped into 13 clusters, with the largest cluster consisting of nine isolates. Clusters 1 and 3 contained isolates from different wards and hospitals suggesting circulating/established strains. Most of the clusters were composed of isolates collected between 2020 and 2022, indicating persistence of specific strains within the hospitals.

CONCLUSION:
Continuous monitoring of biocides resistance is recommended for the prevention, emergence and spread of MDR P. aeruginosa to ensure effective infection control in these public clinical settings.

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Theme: Collaborate
Methodology: Inter-disciplinary study

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Abstract Detail
Title: UNDERSTANDING POPULATION STRUCTURE AND ITS IMPLICATIONS FOR DRUG-METABOLISM: A BIOINFORMATICS PERSPECTIVE

Background
African populations show a high-degree of genetic diversity. Our understanding of this diversity, and its connection to drug-metabolism, will help achieve good pharmacological outcomes. A large number of studies do not use African-sensitive sample-selection, making African-enriched datasets a unique opportunity to understand understudied population structures. Through this, we can work towards achieving more personalised compound and dosage approaches as part of a larger study.

Methods
We focus on understanding the population stratification present in our dataset, using a combination of parametric and non-parametric methods. To investigate this, we used Principal-Component Analysis (PCA) to assess our data with non-parametric approaches, and Admixture-1.3.0 and PONG to test parametric approaches to describing population structure.

Results and Discussion
African samples showed a high degree of inter-population diversity, and clustered separately from previously studied populations. East Asian, and Oceanian populations also clustered individually, forming a total of three distinct, largely homogenous clusters and one heterogeneous cluster. Interestingly, African samples also showed a high degree of intra-population diversity, more so than any other population in this study.

Conclusion
African populations display a high degree of diversity, but also show distinct clustering from previously studied populations. This is relevant when considering medical findings based on non-African sample selection, as this highlights underlying differences which may invalidate prior assumptions. Furthermore, there is a striking need to include more African sub-population groups in genetic studies, to prevent possible bias. This is shown by a high degree of intra-population diversity, possibly indicating uncaptured sub-population-level clustering.

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
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Abstract Detail

Title: GENOMIC COMPARISON BETWEEN STAPHYLOCOCCUS AUREUS ISOLATES FROM PATIENTS WITH BACTERAEMIA AND INFECTIVE ENDOCARDITIS FROM PUBLIC HOSPITALS IN GAUTENG

Background: Staphylococcus aureus (S. aureus) is a leading cause of bacteraemia (SAB) and its complication, infective endocarditis (SAIE), worldwide. Early-stage diagnosis of SAIE is challenging, resulting in delays or misdiagnoses with increased mortality risk. The study aimed to compare SAIE and non-IE SAB isolates from Gauteng public hospitals and identify distinct virulence gene profiles that may aid in predicting SAIE risk.

Method: A total of 37 SAB and 4 SAIE isolates were collected from a public diagnostic laboratory. Genomic DNA extraction was done using the boiling method, followed by multiplex-PCR assays to confirm the identity of the 41 S. aureus isolates and to target surface protein (fnbA), cytotoxin (pvl) and superantigen (sec, seg, sei, sen, tst) genes. Significance was determined using the Chi-square test ($p<0.05$).

Results and Discussion: The virulence gene prevalences in the SAB and SAIE isolates were: sen 36.6% (15/41), seg and sei 33.3% (11/33), pvl 22.0% (9/41), fnbA 12.1% (4/33) and tst and sec 9.1% (3/33). No significant differences ($p>0.05$) in the virulence gene profiles of the SAB and SAIE isolates were found.

Conclusions: Toxigenic genes were frequent in the isolates, suggesting their importance in the severity and progression of SAB and SAIE. The findings highlight the need for virulence gene screening to guide antibiotic therapy and prevent complications associated with enhanced PVL and superantigen production, particularly in β-lactam-treated cases. Enhanced surveillance of toxin-producing strains may reduce morbidity and mortality rates in SAB and SAIE patients.

Faculty Research Day 2023
Abstract no: 2023043

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: INVESTIGATING THE EFFECT OF A SULPHAMOYLATED ANTIMITOTIC COMPOUND ON A CERVICAL CANCER CELL LINE

Background: 2-Methoxyestradiol (2ME), a 17-beta-estradiol metabolite, has anticancer effects both in vitro and in vivo. Due to its low bioavailability, sulphamoylated 2ME analogs were in silico designed and synthesized. The goal of this study was to evaluate the effects of a sulphamoylated antimitotic compound, 2-Ethyl-17-oxoestra-1,3,5(10)-trien-3-yl sulphamate (ESE-one), on cell proliferation in a cervical cancer cell line using the crystal violet staining technique.

Methods: A cervical cancer cell line (HeLa) was grown and incubated for 24 hours at 37°C and 5% CO_2. The cells were subsequently treated for 24, 48, and 72 hours with various doses of ESE-one ranging from (0.1µM-1,0µM). The crystal violet staining technique was used to assess cell proliferation. The cells were fixed and stained with crystal violet dye after the treatment. The fixed cells were then solubilized, and the absorbance at 570nm was measured with a spectrophotometer.

Results: Following treatment with ESE-one, we observed a substantial dose-dependent decrease in cell proliferation at 0.5µM. These data indicate that ESE-one has antimitotic characteristics, reducing cell growth in the cervical cancer cell line.

Conclusion: This study provides evidence for the inhibitory effect of ESE-one on cell proliferation in a cervical cancer cell line, as determined by crystal violet staining. This paves the way for exciting possibilities in further studies aiming to elucidate its mechanism of action and explore its potential as a therapeutic agent.

Keywords: cervical cancer, ESE-one, cell proliferation, crystal violet staining

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: MECHANISMS BY WHICH THE PHARMACOLOGICAL CHAPERONE, LHR-CHAP, AFFECTS PROCESSING OF LUTEINISING HORMONE RECEPTOR VARIANTS

Background:
G protein-coupled receptor variants commonly cause protein misfolding in the endoplasmic reticulum (ER), leading to decreased cell surface expression and disease. Pharmacological chaperones (PC) stabilise folding of misfolded proteins and promote their cell surface trafficking. How variants are processed by ER quality control (QC) machinery, and how this is overcome by PCs, remains largely unknown. Here, the luteinising hormone receptor (LHR) and a PC, LHR-Chap, was used as a model to examine these processes.

Methods:
LHR expression was determined by receptor ELISA. Expression of ER QC components was determined by qPCR array. LHR immunoprecipitation followed by mass spectrometry was performed to examine interactions with ER QC proteins. In each case, wild-type (WT) and variant LHRs were utilised and compared in the presence and absence of LHR-Chap.

Results and Discussion:
Variant LHRs had a range of cell surface expression and LHR-Chap rescue profiles. Multiple genes involved in ER QC/protein folding were downregulated upon expression of a variant LHR and following rescue with LHR-Chap. Optimisation of LHR immunoprecipitation confirmed successful capture of proteins involved in pathways associated with protein localisation and ER QC functions.

Conclusion:
Differential expression and rescue of variant LHRs and the altered expression of QC components indicate that they may be processed differently by ER QC processes. Further examination of gene regulation by other LHR variants and by LHR-Chap treatment as well as mass spectrometry analyses to compare the LHR interactomes will help to further elucidate the mechanisms involved in variant receptor ER processing and PC rescue.

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Theme: Innovate
Methodology: Evidence Synthesis

Disclaimer:
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Abstract Detail
Title: GENETIC VARIANTS IN HYPOXIC ISCHEMIC ENCEPHALOPATHY-ASSOCIATED GENES WITHIN THE GENERAL AFRICAN POPULATION

Background:
Prior studies have revealed associations between neonatal encephalopathy resulting from suspected hypoxic ischemic encephalopathy (HIE) and genes involved in vasodilatation, inflammation, and apoptosis. These studies have been performed in predominantly Asian and European populations, with no studies on African populations. This study aimed to determine the frequencies of variants in HIE-associated genes within the general African population, as preliminary data for a genetic association analysis.

Method:
Variant call data on the general African population was obtained from the South African Human Genome Programme, Human Genome Diversity Project and 1000 Genomes. Variant frequencies of the genes of interest were determined using an in-house bioinformatics pipeline. East Asian, South Asian and European variant frequencies were extracted from the Allele Frequency Aggregator database, where available, for comparison.

Results and Discussion:
In total, 9960 variants were identified across 828 individuals. Of these, 5712 occurred in less than 0.5% of the population, and 2816 were potentially novel. 26.4% of the variants were shared across all African ethnolinguistic groups, and of those, 10.8% had significant frequency differences between two or more African regions. When comparing variant frequencies of the African population to those of East Asia, South Asia, and Europe, 88.1% of the compared variants exhibited significant frequency differences between Africa and either Asia or Europe.

Conclusion:
An abundance of rare, novel and population-specific variation, alongside population frequency differences suggest that findings in other populations may not apply to Africans. This highlights the need for additional research in an African context on a genetic predisposition to HIE.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: CORRELATIONS BETWEEN FACIAL FEATURE SHAPES FOR APPLICATIONS IN COMPOUND CRANIO-FACIAL APPROXIMATION TECHNIQUES

An intercorrelated relationship in both form and function between skeletal structures and overlying soft tissues of the face is expected based on biological reasons. This intercorrelation has been of scientific interest in many disciplines, including craniofacial surgery, orthodontics, forensics, and anthropology. In facial approximation specifically, these relationships are vital for developing more accurate facial recognition methods.

This study aims to assess correlations the shape of the ear, nose, eyes, mouth, and the underlying skeletal structures in a South African sample using Cone-Beam Computed Tomography (CBCT) scans. CBCT images were loaded into MeVisLab 2.7.1 for 3D reconstruction and automatic shape extraction using anatomical and sliding landmarks. The cartesian coordinates were recorded and analysed using geometric morphometric methods to assess the correlations in shapes.

The ears and nose correlated strongly to their respective underlying hard tissues ($r2>0.7$), but also showed very strong correlations to the each another. The eyes and mouth had the weakest correlations to other soft or hard tissue matrix shapes ($0.3<r2<0.65$). The ear, which cannot accurately be estimated from the temporal bone alone, correlated strongly to the hard and soft tissue midface ($r2>0.7$). Such facial features which are not strongly correlated to their specific underlying hard tissues can rather be estimated through a compound approach based off more accurately approximated features such as the nose.

Features of the midfacial skeleton, which are most adapted to environmental pressures, are thus most reliable to use when estimating all soft tissue facial features in both forensic and reconstructive surgery preparation contexts.

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: INVESTIGATING THE ROLE OF THREE PRIME UNTRANSLATED REGIONS ON G PROTEIN-COUPLED RECEPTOR EXPRESSION IN CANCER CELL MODELS

Background
Dysregulated G protein-coupled receptor (GPCR) expression has been associated with cancer yet the post-transcriptional regulation of this important family of proteins remains largely unexplored. This study set out to determine whether the expression of GPCRs implicated in breast cancer are regulated post-transcriptionally by their transcript 3'-untranslated regions (3' UTRs).

Methods
The 3' UTRs of KISS1R, LGR5 and GHRHR were cloned into a pmirGLO vector downstream of a firefly luciferase open-reading frame (ORF) and transfected into breast cancer cell-lines (BT-20, MDA-MB-231, and MCF-7). Luciferase activity was measured at 24 and 48-hours post-transfection. The pmirGLO vector also contained a Renilla luciferase ORF to serve as a normalisation control. pmirGLO with no subcloned 3' UTR (empty vector) was used as a baseline control.

Results and discussion
KISS1R 3' UTR shows a significant decrease in luciferase expression in BT-20 cells. GHRHR 3' UTR significantly increased luciferase expression in HEK-293T cells (a non-cancer control cell-line) while significantly decreased signal in BT-20 and MDA-MB-231 cells. The LGR5 3' UTR resulted in a significant decrease in luciferase expression in all cell lines tested. Presumably the 3' UTRs tested contain cis-elements that are bound by cancer cell-specific trans-factors affecting mRNA stability/translation. This will be the focus of future research endeavours.

Conclusion
We demonstrate for the first time that cancer associated GPCRs may be differentially expressed in breast cancer cell backgrounds at least in part due to 3' UTR-mediated post-transcriptional regulation.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: VARIATIONS IN FRENCH FACIAL MORPHOLOGY MATRICES USING CT SCANS

Background: Facial approximation is a developing forensic field requiring knowledge of modern populations. Information from living individuals can be used to create reliable population databases to approximate the face of an unknown person using their skull. This study aimed to analyse the soft- and hard-tissue facial matrices of French adults using computed tomography (CT) scans.

Methods: A total of 99 CT scans of males and females from the University of Bordeaux, France, were used. Sixty-nine capulometric landmarks were placed on the soft-tissue surfaces, while 43 craniometric landmarks were placed on the hard-tissue surfaces. Five hundred and fifty-nine semi landmarks were also indicated on cranial elements to capture curves. Shape differences and correlations between matrices were assessed using geometric morphometric methods.

Results and Discussion: When assessing shape variation, the sample was found to be significantly influenced ($p<0.05$) by sexual dimorphism, while age had little influence on the overall shape variation. When the French sample was statically compared to a white South African sample, all facial matrices were significantly influenced by population affinity ($p≤0.001$). The correlations in the French sample were weak to moderate ($0.2<r2<0.59$). Finally, additional correlations assessed in a white South African sample produced mostly strong correlations ($r2>0.6$).

Conclusion: Our findings provide an understanding of how biological factors influence the morphology of facial matrices within population groups. Applying this research can benefit forensic sciences by improving facial approximation methods used across different population groups and biological profile estimation methods. This research is also beneficial in applied medical sciences for reconstructive facial surgeries.

Faculty Research Day 2023
Abstract no: 2023049

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: EVALUATION OF A DIFFERENTIAL DIAGNOSTIC TAQMAN ARRAY CARD FOR PATHOGENS ASSOCIATED WITH UNEXPLAINED NEUROLOGICAL DISEASE AND DEATHS IN ANIMALS IN 2021 IN SOUTH AFRICA

Several zoonotic pathogens can cause neurological manifestations, which can be fatal. The array of infectious aetiologies causing neurological manifestations creates diagnostic challenges. Differential diagnoses via an in-house TaqMan Array Card (TAC), which includes both common, vector-borne and zoonotic aetiologies of neurological causes in animals will give insight into the potential causes of unsolved neurological deaths in South Africa (SA).

Animal samples submitted in 2021 through the Zoonotic, Arbo-and Respiratory Virus Surveillance Program which previously tested negative for neurological arboviruses were screened retrospectively using a customized single-plex multi-pathogen assay, the TAC. The samples screened included brain, spinal cord and blood specimens of animals which experienced neurological signs before unexplained death, acute death or abortions.

Positive cases were confirmed with pathogen-specific PCRs, followed by Sanger sequencing and phylogenetic analysis. A total of 40 animals were tested, two of which tested positive. A horse showing signs of ataxia, as well as severe lymph-adenomegaly, retropharyngeal- and submandibular lung oedema, interstitial pneumonia, and caudal tongue; tested positive for Equine Herpes Virus-1 (EHV-1) on the brain. Secondly, a Cape fur seal showing signs of ataxia and seizures, and was subsequently found dead along the coast, tested positive for Ehrlichia spp. on the brain.

Further typing will be done for the Ehrlichia spp. to deduce which strain it is. The TAC is a useful tool which can be used in outbreak settings or as in this study, for surveillance. Here we identified an animal herpes virus (EHV-1) and a previously unidentified Ehrlichia spp. The specific Ehrlichia spp. has not previously been identified in seals and may potentially indicate cause of seal deaths along the coast of SA. Further characterization and investigation into its zoonotic host range may aid in curbing potential future zoonotic outbreaks.

Faculty Research Day 2023
Abstract no: 2023051

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:

Abstract Detail
Title: STIGMATIZATION AND THE ATTITUDE OF MENTAL HEALTH CARE WORKERS TOWARDS COLLEAGUES WITH MENTAL ILLNESS IN A PSYCHIATRIC SETTING IN PRETORIA, GAUTENG PROVINCE.

Background: The purpose of the study is to evaluate stigmatization of mental illness and the attitude of mental health care workers towards mentally ill colleagues in a psychiatric setting.

Methods: Two hundred and sixty-nine participants from five groups of mental health practitioners were included. Anonymous questionnaires adapted from the attitudes to mental illness questionnaire (AMIQ) were used.

Results and discussion: Majority of participants were nurses (N = 178; 66,2%). The rest were medical doctors, clinical psychologists, social workers, and occupational therapists. More females (N = 203; 75%) than males (N = 66; 25%) participated. Average age of participants was 39 years. The mean years of experience as a mental health care worker was 9 years. Majority, and those with more work experience did not have negative attitude towards colleagues having bipolar mood disorder (p-value=0.0127<0.05) and those who are Christian (p-value =0.0609<0.05). They stigmatized those having major depressive disorder (p-value=0.9215), substance use disorder (p-value=0.3899) and covid-19 (p-value=0.2048). Regarding their experiences with mental illness, majority denied ever having mental illness or knowing of a colleague having mental illness and denied having negative attitudes towards colleagues with mental illness.

Conclusion: Stigma and negative attitudes towards colleagues with mental illness seems to exist, however those who have been in the field longer stigmatize less.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: AUTOPHAGIC EFFECTS AND INTRACELLULAR CONTROL OF MYCOBACTERIUM TUBERCULOSIS BY SELECTED MMV PATHOGEN BOX COMPOUNDS

Background: Identification of novel agents that can induce autophagy in host cells directed against M. tuberculosis is urgently needed to treat tuberculosis. This study explored the autophagic effect of five selected Pathogen Box lead compounds against M. tuberculosis.

Methods: Microplate reader and PrestoBlueTM High Sensitivity Cell Viability Reagent were used to assess the viability of murine monocyte-derived macrophages (MDMs) after treatment with PBCs MMV676603, MMV687146, MMV687696, MMV687180, and MMV153413 for 48 hrs. Western blotting assay was used to investigate the autophagic activity of these compounds and the effect on clearing M. tuberculosis from host cells using the colony-forming unit count.

Results and Discussion: Compared to the control group, treatment of MDMs with MMV676603 (1 μM), MMV687146(1μM), MMV687696 (1 μM) and MMV687180 (2 μM) recorded a viability of between 87.7% - 99.9%, and induced LC3-II lipidation. A significant LC3II/LC3I ratio was recorded ($p = 0.02$) after treatment with MMV687146. There was significant intracellular suppression of M. tuberculosis in infected macrophages measured by colony-forming units count after treatment with MMV686603 ($p = 0.0002$), MMV687146 ($p = 0.0015$) and MMV687180 ($p = 0.0011$) when compared to control group. Notably, inhibition of autophagy flux significantly reversed the anti-mycobacterial activity of MMV676603 ($p = 0.0019$) and MMV687146 ($p = 0.0235$).

Conclusions: The selected compounds have acceptable cytotoxicity levels and effectively suppressed the growth of intracellular M. tuberculosis. Inhibition of the autophagic flux reversed the anti-mycobacterial activity of MMV676603 and MMV677146, suggesting autophagy as a possible mechanism in inhibiting intracellular growth of M. tuberculosis.

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Theme: Collaborate
Methodology: Inter-disciplinary study

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Abstract Detail
Title: ESTIMATING SOCIO-CULTURAL IDENTITY WITHIN BLACK SOUTH AFRICAN GROUPS USING SUB-SPECIFIC DISCRIMINATE 3D SHAPE MATRICES

The probable identification of an unknown individual is based on the presence of quantifiable phenotypic variations and the relationship of these variations to the individual's socio-cultural identity. Therefore, this study aims to create sub-specific discriminate shape matrices to estimate socio-cultural identity among black South Africans.

The sample consists of 191 adult South Africans representing nine modern black South African socio-cultural groups, namely Pedi, Sotho, Swati, Tsonga, Tswana, Venda, Ndebele, Xhosa, and Zulu, obtained from the Pretoria Bone Collection in the Department of Anatomy at the University of Pretoria. Three-dimensional (3D) modelling of the relevant anatomical area was performed using an EinScan H 3D scanner. The 3D anatomical extraction was performed by placing 41 standard craniometric landmarks and 378 sliding landmarks (interpolation factor = 1 mm) on 3D models using the Avizo 9.4 software.

The analysis of variance associated with the linear model "shape against socio-cultural identity" explained 95.5% of overall shape variation and showed that variations in midfacial shape configurations were statistically significant (MANOVA: $p = 0.001$; 50-50 MANOVA: $p < 2e-16$) for all shape configurations, including sub-specific discriminate shape matrices, separately. Additionally, cross-validated linear discriminant function analysis yielded an accuracy between 73.01% and 91.53% for all shape configurations and sub-specific discriminant shape matrices, reflecting the discriminative power of socio-cultural groups in the black South African population.

Finally, geometric morphometric approaches for socio-cultural estimation using the midface retain the objects' geometry and analyses subtle structural differences. Consequently, innovative 3D approaches may estimate socio-cultural identity within the modern black South African population more accurately.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: A COMPARISON OF THE FREQUENCY OF TRUNCAL METASTASES IN BREAST CARCINOMA MOLECULAR SUBTYPES USING COMPUTED TOMOGRAPHY

Background: There are five molecular subtypes of breast carcinoma, each with a different regional and distant metastases pattern. There are no existing imaging protocols used as a guidance tool for the metastatic staging of newly diagnosed breast cancer patients at Steve Biko Academic Hospital (SBAH). Currently, the routine investigations for breast cancer staging include a chest radiograph and liver ultrasound. Bone scintigraphy is only done if skeletal metastasis is suspected clinically. A baseline staging CT Scan of the chest, abdomen, and pelvis is performed in patients with more locally advanced breast carcinoma after discussion with the multidisciplinary team. The baseline staging CT scan may be delayed as patients may endure long waiting periods in obtaining an appointment for a CT scan.

Objectives: To determine the most frequent molecular subtype of breast carcinoma in the population served by SBAH and to determine the site of distant metastases that each molecular subtype may follow.

Results: The molecular subtype of each patient was determined using the immunohistochemistry markers provided on the National Health Laboratory Service (NHLS) histopathology report. The most common molecular subtype was Luminal B, followed by Luminal A, HER-2, Triple negative/ Basal-Like, and Luminal Type. All molecular subtypes had a significant amount of metastases when the baseline staging CT Scan was done. Each molecular subtype had a particular pattern of metastases.

Conclusion: By determining the site of metastases of each molecular subtype of breast carcinoma, the recommendation of incorporating an index staging CT Scan of the chest, abdomen, and pelvis as part of the baseline metastatic work-up of these patients can be made. This will optimize the early detection of metastases and contribute to advancing the approach to the diagnostic work-up of breast carcinoma by ensuring targeted therapy, reducing hospital stay and improving patient prognosis.

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Theme: Innovate
Methodology: Non-Randomised Controlled Trial

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Abstract Detail
Title: A PILOT STUDY ASSESSING THE EFFICACY OF MAGGOT DEBRIDEMENT THERAPY AS AN ALTERNATIVE DEBRIDEMENT TECHNIQUE TO STANDARD CARE WITH INTRASITE GEL DRESSINGS IN THE TREATMENT OF CHRONIC, SEPTIC WOUNDS IN ADULTS

Introduction:
In developing countries, such as South Africa, increased healthcare costs and the threat of resistant infections pose significant challenges in the treatment of chronic wounds. Wound debridement is integral in chronic wound treatment and can be performed using techniques such as autolytic debridement or biological debridement with larvae from the green bottlefly, Lucilia sericata. While there are numerous debridement techniques, not all are equally effective. This study aimed to investigate biological debridement as an alternative to autolytic debridement with IntraSiteTM Gel in the treatment of chronic, septic wounds in adults.

Methods and materials:
This pilot study was conducted at Steve Biko Academic Hospital in ten adult patients who presented with chronic, septic wounds. The efficacy of debridement, removal of slough, tissue granulation, reduction of pain, treatment acceptability and cost were assessed over 22 days. Eligible participants were randomly allocated to one of two treatments, i.e. IntraSiteTM Gel or maggot debridement therapy (MDT), and treatment was repeated every 48-72 hours.

Results and Discussion:
The study is ongoing and preliminary results are available. The findings showed that MDT-treated patients required a maximum of two applications to achieve effective wound debridement while those treated with IntraSiteTM Gel required a longer duration exceeding 22 days. However, preliminary results are not yet conclusive to indicate the difference in safety and efficacy of the two treatment arms.

Conclusion:
The preliminary results obtained from this study may provide insight into the efficacy and safety of the two treatment arms in low-middle-income countries. Further studies are required to indicate the difference in safety and efficacy.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: NEW HORIZONS IN THE DIAGNOSIS OF TUBERCULOSIS OF THE SPINE: THE ROLE OF WHOLE GENOME SEQUENCING.

Purpose: To evaluate the utility of whole genome sequencing (WGS) in drug resistance testing, lineage of the organisms and organism-related factors responsible for the bacilli to settle in the spine.

Literature overview: The workstream for diagnosis of Tuberculosis(TB) involves isolation and culture of the organism, and drug resistance testing using phenotypic methods. GeneExpt is a genetic-based method that tests for Mycobacterium tuberculosis DNA in the rpoB gene. WGS is a newer genetic-based method, testing beyond the rpoB gene, to test the whole genome of the bacterium.
Very few studies report on WGS in extrapulmonary sites. We included WGS in the diagnosis of tuberculosis of the spine.

Methods: Tissue from 61 patients undergoing surgery for TB spine was sent for histologic examination, GeneExpert and culture and sensitivity. DNA from the cultured bacteria was sent for WGS. The test bacterial genome was compared to a reference strain of pulmonary TB.

Results: Acid Fast Bacilli were observed in 9 /58. Histology confirmed tuberculosis all the patients. Bacilli could be cultured in 28 patients (48.3%), average time to culture was 18.7 days. GeneExpert was positive in 47(85%) cases. WGS was done in 23 of the cultured isolates. Fourty-five percent of the strains belonged to lineage 2 (East-Asian). There was one multidrug resistant TB and two non-tuberculous mycobacteria on WGS. We could not confirm any genomic difference between pulmonary and spine TB strains.

Conclusion: GeneExpt done from tissue or pus is the investigation of choice in the diagnosis of TB spine. WGS can diagnose multidrug resistant TB and non-tuberculous mycobacteria more accurately. No mutations were identified between TB spine and pulmonary TB bacteria.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: Determining the effect of antiretroviral exposure on umbilical cord blood-derived haematopoietic stem/progenitor cells

Background
HIV exposed uninfected (HEU) infants are exposed to antiretroviral drugs (ARVs) in utero but the effect of this exposure on haematopoietic stem/progenitor cell (HSPC) functioning has not been determined. This would be valuable in understanding any haematological abnormalities in the neonate/infant and the potential use of these cells for haematopoietic stem cell transplantation (HSCT) or other cellular therapies.

Methods
Tenofovir (TDF), Lamivudine (3TC), Dolutegravir (DTG), Emtricitabine (FTC) and Efavirenz (EFV) were all reconstituted in dimethyl sulphoxide. Umbilical cord blood (UCB) HSPCs were magnetically isolated and plated at 2 x 10³ cells per well in 96-well plates with medium and cytokines. ARVs were added to wells individually and in two combinations as taken by mothers in pregnancy, TLD (TDF, 3TC, DTG) and TEE (TDF, FTC, EFV) at 6 concentrations each. Exposures were for 7 days and 24 hours to determine acute and chronic effects. After 7 days, lactate dehydrogenase (LDH) colorimetric and resazurin fluorometric assays were performed to determine cytotoxicity and cell viability, respectively.

Results and discussion
24-hour exposure to EFV alone and the TEE combination showed an increase in LDH activity with increasing drug concentration, pointing to increased drug toxicity. This was verified on the resazurin assay. Seven-day exposure to DTG alone and the TLD combination showed an increase in cell viability at certain concentrations.

Conclusion
Over the course of 7 days, all drugs, except EFV, had no deleterious effects on HSPC cytotoxity or viability and are the foundation upon which further research can be performed to assess the potential use of these cells in HSCT.

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
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Abstract Detail
Title: FACTORS ASSOCIATED WITH PATELLOFEMORAL PAIN IN RECREATIONAL ROAD CYCLISTS: A CROSS-SECTIONAL STUDY IN 59953 CYCLISTS - SAFER XXXIII

Background: Patellofemoral pain (PFP) is a common cycling-related injury, and independent factors need to be identified to enable effective injury prevention strategies. We aim to determine factors associated with PFP in cyclists entering mass community-based events.

Methods: 62758 consenting race entrants completed pre-race medical questionnaire, at the time of entry for the 2016-2020, and 323 reported PFP. Selected factors associated with PFP (demographics, cycling experience and training, chronic disease history) were explored using multivariate analyses.

Results and Discussion: Prevalence ratio (PR) of PFP was similar for sex and age groups [<30yrs vs. groups: 31 to <40yrs (PR=0.9); 41 to <50yrs (PR=0.8); >50yrs (PR=1.1)]($p=0.0600$). Independent factors associated with PFP (adjusted for sex and age) were history of chronic disease [Composite Chronic Disease Score (0-10)(PR=2.0, $p<0.0001$) and any allergies (PR=2.0, $p<0.0001$)].

Figure: The relationship between the CCDS and prevalence of PFP in cyclists (shaded area: 95%CI). Figure was limited to CCDS=6 (sample size too small at higher CCDS).

Conclusion: The main independent factors associated with a history of self-reported PFP in race entrants were a history of multiple chronic diseases and a history of any allergies. Practical clinical recommendations are: 1) that prevention programs for PFP be considered when cycling is prescribed as a physical activity intervention for patients with chronic disease, and 2) that older cyclists presenting with PFP be assessed for the presence of factors or existing chronic disease.

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
The review committee reserves the right to allocate your abstract to a specific category, i.e. oral presentation or poster.

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Abstract Detail
Title: PLASMID-BORNE RESISTANCE PROPERTIES OF STAPHYLOCOCCUS AUREUS ISOLATED FROM CLINICAL SAMPLES FROM GAUTENG PROVINCE, SOUTH AFRICA

BACKGROUND: Limited studies are available regarding the plasmid-borne resistance properties of clinical Staphylococcus aureus isolates at tertiary academic hospitals. Therefore, this study aimed to investigate and compare the plasmid-borne resistance and virulence properties of S. aureus isolates from patients in private and public clinical settings in Gauteng province, South Africa.

METHOD: Plasmid extraction was done on thirty methicillin-sensitive S. aureus (MSSA) and twenty-three methicillin-resistant S. aureus (MRSA) isolates, followed by plasmid profiling. Multiplex polymerase chain reaction assay was used to detect selected genes encoding AMR (blaz, cfr, ermB, ermC, mupA, tetK, vanB), biocide (qac/AB), heavy metal (cadA, cadD) and virulence (eta, sdrE).

RESULTS AND DISCUSSION: Plasmids were identified in 67% (8/30) of the MSSA and 35% (8/23) of the MRSA isolates and ranged from 1.1 kb to >10 kb in size. There was no consistent relationship between plasmid sizes, the number of plasmids per isolate and the presence of resistance and virulence genes. The absence of the linezolid resistance gene and the low prevalence of genes encoding vancomycin (vanB), mupirocin (mupA) and biocide (qacA/B) resistance genes in the S. aureus isolates studied, indicates that these antimicrobials are still effective against S. aureus.

CONCLUSION: The high prevalence of genes encoding cadmium, penicillin, tetracycline resistance in plasmid-positive isolates is a concern as these genes can be transferred to other other species and genera leading to multi-drug resistance. Therefore, there is a need for surveillance and antimicrobial stewardship programs in both private and public hospitals to prevent an increase in AMR in S. aureus.

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: COMPARISON OF MURINE AND HUMAN GPER TO ESTABLISH THE DETERMINANTS OF LOCALIZATION.

Introduction: Estrogen is an important sex hormone that contributes to normal functioning and development in both male and female physiology. Estrogen signaling can be mediated through classical estrogen receptors that are members of the nuclear receptor family. However, the G protein-coupled estrogen receptor (GPER) plays a crucial role in rapid signaling effects of estrogen. Unlike traditional G protein-coupled receptors, which are localized at the plasma membrane, GPER has been suggested to adopt a nuclear localization in some studies. It has been postulated that species differences may contribute to these differences in receptor localization. Thus, the aim of this project was to compare the localization of human and murine GPER.

Methods: PCR primers were used to isolate murine GPER (mGPER) from murine genomic DNA. A mammalian expression vector encoding human GPER (pcDNA3.1-HA-WT-hGPER construct) was already available. hGPER was excised from this plasmid by restriction digestion and mGPER was ligated in its place, resulting in a pcDNA3.1-HA-WT-mGPER construct. The two constructs will be used for transient transfection of HEK293T cells. These will be observed by confocal microscopy using fluorescent antibodies targeting the HA epitope tag to establish the localization of the different GPERs.

Results: Observation of the localization of mouse and human GPER will enable any differences in localization to be identified.

Conclusion: Following characterization of the localisation of the two receptor species, chimeric receptor constructs will be produced in which different portions of the receptor are interchanged in order to further establish the determinants of GPER cellular localization.

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: IDENTIFICATION OR RARE CYP2D6 GENE VARIANTS IN A SOUTH AFRICAN COHORT USING HIFI LONG READ SEQUENCING

Background
CYP2D6 metabolizes ~25% of prescribed medications including amitriptyline, commonly prescribed in the South African public health sector. Accurate CYP2D6 genotyping in pharmacogenetics testing is essential for effective amitriptyline dosing. The main aim was to correlate CYP2D6 genotype with amitriptyline efficacy in a cohort of diabetic patients at the Kalafong Provincial Tertiary hospital, Pretoria.

Method
A cohort of 150 patients were genotyped for CYP2D6 using the Axiom Precision Medicine Diversity Research Array (PMDA). Long-range PCR was employed to obtain CYP2D6 full gene, CYP2D6 duplicated genes, CYP2D6-CYP2D7 and CYP2D7-CYP2D6 hybrid genes amplicons. Amplicons were submitted for circular consensus long read sequencing using the PacBio Sequel System.

Results
Inconclusive CYP2D6 star allele diplotypes were recorded in 45 samples following PMDA array analysis. The array accurately (100%) called homozygous and heterozygous CYP2D6 gene deletions and gene duplications. CYP2D6-CYP2D7 hybrids were accurately (100%) called by the array although CYP2D7-CYP2D6 hybrid gene calls were inconsistent. Long range sequencing analysis resolved the previously inconclusive array calls and identified alleles in duplicated and hybrid gene copies, enabling accurate activity scores and phenotypes. This resulted in a change of CYP2D6 activity scores and phenotype predictions in 35 and 13 samples respectively from the previous array results. Rare CYP2D6 sub star alleles and variants were also identified.

Conclusions
HiFi sequencing of CYP2D6 enabled accurate star allele calls in the South African cohort. The long-read sequencing method employed herein is appropriate for identifying rare CYP2D6 haplotypes. Identification of rare haplotypes is essential for customizing genotyping for African populations.

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: ALTERATIONS IN CELLULAR KINETICS AND ANGIOGENIC FACTOR EXPRESSION IN RESPONSE TO ENDOTHELIAL-OESOPHAGEAL CANCER CELL INTERACTIONS

Introduction: Oesophageal cancer prevalence is on the rise worldwide due to its rapid progression and poor prognosis. Current treatments remain unsatisfactory due to low response rates when diagnosed at an advanced stage.OC is characterised by angiogenesis and is regulated by molecules expressed differently in various cancers. This difference has been attributed to the uniqueness of the endothelial cell-cancer cell interactions that take place within the tumour microenvironment promote the growth, progression of oesophageal cancer. These interactions also affect tumour response to treatment.
The purpose of this study was to analyse the effects of EC-OC interactions on angiogenesis parameters.

Methods: Growth kinetics of ECs in mono- and co-cultures were investigated using the xCELLigence system, and cell morphology was studied using confocal laser scanning microscopy. Cell migration was measured using an in vitro scratch assay. Levels of angiogenic molecules were measured using enzyme linked immunosorbent assay.

Results: ECs cultured in OC-conditioned medium grew over 24 hours, reaching a plateau at 60 hours. A more pronounced growth effect was observed when ECs were grown with OC cells in co-cultures. Microscopy studies revealed nuclei filopodia and lamellipodia extensions. There was no effect on EC migration (P > 0.05). Of the measured proteins, VEGF -A and FGF-2 were significantly high.

Conclusion: OC induced EC growth. VEGF-A and FGF-2 may account for the degree of EC proliferation observed in experimental wells. The study provides evidence that OC secretes factors which activate ECs and stimulate angiogenesis. Targeting both VEGF-A and FGF-2 may be effective in reducing neovessel growth in OC.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: EFFECTS OF GOLD NANOPARTICLES ON VASCULAR ENDOTHELIAL GROWTH FACTOR-A-INDUCED MELANOMA CELL GROWTH AND ANGIOGENESIS

Introduction: Melanoma is a skin cancer that relies on angiogenesis, the formation of new vessels from existing vessels for growth and progression. Current anti-angiogenic drugs are not effective in the treatment of melanomas due to serious side effects such as hypertension and the development of resistance. On the other hand, gold nanoparticles (AuNPs) have been reported to be biocompatible in preclinical models. Furthermore, AuNPs were shown to be cytotoxic in prostate cancer cells. The current study aimed to investigate the possible cytotoxic effects of AuNPs-vinblastine conjugates (1.2–3.2 nM) on melanoma cells and angiogenesis parameters (endothelial cell (EC) growth and migration) as well as on the levels of angiogenesis promoting proteins, vascular endothelial growth factor-A (VEGF-A) and placental growth factor (PIGF).

Methods: To investigate whether AuNPs were cytotoxic to melanoma cells, the effect of the particles on B16-F10 cell survival was measured using the xCELLigence system. Endothelial cell growth and migration were investigated using xCELLigence and scratch assay respectively. Also, EC morphology was studied using polarisation-optical interference contrast light microscopy. The enzyme-linked immunosorbent assay was used to determine the effects of AuNPs on the levels of VEGF-A and PIGF.

Results: AuNPs decreased the viability of melanoma and ECs. The scratch assay showed that more ECs migrated in cultured treated with AuNPs ($P < 0.05$). The concentration of the VEGF-A/PIGF heterodimer was reduced significantly following treatment with AuNPs, meaning that the particles exhibited anti-angiogenic properties.

Conclusion: This outcome provides a basis for further testing of AuNP-conjugates as potential treatment for melanoma.

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Theme: Collaborate
Methodology: Inter-institutional study

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Abstract Detail
Title: INVESTIGATING THE BLOOD METABOLOMIC PROFILE OF NESHIE INFANTS

Background
Hypoxic ischemic encephalopathy (HIE) is a subcategory of neonatal encephalopathy (NE), which we refer to as NE with suspected HIE (NESHIE). Various factors including genetics, gut microbiota and the environment influence metabolites present in blood. Blood metabolomic profiling of NESHIE infants will improve our understanding of the biological pathways involved in the development of NESHIE, and might assist in identifying NESHIE-associated biomarkers to improve diagnosis and management of this condition.

Methods
Informed consent was obtained from parents of moderate/severe NESHIE infants undergoing therapeutic hypothermia. Dried blood spots (DBS; 75-80 µL of blood on Whatman® 903 blood spot cards) were collected at 0-6 hours and 48-72 hours after birth and stored at Clinical Laboratory Services at -80°C. Untargeted metabolomics analysis of 182 samples was performed by Sapient Bioanalytics (USA) using a high-throughput liquid chromatography-mass spectrometry (LC-MS) system.

Results and discussion
An initial analysis identified 10 candidate biomarkers to be significantly associated with NESHIE severity (Sarnat score) from DBS collected at 48-72 hours after birth. Seven biomarkers were significantly elevated in the 48-72h time point with a stringent p-value threshold ($p < 0.0000241$). In addition, three biomarkers were significantly elevated in the 48-72h time point with a relaxed p-value ($p < 0.05$). One biomarker identified in the 0-6h time point was negatively associated with peak Sarnat severity ($p < 0.05$).

Conclusion
Through an untargeted metabolomics analysis, we have identified 11 candidate metabolites significantly associated with Sarnat severity in NESHIE, which could aid in our understanding of the underlying biological pathways involved in NESHIE development and progression.

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Theme: Collaborate
Methodology: Inter-disciplinary study

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Abstract Detail

Title: MATHEMATICAL MODELLING FOR CTCE-9908 (A CXCR4 INHIBITOR) ON B16 F10 MELANOMA CELL PROLIFERATION

Introduction: The treatment of metastatic melanoma remains a governing concern due to its metastatic nature. CTCE-9908, a CXCR4 antagonist, is a proposed therapeutic target which inhibits the binding of CXCL12 to CXCR4 on melanoma cells and thereby impedes the signalling pathways that regulates cell processes such as proliferation, survival, migration, and adhesion. This study aimed to investigate the effects of CTCE-9908 on the proliferation of B16 F10 melanoma cells in vitro by deriving a cell viability function for experimental data.

Methods: Crystal violet staining was used to study the effects CXCR4 inhibition on tumour cell cytotoxicity. Experimental data was then used to approximate the mathematical parameters at a 95% confidence interval. To validate the model, the bootstrapping technique was used to determine the stability of the estimated parameters at a 95% bootstrap confidence level. The mathematical model was used to calculate the half maximal inhibitory concentration (IC50) of CTCE-9908 at any timepoint from 0-100 hours. Haematoxylin and Eosin (H&E) staining, polarization-optical differential interference contrast (PlasDIC) and transmission electron microscopy (TEM) were used to assess the morphological changes on the tumour cells after receptor inhibition.

Results: IC50 values for CTCE-9908 were calculated as a function of concentration and time. CTCE-9908 at 0.05 mM after 48 hours induced morphological changes indicative of cell death.

Conclusion: The mathematical model contributes to the knowledge of CTCE-990 on inhibition of CXCR4-mediated B16 F10 melanoma cell proliferation. CTCE-9908 may offer future treatment strategies in combination with other viable treatments against melanoma.

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail

Title: IN VITRO EFFECTS OF MAZ-51 AND EPIGALLOCATECHIN GALLATE ON CELLULAR MORPHOLOGY IN MELANOMA CELLS

Background
In 2020, the International Agency for Cancer Research reported approximately 10-million cancer deaths worldwide. South African populations represented over 60-thousand of these cancer deaths. Melanoma is a cancer of the skin melanocytes which has an aggressive malignancy and low survival rate. Current therapeutics for melanoma are limited in efficacy. Epigallocatechin gallate (EGCG) is a flavonoid in green tea. It interacts with cellular targets to inhibit tumour cell proliferation through apoptotic induction. 3-[[4-(dimethylamino)-1-naphthalenyl]methylene]-1,3-dihydro-2H-indol-2-one (MAZ-51) is a selective tyrosine kinase inhibitor that acts as an antagonist in ligand-induced vascular endothelial growth factor receptor-3 (VEGFR-3) autophosphorylation.

Methods
The in vitro effects of MAZ-51 and EGCG on tumour cell survival was determined using mouse melanoma (B16F10) and non-cancerous murine macrophage (RAW 264.7) cell lines. Using the crystal violet assay, EGCG (50 – 200 μM) and MAZ-51 (11 – 16 μM) were used to determine percentage cytotoxicity. Additionally, polarization-optical transmitted light differential interference (PlasDIC) microscopy, light microscopy and transmission electron microscopy (TEM) were used to determine morphological alterations at inhibitory concentrations.

Results and Discussion
The IC_{50} values for B16F10 cells were obtained at 48 hours, 107 μM for EGCG (p<0.0001) and 34 μM for MAZ-51 (p<0.0001). Morphological changes concurred with the cytotoxicity data showing decreased cell density and cell rounding indicative of apoptosis and necrosis in B16F10 cells.

Conclusion
In conclusion, both MAZ-51 and EGCG showed a significant reduction in B16F10 cells, less so in RAW 264.7 cells. The results of this study agree with the literature, indicating that individually each compound (MAZ-51 and EGCG) has demonstrated significant reduction in melanoma cell growth.

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: IN-VITRO EFFECTS OF EPIGALLOCATECHIN GALLATE ON CELL VIABILITY AND ADHESION OF MELANOMA AND ENDOTHELIOMA CELLS

Background: Melanomas only account for 1- 4% of skin cancers, however, they have a higher mortality rate than their non-melanoma counterparts. Hemangioendotheliomas are rare cancers that have few treatment options due to the unknown nature of their pathophysiology. Epigallocatechin gallate (EGCG) is a polyphenol with properties that promote anti-cancer effects.

Method: Melanoma (B16F10), endothelioma (sEnd.2) mouse cell lines and a non-cancerous control cell line, murine macrophage (RAW 264.7) were used to observe the cytotoxic and anti-proliferative effects of EGCG on the cancerous cell lines. The crystal violet assay was used to calculate the half maximal inhibitory concentration (IC50) of the cancerous cell lines. The IC50 was calculated to be 141.4 µM for the B16F10 cells and 107.1 µM for the sEnd.2 cell line at the 48-hour timeline. Morphology studies at these IC50's were conducted using Hematoxylin and Eosin staining and polarization-optical transmitted light differential interference contrast. The treated B16F10 and sEnd.2 cells indicated features of apoptosis: cell rounding and chromosome condensation. Flow cytometry was used to measure cell death mechanisms using cell cycle assay. An adhesion assay was used to determine the adhesive capabilities of EGCG after plates were treated with extracellular matrix protein (fibronectin) on the cancer cells.

Results: As the EGCG and the positive control decreased cellular adhesion of the B16F10 cells.

Conclusion: A dose-dependent decrease in adhesion was seen in EGCG treated cancer cells. In addition, EGCG induced cell death on the B16F10 and sEnd.2 cell lines and not on the control RAW 264.7 cell line.

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: THE IN VITRO EFFECT OF KYNURENINE METABOLITES ON CELL MORPHOLOGY, CELL CYCLE PROGRESSION AND THE INDUCTION OF APOPTOSIS IN TUMOUR ENDOTHELIOMA CELLS

Background: Cancer is one of the leading causes of death worldwide. The development of anticancer therapies plays a crucial role in mitigating tumour progression and metastasis. Kynurenine metabolites which include L-kynurenine, 3-hydroxykynurenine, 3-hydroxyanthranilic acid and quinolinic acid have been shown to inhibit T-cell proliferation resulting in a decrease in cell growth of natural killer (NK) cells and T cells. Research showed that L-kynurenine inhibits proliferation of melanoma cells in vitro.

Methods: The present study aimed to explore the in vitro influence of L-kynurenine, quinolinic acid and kynurenic acid on endothelioma sEnd-2 cells at concentration ranges of 1 mM – 4 mM for 24 h, 48 h and 72 h on cell morphology, cell cycle progression and induction of apoptosis.

Results and Discussion: The half inhibitory concentration (IC50), as determined using GraphPad Prism, for L-kynurenine, quinolinic acid and kynurenic acid was 10.77 mM, 14.78 mM and 535.4 mM respectively. Optical transmitted light differential interference contrast and hematoxylin and eosin staining revealed the presence of cells blocked in metaphase, formation of apoptotic bodies and compromised cell density in L-kynurenine- and quinolinic acid- treated cells. A statistically significant increase in the number of cells present in the sub-G1 phase was observed in L-kynurenine-treated samples.

Conclusion: It can be concluded that L-kynurenine exerts an antiproliferative effect on the sEnd-2 cell line by a decrease in cell growth and proliferation and metaphase block. These hallmarks suggest cell death via apoptosis. Further research will be conducted on L-kynurenine to assess the effect on cell adhesion in vitro and in vivo.

Keywords: L-kynurenine, quinolinic acid, kynurenic acid, endothelioma, apoptosis

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: ANA ANTOMICAL INVESTIGATION OF THE SUBOCCIPITAL- AND INFERIRO SUBOCCIPITAL TRIANGLES

Background: The suboccipital triangle (ST) is a clinically relevant landmark in the posterior aspect of the neck and is used to locate and mobilize the horizontal segment of the third part of the vertebral artery. Unfortunately, this space is not always a viable option for vertebral artery exposition, and consequently a novel triangle, the inferior suboccipital triangle (IST) has been defined.

Methods: The purpose of this study was to better define the anatomy of both triangles by measuring their borders and calculating their areas. Ethical clearance was obtained from the University of Pretoria (Ref: 222/2021) and both triangles were subsequently dissected out on both the left- and right sides of 33 formalin-fixed human adult cadavers. The borders of each triangle were measured using a digital calliper and the areas were calculated using Herons Formula.

Results and Discussion: The average area of the ST is 969.82 mm2 (SD = 153.15 mm2), while the average area of the IST is 307.48 mm2 (SD = 41.31 mm2). No statistically significant differences in the findings were observed between the sides of the body, ancestry- or sex of the cadavers. The IST will allow surgeons to locate the artery more proximally, where its course is more predictable.

Conclusion: Measurement and analysis of these triangles provided important anatomical information and speak to their clinical relevance as surgical landmarks with which to locate the vertebral artery. Of particular importance here is the IST, which allows for mobilisation of this artery more proximally, should the ST be occluded.

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: The expression of pro-angiogenic biomarkers in cutaneous tumour in vivo and in vitro

Purpose: Angiogenesis, the formation of new blood vessels from existing blood vessels, plays a significant role in the progression and metastasis of cutaneous cancers, including melanoma and cutaneous haemangioma. As a result, there is a need to identify angiogenic markers as tools to systematically disrupt vessel formation.

Methods: This study aimed to investigate angiogenic biomarkers in cutaneous tumour cells and biopsies. Cultured endothelial cells (EC) in different medium conditions were seeded and analysed for growth and cell morphology. ELISA was used to determine the expression levels of VEGF, bFGF, and PDGF in the B16-F10 cell lines. Formalin-fixed haemangioma biopsy tissues were immunoblotted to investigate the presence of EC and the expression of Bcl-2 and VEGF-R.

Results: In a time-dependent cell growth assay, EC demonstrated significant growth in melanoma-conditioned medium and presented a healthy spindle-like morphology with well-defined nucleoli. VEGF and bFGF expression levels were significantly associated with disease progression. Haemangioma biopsy samples exhibited numerous blood vessels that were associated with intense VEGF-R staining compared to Bcl-2.

Conclusion: The collectively identified angiogenic biomarkers have the potential to be used as molecular targets in cutaneous tumours to eradicate vessel formation, ultimately leading to disease regression.

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: ANALYSIS OF THE HARD-TISSUE MENTON SHAPE IN ADULT SOUTH AFRICANS USING CONE-BEAM COMPUTED TOMOGRAPHY (CBCT) SCANS

Background: In forensic anthropology, the biological profile is based on human variation. To increase understanding shape variation of the mental region, this study analyzed the influence of population affinity and sex on the menton in adult black and white South Africans, using geometric morphometric methods (GMM).

Methods: We used cone-beam computed tomography (CBCT) scans of 291 adult dental patients from the Oral and Dental Hospital, University of Pretoria. We placed eleven standard craniometric landmarks on the menton, mandible, and maxilla of three-dimensional (3D) reconstructions by automatic landmarking and analyzed them by applying GMM. In addition, a subtle shape matrix of seven landmarks was created for a focused analysis of the menton only. Finally, we tested the reproducibility of the landmarks placement with a dispersion analysis.

Results and Discussion: The landmarks used in this study were reproducible, with an overall dispersion of less than 1 mm. Population affinity significantly influenced menton shape, with P-values = 0.001 in the complete sample and within the sex groups. Differences between sexes for these seven landmarks were also statistically significant (P-values 0.001 to 0.003) in the complete sample, but not within population groups in isolation. The accuracy for estimation of population affinity by discriminant function analysis was 86.9%.

Conclusion: The automatic landmarking improved landmark reproducibility. Population affinity and sexual dimorphism significantly influenced menton shape. However, shape analysis, including all eleven landmarks, was not significantly influenced by sex. This study supports further research focusing on the facial approximations for forensic identification in South Africa.

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: INVESTIGATING THE ANTIDIABETIC PROPERTIES OF SMALL PEPTIDES IN RELEVANT IN VITRO CELLULAR MODELS

Background
Type 2 diabetes mellitus (T2DM) is a common metabolic disorder that is increasing worldwide, especially in South Africa. Obesity and liver dysfunction, such as non-alcoholic liver disease, as well as excess reactive oxygen species (ROS), and nitric oxide (NO) contribute to inflammation observed in T2DM. Peptides such as SQSPA, YPG, STYV and STY are resistant to digestion and, to various degrees, scavenge ROS and NO while additionally preventing lipid accumulation in adipocytes.

Methods
This study evaluated these properties in relevant cell models. Firstly, cytotoxicity was assessed using the Crystal Violet and 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide assays in the HepG2, RAW 264.7 macrophages and the 3T3-L1 adipocytes. Morphological changes were assessed using light microscopy, phase-contrast microscopy and polarisation optical differential interference contrast (PlasDIC) microscopy. Antioxidant activity was assessed chemically using the oxygen radical absorbance capacity assay (ORAC) and the cellular antioxidant assay in relevant cells. The NO scavenging effects on the RAW 264.7 macrophage and the inhibitory effects on lipid accumulation were evaluated in the oleic acid/HepG2 and the 3T3-L1 adipocyte models.

Results
The peptides were non-cytotoxic at all concentrations up to 100µM after 48 hours of exposure, although PlasDIC revealed that the cells were enlarged. Compared with antidiabetic drugs such as metformin, acarbose, and diprotin A. The antioxidant activity of the peptides was 98 – 408µM Trolox equivalents. Both STYV and STY reduced NO levels to 65% and 80% respectively as well as lipid accumulation by 10%.

Conclusion
This study confirms the anti-diabetic properties of all the peptides, but especially of STYV and STY in relevant cell models.

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Theme: Collaborate
Methodology: Inter-disciplinary study

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Abstract Detail
Title: DETECTION AND GENOTYPING OF ADENOVIRUSES AND ROTAVIRUSES IN STOOL SPECIMENS COLLECTED FROM PATIENTS HOSPITALISED WITH DIARRHOEA IN THE TSHWANE REGION (SOUTH AFRICA) DURING 2019 AND 2020

Human enteric viruses such as human adenovirus (HAdV) and human rotavirus (HRV) cause a significant burden of disease. Adenovirus is a non-enveloped, double-stranded DNA virus causing respiratory infections and gastroenteritis, while rotavirus is a non-enveloped, double-stranded RNA virus that causes severe gastroenteritis in young children. Transmission is via the faecal-oral route as these viruses are shed in the stools of infected individuals. It is imperative to understand the genetic diversity of HAdV and HRV in order to develop treatments and control their spread.

The aim of this study was to determine the prevalence and genotypes of HAdVs and HRVs in diarrhoeal stool specimens of hospitalised patients with gastroenteritis from the Tshwane region. Stool specimens (n=90) were collected between April 2019 and May 2020. Nucleic acids were extracted with the automated EMAG platform and virus screening was performed with a commercial real-time PCR assay.

The most prevalent virus detected was HAdV (29%), followed by HRV (11%), norovirus GII (6%) and GI (4%). Ten positive samples for each HAdV and HRV were selected for genotyping, using molecular methods. Human adenovirus F species (F40/F41) was the most prevalent HAdV (70%) followed by HAdV-D (20%) and HAdV-C (10%). The most prevalent HRV types were G12 (71%) and P[6] (56%).

Viral diversity of gastroenteritis-causing viruses requires continued surveillance for future vaccine development and monitoring of outbreaks.

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: AN ANATOMICAL INVESTIGATION OF THE CONFLUENCE OF THE SINUSES

Background: The confluence of the sinuses is highly variant in its drainage patterns, which is of clinical significance for neurosurgical procedures. Previous international studies conducted have investigated and catalogued the various drainage patterns. However, this study is a first in the Sub-Saharan African population utilizing two samples, including a large osteological sample size.

Materials and methods: The drainage patterns of the confluence of the sinuses in a sample of 391 dried osteological specimens were investigated and compared. Correlations were analyzed between four cohorts of different sexes and ancestries within a South African sample. Furthermore, the drainage patterns in 26 adult cadaveric specimens were investigated to compare the drainage patterns within the dura mater, and subsequently the bony impressions within the posterior cranial fossa.

Results and discussion: Statistical analyses determined that there were no statistically significant relationships between the drainage patterns and ancestry or the sex of the sample. The most common drainage pattern recorded in the osteological and cadaveric samples were the asymmetric right dominant type and the drainage of the superior sagittal sinus into the right transverse dural venous sinus respectively. In addition, variation was observed in the drainage pattern with the dura mater in-situ compared to the dura mater removed.

Conclusion: The drainage patterns observed in the cadaveric specimens were not always confirmed in the dura mater and cranial cavity of the same cadaver. This suggests that an osteological sample alone may not be a reliable modality, and future research is warranted using different sample modalities.

Faculty Research Day 2023
Abstract no: 2023075

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Theme: Innovate
Methodology: Randomised Controlled Trial (RCT)

Disclaimer:
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Abstract Detail
Title: THE EFFECT OF A 12-WEEK AEROBIC AND RESISTANCE EXECISE INTERVENTION ON BODY COMPOSITION, PERCIEVED BODY IMAGE AD SELF-EFFICACY IN YOUNG BLACK SOUTH AFRICAN WOMEN LIVING WITH OVERWEIGHT AND OBESITY

Background: The high prevalence of overweight and obesity among Black South African (SA) women is a public health challenge. It can be argued that acceptance of a larger body size by Black SA women is a contributing factor to the high prevalence of overweight and obesity among this population. The aim of this study was to determine the effects of a 12-week exercise training intervention on perceived body image and self-efficacy in young Black SA women living with overweight and obesity.

Method: Forty-five participants were randomly assigned to an exercise (n=23) or control (n=22) group. Data was collected pre and post intervention and all participants were encouraged to maintain their dietary habits. The control group was instructed not to engage in any new exercise activities. Body image perception was assessed using Stunkard's silhouettes and perceived self-efficacy was measured using the generalized self-efficacy questionnaire.

Results and Discussion: The total of 34 (exercise, n=20; control, n=14) participants completed the intervention. The FID score indicated body size dissatisfaction in both groups at baseline and this did not change significantly in either group in response to the intervention. The control group presented with higher general self-efficacy at baseline (p=0.003) and post intervention (p=0.036) compared to the exercise group. A decline in general self-efficacy was observed in both groups post intervention (p=0.021).

Conclusion: These findings suggest that the women desired to be normal weight, which has important and practical implications. Black SA women living with overweight and obesity may be receptive of weight loss programs.

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
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Abstract Detail
Title: HISTORY OF MULTIPLE ALLERGIES AND GRADUAL ONSET RUNNING-RELATED INJURIES IN DISTANCE RUNNERS

Background: To determine if any gradual onset running-related injury (GORRI) was associated with any allergies, multiple allergies (allergies to animals, plants, medication) and allergy medication use.

Methods: A cross-sectional descriptive study, using data collected prospectively over 4 years from the Two Oceans (56km, 21.1km) running race. Using a compulsory online screening questionnaire, consenting entrants were included. The main outcome was a history of any GORRIs, and subcategories of GORRIs (muscle, tendon) in the past 12 months. The prevalence (%), and prevalence ratios (PR; 95%CIs) for history of: 1) any allergies 2) multiple allergies to broad categories of allergens (animal material, plant material, allergies to medication, and other allergies) and 3) allergy medication use and history of GORRIs (and subtypes of GORRIs) were reported.

Results: In 68258 race entrants, the following were significantly associated with reporting any GORRIs: a history of any allergy (PR=2.2; $p<0.0001$), a history of allergies to broad categories of allergens (animal, plant, medication allergy and other) ($p<0.0001$), and the use of allergy medication ($p<0.0001$). A history of any allergies (PR=2.4; $p<0.0001$), all broad categories of allergies, and history of allergy medication use were significantly associated with muscle injuries ($p<0.0001$) and tendon injuries ($p<0.0001$). The risk of reporting a GORRI increased as the number of reported allergies to broad categories of allergies increased ($p<0.0001$).

Conclusions: A novel finding is that there was a cumulative risk effect with a history of multiple allergies. Further studies should aim to determine the underlying mechanism relating allergies and GORRIs.

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
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Abstract Detail
Title: OBESITY AND DIABETES IN PREGNANCY: ASSOCIATION WITH MATERNAL ADIPONECTIN

Background
Adiponectin is an insulin-sensitizing adipokine that is downregulated during obesity and insulin resistant states. Lower adiponectin levels have also been associated with pregnancy progression and adverse infant outcomes. This study investigated the effect of diabetes in pregnancy (DIP) on infant outcomes and the association between serum adiponectin levels, obesity and DIP.

Methods
Pregnant women with type 1 (T1DM, n=26) and type 2 (T2DM, n=77) diabetes, gestational diabetes (GDM, n=58) and normoglycemia (n=69) were recruited at the Steve Biko Academic Hospital, Tshwane, South Africa between 2017 and 2022. Serum adiponectin concentrations were measured using ELISA kits. Body mass index (BMI) was categorized as normal weight (BMI = 18.5–24.9 kg/m2), overweight (BMI = 25.0–29.9 kg/m2), and obesity (BMI ≥ 30 kg/m2).

Results
Preterm birth was higher in T1DM and T2DM compared to controls (70.0% and 52.8% vs 19.3%; $p < 0.001$). Lower levels of adiponectin were observed in T2DM diagnosed in pregnancy (2-fold; $p < 0.01$) and GDM (2-fold; $p < 0.05$) compared to T1DM. Adiponectin levels were negatively correlated with fasting ($r = -0.244$; $p < 0.05$), 1-h ($r = -0.299$; $p < 0.01$) and 2-h ($r = -0.246$; $p < 0.05$) oral glucose tolerance test glucose concentrations. BMI ($r = -0.221$; $p < 0.05$) and body weight ($r = -0.222$; $p < 0.01$) were negatively correlated with adiponectin concentrations, with lower levels observed in obese compared to normal-weight (2-fold; $p < 0.05$).

Conclusion
Maternal serum adiponectin is associated with glucose concentrations and BMI and low levels were associated with obesity and diabetes in pregnancy. The correlation between adiponectin and hyperglycaemia was lost after adjusting for BMI, suggesting that adiponectin levels are primarily regulated by weight.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: COMPARISON OF A NEWLY DEVELOPED AND EXISTING SAMPLING METHOD FOR THE DETECTION OF SULPIRIDE IN LOW VOLUMES OF DONOR BREASTMILK VIA LIQUID CHROMATOGRAPHY TANDEM-MASS SPECTROMETRY (LC-MS/MS)

Background:
South Africa has a high prevalence of sulpiride prescription for its off-label use as a galactagogue to treat human milk insufficiencies, despite potential negative effects of this drug on developing infants. This study aimed to develop and optimise a new, more efficient extraction procedure to assist in the detection of sulpiride in very low volumes donor breast milk samples utilising a targeted high performance liquid chromatography technique (LC-MS/MS).

Method:
Breastmilk samples obtained from nursing mothers undergoing sulpiride therapy were collected by the South African Breastmilk Reserve (SABR). The existing extraction methodology used 4 mL of breastmilk that was centrifuged to yield an aqueous and lipid fraction before liquid-liquid extraction. The new method used only 15 µL breastmilk spotted and dried on Whatman filter paper sampling cards before extraction. The extracted sulpiride was quantified using a targeted LC-MS/MS analysis.

Results and discussion:
The new extraction method required 250 times less sample than the original method and yielded an average analytical response 10 times more sensitive within the expected detection range for sulpiride in breastmilk samples. The sample preparation method was found to be more efficient, straightforward, and cost effective.

Conclusion:
The new micro-extraction procedure could accurately quantify sulpiride residues in breastmilk samples while requiring minimal sample volumes. This method will be used in a future pharmacokinetic study to determine sulpiride exposure in breastfed premature infants.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: USING REDCAP TO CREATE A DISCERNING PLATFORM FOR DATA CAPTURE AND DATA ACCURACY IN THE NESHIE STUDY

Background
REDCap, an electronic data capture software, is utilised in the NESHIE study. However, database users are prone to data capturing errors. We therefore undertook a redesign of an existing REDCap database to reduce data capturing errors.

Method
Clinical data captured in REDCap was compared with corresponding case report forms to identify data discrepancies across all study sites. Key areas responsible for data discrepancies were identified; built-in and advanced REDCap features were leveraged to refine the database. To assess the impact of the adjustments, comparative analyses were conducted using Chi-squared analysis in R to compare variance across the original and adjusted databases. Post-hoc analysis with Bonferroni correction was also performed.

Results and Discussion
Prior to implementing the refined database, error rates ranged between 6-20% (n=77). However, in the refined database across all sites (n=83), error rates were observed at 1-11%. These errors were mainly attributed to missing or unavailable data, as well as misinterpretation of case report forms. There was a significant decrease in the number of errors observed in the refined database (A7; $p<0.05$).

Conclusion
By leveraging multiple in-built features of REDCap, the aesthetics of the database were improved, and user error rates reduced. The enhancements ensured continued efficient usability, while simultaneously promoting the maintenance of high-quality data.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: MOLECULAR AND SEROLOGICAL INVESTIGATION OF SHUNI VIRUS IN SOUTH AFRICA

There are several neglected re-emerging zoonotic Orthobunyaviruses in Africa such as Shuni Virus (SHUV), Ngari virus (NRIV) and Bunyamwera virus (BUNV). The goal of this study was to investigate the incidence of SHUV in cases of acute fever of unknown cause (AFDUC) with or without neurological signs in sentinel hospitals in Gauteng and Mpumalanga, South Africa (2019-2021). In addition, the incidence of SHUV in animal samples with neurological signs was also investigated (2020 to 2023).

Samples from animals with fever, neurological signs or unexplained deaths were submitted through a veterinary network from across the country as part of the arbovirus surveillance network. Clinical samples from patients with AFDUC were collected from hospitals of Gauteng (Kalafong Hospital) and Mpumalanga (Mapulaneng and Matikwane Hospitals) as part of the African Network for improved diagnostics and epidemiology (ANDEMIA) study. These samples were screened using a Simbu serogroup Orthobunyavirus RT-PCR specific on the S-segment. Viral neutralization assay was carried out to screen animals and patients with AFDUC. From the viral neutralization assay, IgM ELISA assay was developed to identify acute cases that were outside the viremic phase.

Since 2020, 7/448 (1.6%) animals tested positive for Orthobunyavirus using an inhouse RT-PCR. Sanger sequencing on the S gene confirmed 5 were identified as SHUV by phylogenetic analysis with a fatality rate of 71%. In total, 3/278 (1%) of human samples tested positive on the RT-PCR (January-June, 2019-2021). In total there are 11/131 (8.4%) human sera showed to be neutralizing against SHUV (2019-2020) and 30/249 (12%) in animals. From the viral neutralization assay, 9 positive sera showed to have IgM antibodies with 60% of the patients presented with clinical signs of seizures and 40% with meningitis. Seroprevalence of SHUV in humans in South Africa will be determined by using a Shuni IgG ELISA from health donors in the region.

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
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Abstract Detail
Title: EPIDEMIOLOGY AND TIME-LOSS SHOULDER INJURIES IN PROFESSIONAL SOUTH AFRICAN RUGBY PLAYERS: FOCUS ON REAL-TIME COLLISION DATA DURING A TACKLE

Background:
In rugby, the shoulder is essential in attack/defence during collisions, tackling, falling, scrummaging and mauling. We first investigated the frequency, tissue and pathology type of shoulder injuries per player position among South African professional rugby players. We further observed injury severity in the context of momentum, intensity, and collision variables.

Methods:
A cross-sectional study collecting shoulder injury data of 80 male Super Rugby players (>18 years) over 4 seasons (2018–2021). Players wore a Catapult Evo GPS unit during training and match-play, recording performance variables and collision forces during injury. We collected tissue and pathology types of injury from players' medical files, including clinical examination and special investigations.

Results:
The frequency of all shoulder injuries ranged from 2.27–34.04% per year. Forwards (62.79%) sustained most shoulder injuries, specifically locks (30.23%). AC joint (46.51%) and ligament/joint capsule (65.11%) were mostly injured. Injuries with the highest average momentum resulted in players suffering minimal to mild severity injuries (1–7d time-loss). Backs (631.15kg.m/s) required less momentum than forwards (816.00kg.m/s) to suffer injuries resulting in >28days time loss (p=0.0081). Backs encountered higher match intensity (67.76m/min, p=0.0307) and highest average collisions (0.28/min) without suffering more severe injuries. Match intensity of >60m/min resulted in more than 55% of shoulder injuries.

Conclusion:
Forwards, specifically locks, sustained most shoulder injuries. The AC joint is the most injured area. Backline players were involved in higher velocity contact situations, game intensity, and collision frequency. They suffered fewer injuries but required less momentum to sustain more severe injuries.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: ASSESSING VARIATION IN EAR SIZE OF SOUTH AFRICAN POPULATIONS FOR 3D CRANIO-FACIAL APPROXIMATION

Background:
Knowledge of variation in ear size is important for facial approximation methods but remains understudied in a South African context. This study aims to evaluate the influence of sex and population affinity on ear size using cone-beam computed tomography scans.

Method:
Ten landmarks were placed on the soft-tissue ear of 101 black (43 female, 58 male) and 94 white (54 female, 40 male) South African adults. Mahalanobis distances were used to measure six inter-landmark distances: ear height, ear width, lobule height, lobule width, conchal height, and attachment height.

Results and Discussion:
An ANOVA identified significant height variations between populations and sex groups ($p<0.05$), while variation further increases within population-specific sex groups ($p<0.001$). White South Africans have longer mean ear lengths (64.36mm) than black South Africans (58.71mm), whereas mean ear widths were similar between groups (36.01mm and 35.53mm respectively). A Pearson's test was applied to test for correlations between inter-landmark distances for development of regression formulae, however, ear height and width were only moderately correlated ($r2 = 0.695$). Strong correlations were observed between the ear and lobule height ($r2=0.767$). Correlations were stronger when assessing population and sex groups separately, indicating a need for separate regression formulae per group.

Conclusion:
Our findings will be used to create accurate regression formulae that take population affinity as well as sex into consideration. Applications for this research could further also extend into pre-operative planning for reconstructive surgeries of the ear resulting from congenital deformation, trauma, or pathology.

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
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Abstract Detail
Title: COMBINING ULTRASOUND-DERIVED TRACHEAL DIAMETER WITH ANTHROPOMETRIC DATA TO AID SELECTION OF APPROPRIATE DOUBLE-LUMEN ENDOTRACHEAL TUBE SIZE AT TWO SOUTH AFRICAN UNIVERSITY HOSPITALS

Background: Selection of an appropriately sized double-lumen tube (DLT) is vital for safe practice of one-lung ventilation, but wide variation remains when determining this. A novel method combining ultrasound measurement of tracheal diameter with patient anthropometric data has been suggested in Europe. This study evaluated the utility of tracheal ultrasound in the combined tracheal- ultrasound-and-anthropometric-data-method, for selection of DLT size in our local population.

Methods: We did an analytic cross-sectional study which enrolled 87 adults requiring one- lung ventilation with a left-sided DLT (LDLT) at Steve Biko Academic and Groote Schuur Hospitals. DLT size was selected based on current institutional practice. Sizing was considered adequate based on bronchial cuff volume required for lung isolation. Cut-off points for tracheal diameter and height associated with an adequately sized DLT were determined and compared to those derived using European data.

Results: DLT size was inappropriate for 22% of females and 50% of males. A logistic regression model established that tracheal diameter is useful in optimising size selection for females, but not males. Tracheal diameter was significantly correlated with DLT size in females (r=0,32374), but not male patients (r=0,11136). Tracheal diameter is a predictor of DLT size for females (0,05 < p=0,0544 < 0,1), but is not statistically significant for males (p=0,53 > 0,05).

Conclusion: The use of anthropometric parameters alone is inadequate for estimation of appropriate DLT size. The European combined cut-off points dictating LDLT selection do not correspond with those of the South African population. Population-specific cut-off points prove more useful.

Faculty Research Day 2023
Abstract no: 2023084

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
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Abstract Detail
Title: THE RELATIONSHIP BETWEEN CONCUSSION HISTORY AND SLEEP IN ADULT RUGBY PLAYERS.

Background:
Rugby is a contact sport with players at risk of sustaining sports related concussion in training and matches. Concussion reflects a cerebral functional disturbance, with sleep being one of the functions that may be impacted post-concussion. The aim of this study is to investigate the relationship between concussion history and quality of sleep in adult rugby players.

Methods:
This is a cross-sectional pilot study involving 103 male adult rugby players (>18 years) from a professional rugby club in South Africa. Due to COVID-19, only 38 participants completed the PSQI questionnaire. The players' concussion history at baseline (pre-season) was obtained using the Sport Concussion Assessment Tool 5th Edition (SCAT5). Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI). A mixed-method analysis was utilised to investigate the association between concussion and sleep quality.

Results:
The mean age of athletes was 20.61±2.57 years. A mean of 1.09 concussions/player was sustained, and 9.9% of participants were hospitalised for a head injury. The Global PSQI score for all athletes was 6.42±3.31. The Global PSQI score of the concussed group was 7.00±3.21 compared to 5.29±3.77 in the control group (p=0.4756).

Conclusion:
In this small group, athletes with a prior concussion had poorer quality of sleep in comparison to those without prior concussion, although not statistically significant. Sleep is negatively impacted by concussion in adult elite rugby players.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: PRIMESTORE MOLECULAR TRANSPORT MEDIUM ENHANCES THE DETECTION OF MYCOBACTERIUM TUBERCULOSIS USING XPERT MTB/RIF ULTRA

Background: Contacts of confirmed cases of tuberculosis (TB) are generally regarded as a priority group for follow-up and case-finding activities. Triaging for presumptive TB by point-of-care testing of non-invasive oral swab samples is proposed as a low cost and rapid procedure for prioritizing subjects for further investigation. PrimeStore molecular transport medium (PS-MTM) has been shown to inactivate infectious organisms such as Mycobacterium tuberculosis (M. tuberculosis) and preserving nucleic acids, making it a safe method for handling infectious samples. The aims of this study were, (1) to demonstrate that PS-MTM lyses cells to release naked DNA, (2) demonstrate the compatibility of PS-MTM with the Xpert Ultra system, and (3) assess the limit of detection of Xpert Ultra based on a dilution series simulating pooled oral sab collections prepared in PS-MTM.

Method: M. tuberculosis DNA was analysed by a real-time PCR assay and Xpert MTB/RIF Ultra (Xpert). A simulated pooled oral swab sample was subjected to Xpert testing using the traditional Xpert processing method compared to the PS-MTM processing method.

Results and Discussion: We determined that PS-MTM lyses cells to release naked DNA. We determined that the limit of detection of a pooled specimen is 102 cfu/ ml. PS-MTM assists in the presentation of DNA to the Xpert Ultra system.

Conclusions: PS-MTM is shown to be compatible with Xpert and enhance the detection of M. tuberculosis. Pools oral swab specimens have a high potential as an effective triaging test for household contacts of TB index cases.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
The review committee reserves the right to allocate your abstract to a specific category, i.e. oral presentation or poster.

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Abstract Detail
Title: COLLABORATION POSSIBILITIES: THE LIMBIC SYSTEM IN MATERNAL AND INFANT HEALTH

Background: The newborn's primary reflex, the limbic system, receives trigger messages from the olfactory receptor sites. Since naturalists, herbalists, and hobbyists use aromatherapy, spiritual leaders use essential oils for sacred rituals, and cosmetics and perfume manufacturers make liberal use of essential oils, it is crucial to understand how this may impact neonatal health.

Methods: A literature review was performed on the safety of essential oils as inhalants on maternal and infant health and the effect of odours on the limbic system. A combination of the following keywords was used: limbic, fetal, infant, polypharmacy, and inhalants.

Conclusion: Recent evidence demonstrates cost-effective pain, anti-parasitic treatment, and wound management with no bacterial resistance when using herbs and essential oils. With the rising cost of medical treatment and limited access to healthcare in rural areas, this approach may offer a much-needed solution in neonatal health. However, these compounds' cumulative and synergistic effects may lead to maternal and newborn toxicity that may harm the fetus and impact the infant's later development.

Biologists, neonatologists, obstetricians, chemists, pharmacists, toxicologists and healthcare workers can Co-Create, Collaborate, and Innovate to raise awareness among the end-users and prevent prenatal and postnatal adverse drug effects and drug interactions. Agriculture professionals can assist with plant identification, phytochemical extraction, over-harvesting, ring barking cessation, and ethical farming practices. Community and religious leaders should be involved in the decision-making processes; for example, only certain species of Sandalwood are acceptable in a ritual context.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
The review committee reserves the right to allocate your abstract to a specific category, i.e. oral presentation or poster.

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Abstract Detail
Title: A BREAST CANCER-DERIVED ORGANOID MODEL REVEALS AN UNLIKELY EVENT: HOW IN VITRO DATA CAN INFORM IN VIVO TUMOUR BEHAVIOUR

Background:
The current breast cancer treatment regimens available to South African patients are largely informed by data gathered from studies performed in Europe or America. Variability in treatment responses and adverse effect profiles have been reported, necessitating the need for establishment of a breast cancer cell model that better represents the African population. Over the last two years, we have collected, established and expanded breast cancer organoid lines derived from tissue from black African women treated within the South African public health system. Here we show data on one line isolated with a rare phenotype in vitro that explains its behaviour in vivo.

Method:
A patient undergoing a radical mastectomy for a T4N1M0 tumour was asked to participate in our organoid biobank study. After consent, part of the tumour was resected following surgery and used to establish an organoid line. The line was assessed for substrate adhesion, and confocal imaging was used to assess cell spreading capability through staining of the actin cytoskeleton.

Results and Discussion:
This organoid line was unique in that it displayed diminished cell-substrate adhesion and completely lacked spreading ability. In contrast, several other lines tested were able to grow and spread in 2D. Dissociation of these organoids with trypsin, however, induced filopodia formation, alluding to possible mechanisms responsible for the observed phenotype. This could involve lack of ability to facilitate EMT-like transition, which may be inducible by trypsinisation.

Conclusion:
Our initial results show that a proliferative but non-metastatic breast tumour generated breast cancer organoids that had diminished cell-substrate adhesion even though cell-cell adhesion was functional and robust. Cells lacked the ability to spread on surface substrates, correlating with the observation that, even with large tumours, no metastasis was observed in the patient.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
The review committee reserves the right to allocate your abstract to a specific category, i.e. oral presentation or poster.

Abstract Detail
Title: CARDIOVASCULAR RISK USING CALCULATED LDL-CHOLESTEROL (LDL-C): HOW DO THE NEWER EQUATIONS PERFORM IN SOUTH AFRICAN PATIENTS

Background
Ultracentrifugation is the reference method for LDL-C, however, this method is unsuitable for use in the routine laboratory. Therefore, direct LDL-C assays and predictive equations are used. In this study, we compared the Friedewald and the newer extended Martin/Hopkins, Sampson/NIH and four other equations to a direct LDL-C assay.

Methods
Lipid profiles from a mixed South African population (n=44194) were analysed on the Beckman DxC800 analyser. We compared LDL-C predictive equations to a direct LDL-C assay and analysed the results using non-parametric statistics and error grid analysis.

Results and discussion
In terms of desirable bias and total allowable error, the extended Martin/Hopkins and Sampson/NIH equations both showed the best correlation with direct LDL-C. The Sampson/NIH equation was least biased in the low LDL-C category (<1.8mmol/L), and produced the least clinically relevant errors at high (4.9 mmol/L) and low (1.8 mmol/L) LDL-C cut-offs compared to the extended Martin/Hopkins and Friedewald equations. However, the total clinically relevant errors of the extended Martin/Hopkins equations were compared to the Sampson/NIH equation, yielding a p-value of 0.255 and thus proving the difference statistically insignificant.

We recommend implementation of the Sampson/NIH equation with the use of the Beckman Coulter analyser in this population, although the Martin/Hopkins equation may also be used as the differences were marginal. Both perform significantly better than the Friedewald equation. We recommend that patients be monitored using one of these methods and that each laboratory perform its own validation of either equation to ensure continuation and accuracy, and prevent between-method variation.

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
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Abstract Detail
Title: MOLECULAR CHARACTERISATION OF SELECTED COAGULASE NEGATIVE STAPHYLOCOCCI FROM INVASIVE INFECTIONS AT PUBLIC HEALTHCARE FACILITIES IN PRETORIA

BACKGROUND: Coagulase negative staphylococci (CoNS) are among the most frequently recovered bacteria in clinical settings, but are often dismissed as harmless contaminants. These bacteria can cause bloodstream infections (BSI) in immunocompromised patients through the implantation of medical devices. This study aims to determine the species prevalence and to detect the antibiotic resistance and virulence genes associated with CoNS infections in public clinical settings within the Pretoria area.

MATERIALS AND METHODS: A total of 50 CoNS isolates were obtained from BSI at a public diagnostic laboratory. Multiplex– polymerase chain reaction assays were used to characterise CoNS species; antibiotic resistance genes (ARGs): beta-lactamases (mecA, blaZ), fluoroquinolones (norA); biofilm genes (icaA, aap, altE); toxins (sea, seb, sec and seg) and haemolysins (hla, hlb and hld).

RESULTS AND DISCUSSION: Staphylococcus epidermidis [62% (31/50)] was the most prevalent CoNS species. The ARGs: blaZ [28% (14/50)], mecA [12% (6/50)], norA [12% (6/50)] and biofilm gene: aap [28% (14/50)] were detected. The genes detected in this study were clinically relevant and can make the treatment and clearance of CoNS more difficult.

CONCLUSION: The CoNS isolates from the study harbour the mecA gene which has been associated with increased resistance and can be transferred to Staphylocccus aureus causing potential methicillin-resistant S. aureus (MRSA) outbreaks. Staphylococcus epidermidis was the most prevalent CoNS and its resistance is increasingly being recognised as a serious problem in hospitals globally. Increased attention and monitoring are required for CoNS in clinical settings, particularly with regards to antibiotic resistance.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail

Title: THE BIOACTIVITY AND STABILITY OF GOLD NANOPARTICLES CONJUGATED WITH Os-C(W5) AGAINST CANDIDA ALBICANS BIOFILMS

Antimicrobial resistance poses a threat to humanity and currently, the number of antifungal drugs available is limited, consequently, novel drugs are needed. Antimicrobial peptides (AMPs) are promising candidates, however stability in high salt and the sensitivity to proteases limits applications.

To overcome these limitations the antifungal peptide, Os-C (low activity in physiological salt environments), was tagged at the C-terminal with five tryptophan residues (W5) and was conjugated electrostatically to gold nanoparticles (GNPs). Tryptophan tagging increases activity in high salt environments but also played a role in the reduction of Au^{3+} with the subsequent formation of stable Os-C(W5)@GNP with quasi-spherical shapes, an average diameter of 14.01 ± 0.31 nm and an attachment of 174.96 peptides/nm2. Against Candida albicans, the 50 % biofilm inhibition (BIC50), eradication (BEC50), and degradation (BDC50) were determined with the resazurin and crystal violet assays measuring cell viability (cv) and biomass (bm) respectively. For Os-C(W5)GNP the BIC50cv and BIC50bm of Os-C(W5)GNP was 8.93 ± 1.24 and 5.99 ± 2.28 µM, the BEC50cv and BEC50bm of Os-C(W5)GNP was >37.5 µM for both (the highest concentration evaluated), and the BDC50cv and BDC50bm was 45.7 ± 15.3 µM and >150 µM respectively.

The BIC50 activity of Os-C(W5)GNP was similar to Os-C(W5), although the BEC50 and BDC50 were several-fold less. The Os-C(W5)@GNPs were non-toxic to HaCat keratinocyte cells. In conclusion, tryptophan tagging of AMPs can be used to generate GNPs coated with AMPs for effective drug delivery and the potential treatment of fungal biofilms.

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Theme: Innovate
Methodology: Randomised Controlled Trial (RCT)

Disclaimer:
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Abstract Detail
Title: EFFECT OF A 12-WEEK EXERCISE INTERVENTION ON PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOUR LEVELS AND PATTERNS IN YOUNG BLACK SOUTH AFRICAN WOMEN: A RANDOMISED CONTROLLED TRIAL

Background: Recent World Health Organization guidelines recommend a minimum of 30 min of moderate-intensity aerobic physical activity five days a week for all healthy adults in order to promote and maintain good health. Black South African women accumulate their physical activity through walking for transport undertaken at a low to moderate intensity. The aim of this study was to determine changes in physical activity patterns during a 12-week exercise intervention.

Method: Women living with overweight and obesity were recruited and randomized into an exercise (EXE; n=23) or control group (CON; n=22). The intervention included both aerobic and resistance exercise and lasted 12 weeks. Participants wore an Actigraph GT3X+ accelerometer and ActivPal simultaneously for seven days at baseline and during weeks 4, 8, and 12 of the intervention.

Results and Discussion: The total of 34 (exercise, n=20; control, n=14) participants completed the intervention. Total physical activity, moderate to vigorous physical activity, sit to stand transitions and number of steps accumulated each week significantly increased throughout the 12-week intervention in the exercise group (p<0.001). The exercise group clearly saw improvements in their physical activity and aspects of their sedentary behaviour over the 12-week period.

Conclusion: These findings promise in that it supports the idea that an exercise intervention may support positive changes in sedentary behaviour habits. Twelve weeks may be too short to detect changes in habitual physical activity levels in response to an exercise intervention, in which case a longer follow-up would be required.

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
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Abstract Detail
Title: METABOLIC ALTERATIONS IN MOTHERS LIVING WITH HIV AND MOTHERS WITHOUT HIV AND THEIR INFANTS.

Background: HIV-exposed uninfected (HEU) children have been found to have suboptimal growth and greater susceptibility to infection in early life compared to HIV-unexposed uninfected (HUU) children. The reasons for this are poorly understood. We aimed to determine which metabolites and metabolic pathways are altered in mothers living with HIV (MLWH) and their HEU infants.

Methodology: A cohort of 60 (29 HIV+ and 31 HIV-) women and their infants were randomly selected from a larger study for metabolomic analysis. Mothers with comorbidities were excluded. All infants were HIV-uninfected and exclusively breastfed for the first 6 weeks. Untargeted metabolomic profiling was performed using 1H-NMR spectroscopy on the plasma of mothers at 28-weeks' gestation and the infants at birth, 6-/10-weeks, and 6-months. Clinical and growth data for these time points were recorded. HEU infants had significantly smaller growth at all three time points than HUU infants, specifically in weight-for-length and weight-for-age at 6-/10-weeks, and finally in mid-upper arm circumference at 6-months.

Results and Discusiion: Among the MLWH, 3-hydroxybutyric acid, acetoacetic acid, and acetic acid were decreased compared to the HIV- mothers. In infants at birth, threonine, and myo-inositol were decreased in the HEU group and acetone and formic acid increased. At 6/10-weeks, betaine, tyrosine, and propylene glycol were decreased in the HEU group. Finally, at 6-months, 3-hydroxybutyric acid was decreased while glycine was increased in the HEU infants.

Conclusion: The NMR analysis has provided preliminary information indicating differences between HEU and HUU infants, seemingly located in glucose and ketone metabolism, which could impact T-cell activation, differentiation, and function.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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or poster.

Abstract Detail
Title: EVALUATION OF AN IN-HOUSE MULTIPLEX PCR FOR HIV DRUG RESISTANCE TESTING

Background: Currently, most HIV drug resistance polymerase chain reaction (PCR) assays amplify protease (PR)
and reverse transcriptase (RT) separately from integrase (IN) gene. The aim of this study was to evaluate the
performance of a multiplex PCR for the simultaneous amplification of PR/RT and IN fragments.

Methods: Total nucleic acids were extracted using the NucliSENS EMAG automated extraction platform. New
primers were designed and used together with amended in-house or published PCR primers for amplification of
PR/RT (1.4 kb) and IN (1.0 kb) fragments. Initially, evaluation of PR/RT and IN PCR primers was performed
separately. Thereafter, these primers were used in a multiplex PCR protocol. Pending data includes Sanger
sequencing and HIV drug resistance analysis.

Results and discussion: Preliminary data includes evaluation of the multiplex PCR in fourteen samples with HIV
VL ranging from 28000 to 75900 copies/ml. Both PR/RT and IN primers successfully amplified target fragments
when evaluated separately. The multiplex protocol successfully amplified both fragments in twelve samples
(85.7%). However, the IN fragments were successfully amplified in all fourteen samples, indicating that there
could have been a bias towards amplification of the IN fragment. Pending study data will be available by the end
of July.

Conclusion: The in-house multiplex PCR assay has shown excellent performance thus far in amplifying both
PR/RT and IN fragments. This could be a cost-effective method for HIV drug resistance testing as both PR/RT and
IN fragments are successfully amplified in one reaction.

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Theme: Collaborate
Methodology: Interdisciplinary study

Disclaimer:
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Abstract Detail
Title: THE IMPORTANCE OF GENETIC BIOSURVEILLANCE OF SARS-RELATED CORONAVIRUSES FROM RHINOLOPHUS BATS AT THE HUMAN-ANIMAL INTERFACE IN LIMPOPO, SOUTH AFRICA.

Background
The emergence of novel coronaviruses from wildlife species has been implicated in several outbreaks, with the most recent being the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic. Coronavirus zoonoses are facilitated by mutations and recombination enabling cross-species transmission. Rhinolophus bats are the suspected origin of Sarbecoviruses (SARS, SARS-CoV-2, and related viruses), however limited surveillance has been done in Africa for these bats.

Method
This study uses longitudinal molecular surveillance of coronaviruses in a Rhinolophus population in Limpopo using non-invasive gastrointestinal samples collected from 2022-2024 and includes retrospective samples from 2008-2021. Sarbecovirus full genomes are characterized using next-generation sequencing at the National Institute for Communicable Diseases and entails both targeted amplification and unbiased approaches.

Results and Discussion
To date, a 5.1% Sarbecovirus positivity has been detected, and a partial genome (80% complete) has been recovered with a high degree of similarity to the African Sarbecovirus lineage despite some differences in the receptor binding motif. This lineage has been suggested as being potentially zoonotic although further adaptation is required. It is essential to monitor important genetic elements and ecological host factors that may contribute to spillover into humans. The full genome sequences from this study will also contribute to the limited data currently available for Africa and can be used for serosurveillance in both human and animal populations. Working with rural communities around the roosting sites, mitigation strategies can be implemented to reduce exposure and risk of zoonoses.

Conclusion
This study describes the first detection and genome characterization of sarbecoviruses from South African Rhinolophids and emphasizes the need for longitudinal surveillance of potentially zoonotic viruses at human-animal interfaces.

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Theme: Collaborate
Methodology: Interdisciplinary study

Disclaimer:
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Abstract Detail
Title: IMMUNOLOGICAL PROFILES OF PLWH ADMITTED WITH ACUTE COVID-19 IN TSHWANE, SOUTH AFRICA

Background: South Africa has the largest population of PLWH in the world, PLWH could have worse COVID-19 outcomes due to persistent immune deficiency and dysregulation.

Method: 174 SARS-CoV-2 PCR-positive clients with moderate to severe COVID-19 were recruited from May 2020 to November 2021. Whole blood samples were obtained on the first day of hospitalization and T-cell and monocyte phenotyping performed on a CytoFlex flow cytometer. Data analysis was done in Kaluza and Cytobank. Cytokine levels were determined in plasma on a Bio-Plex Suspension Array platform.

Results and Discussion: Thirty-seven clients were PLWH. Median CD4+ T-cell count: 256 (IQR 115-388) cells/µL; HIV viral load was suppressed in 76%. They were younger (46 ±10.9 vs 55 ±14.4 years p=0.0064), more likely to be female (73% vs 42.3% p=0.0013) with higher ROX scores (15.3 [IQR 8.2- 22.1] vs 9.6 ([IQR 4.6- 11.4] p=0.0031) than HIV- clients. Mortality was similar between the groups: 15.4% vs 13.5% in PLWH (p=0.7864). PLWH had increased non-classical (p=0.0014), and the highest expression of PD-L1 (p=0.0168). Differences in CD8+ were: lower effector memory (EM)-1 (p=0.0127) and exhausted TEMRA (p=0.0284), higher EM-2 (p=0.0123) and activated central memory (p=0.0001) subsets in PLWH. PLWH had increased concentrations of IL-1Ra (p=0.0096), IL-2 (p=0.0173), and IL-15 (p=0.0217). PLWH hospitalized with COVID-19 had less severe disease, possibly due to lower levels of inflammation secondary to skewed monocyte subset ratios and CD8+ T-cell maturation, and higher levels of anti-inflammatory and immunoregulatory cytokines.

Conclusion: It is possible that the immune dysregulation seen in HIV could inhibit the hyperinflammatory immune response caused by SARS-CoV-2

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: THE PUTATIVE THERAPEUTIC HEALTH BENEFITS OF ESCULTETIN IN BONE HEALTH AND METABOLISM

Introduction: Bones are a vital part of the human body that play an important role in, support and the immune system. Osteoclasts are responsible for bone resorption and their overactivity can cause bone degenerative diseases. When the receptor activator of nuclear factor-kB ligand (RANKL) binds to the receptor activator of NF-kB resulting in osteoclast differentiation. The aim of this study was to investigate the effect of esculetin on osteoclast formation using various techniques on the RAW 264.7 murine macrophage cells.

Methods: The effects of esculetin on cell viability were initially tested using resazurin assay at concentrations of 1, 2.5, 5, and 10 µM. Tartrate-resistant phosphatase (TRAP) staining assessed the effect of esculetin on osteoclast differentiation. Western blotting evaluated the effects on RANKL signalling. PCR analysed the effects on osteoclast-specific genes involved.

Results: Esculetin had no effect on cell viability in comparison with the vehicle control($P>0.05$). Esculetin significantly reduced osteoclast formation at 5 and 10 µM in comparison to the RANKL positive control($P<0.05$). Osteoclast-specific gene expression slightly increased in the presence of esculetin.

Conclusion: Esculetin was shown to be a potent inhibitor of osteoclast formation. These effects are mediated through the inhibition of RANKL signalling pathways. Our Findings suggest that esculetin has the potential to promote bone health.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: PHENOTYPIC PROFILING OF LIPOGRAMS: ANALYSIS BY ARTIFICIAL INTELLIGENCE

Background: Lipid disorders play a critical role in the pathogenesis of ASCVD. Understanding the interplay of lipoproteins and lipid composition is essential for cardiovascular risk assessment. Frederickson's classification system, initially proposed in 1967, is widely utilized to profile lipid electrophoresis and biochemical lipid profiles, providing valuable insights into lipid metabolism and associated disorders. The classification system categorizes lipoprotein disorders into five types based on the composition, density, and electrophoretic mobility of lipoproteins, particularly chylomicrons, very low-density lipoproteins (VLDL), low-density lipoproteins (LDL), and high-density lipoproteins (HDL). Each type has specific clinical manifestations, risk factors, and treatment considerations.

Methods: Using big data analytics, we analysed more than 60 000 lipid profiles using a new automated phenotypic lipid profiling system we have developed using artificial intelligence in a cohort of patients with diabetes across South Africa to identify the predominant phenotype.

Results and Discussion: The automated classification system can be used in laboratory information systems to identify all the classical Fredrickson-like phenotypes with the exception of Type III dysbetalipoproteinemia. The system describes a new phenotype, Type VI. The validation of the automated analysis was performed on a database of lipid electrophoresis gels. The system can be used without the need for lipoprotein electrophoresis.

Conclusions: The ability to rapidly automate the classification of biochemical lipid profiles into Frederickson types holds great promise for patients with atherosclerotic cardiovascular disease whereby profiles with total cholesterol, HDL-cholesterol, triglycerides and calculated LDL-cholesterol can be classified into distinct phenotypes.

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Theme: Co-Create
Methodology: Nominal Group Technique

Disclaimer:
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Abstract Detail
Title: UNRAVELLING THE MULTIFACETED IMPACT OF PAPAVERINE ON TUMORIGENIC MCF-7 BREAST CELLS BY ASSESSMENT OF MORPHOLOGY AND ANTI-PROLIFERATION ACTIVITY

Background: Breast cancer poses significant global health challenges. Papaverine, a non-selective phosphodiesterase inhibitor isolated from the Papaver somniferum plant, has shown promising results in several in vitro cancer models.

Methods: The aim of this study was to determine the antiproliferative effects of papaverine on a tumorigenic MCF-7 breast cells line. The antiproliferative effects of papaverine-treated MCF-7 cells were assessed by using crystal violet staining and spectrophotometry analysis. Morphology of papaverine-treated MCF-7 cells were visualised by polarization-optical transmitted light differential interference contrast (PlasDIC). Papaverine-treated MCF-7 cells were stained with haematoxylin and eosin and images were captured using light microscopy.

Results and Discussion : Results showed that exposure to papaverine induced antiproliferative activity in MCF-7 cells in a dose- and time-dependent manner. When cells were exposed to 150 µM PPV for 24 hours, 72 hours and 96 hours cell growth was reduced to 66%, 68% and 72% respectively in PPV-treated cells when compared to cells propagated in complete growth medium with a significant decrease in cell density. Light microscopy showed that papaverine exposure for 24 hours resulted lamellipodia-like protrusions in MCF-7 cells and enlarged, rounded cells as opposed to the negative control where cells were not rounded. Papaverine induced dose-and time-dependent effects on proliferation and morphology in the MCF-7 cell line. Additional research is required to clarify the underlying molecular pathways.

Conclusion: This study will potentially contribute to future studies please be more specific here on papaverine in cancer cell lines. More research will be conducted where flow cytometric analysis and hydrogen peroxide production will be evaluated in order to investigate the influence of PPV on cell cycle progression and oxidative stress.

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Theme: Innovate
Methodology: Evidence Synthesis

Disclaimer:
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Abstract Detail
Title: A RETROSPECTIVE REVIEW OF HANGINGS IN THE PRETORIA MEDICO-LEGAL LABORATORY

Suicide by hanging is defined as the intentional killing of oneself via an anchor point (e.g., a beam or hook) by a rope/cord like object wrapped around the person's neck – the pressure of the ligature is produced by the weight of the body.

The aim of this project is to review suicidal hanging cases in the Pretoria Medico-Legal Laboratory over the period of 2020-2022. The following data will be collected: all epidemiological data; the type of ligature used, the type of knot (slipknot, fixed knot etc.), and all associated forensic pathological data. This information will help inform public health aspects surrounding this phenomenon.

A retrospective review will be conducted of cases presented to the PMLL as hangings. The cases which do not fit the inclusion criteria will be excluded from the study. The setting of the study will take place at two physical sites: The data collection will take place at the Forensic Pathology Services (FPS), PMLL. The data analysis and processing will be conducted in the Department of Forensic Medicine, Faculty of Health Sciences, University of Pretoria, Prinshof campus. Data is still in the process of being collected so as of this moment no results have been collected and no conclusion can be drawn. The research will be completed before the faculty day presentation.

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Theme: Collaborate
Methodology: Interdisciplinary study

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Abstract Detail
Title: INHERITED CARDIAC ARRHYTHMOGENIC DISORDERS IN A SOUTH AFRICAN COHORT OF SUDDEN UNEXPLAINED DEATHS IN THE YOUNG

Background: Sudden cardiac death is deemed a major global public health concern. In sub-Saharan Africa, including South Africa, there is a lack of reliable statistics on the incidence of SCD, even though a fourfold increase in noncommunicable diseases, largely due to cardiovascular diseases, has been reported. Considering that sudden cardiac deaths contribute to an estimated 50% of all cardiovascular deaths, it highlights South Africa's need for research into better detection, treatment and prevention of sudden cardiac deaths.

The aim of this study was to identify an inherited cardiac arrhythmogenic disorder, caused by variants in cardiomyopathy and arrhythmia-related genes, as a possible contributing factor to the cause of sudden cardiac deaths.

Results and Discussion: Next generation sequencing identified a total of 178 different missense variants among the entire study population (n = 66);164 were known, documented variants whereas the remaining 14 were novel. A total of 127 variants were of like benign significance, 33 were variants of unknown significance, whereas the remaining six variants were of likely pathogenic significance.

Conclusion: Post mortem genetic testing provided evidence of a genetic arrhythmic/cardiac conduction disorder as the probable pathogenic basis for 9% of sudden unexpected death / sudden unexplained infant death cases. Targeted next generation sequencing of 16 prevalent genes are recommended for routine testing in all unexplained sudden unexpected death / sudden unexpected infant death cases in South Africa.

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Theme: Collaborate
Methodology: Interdisciplinary study

Disclaimer:
The review committee reserves the right to allocate your abstract to a specific category, i.e. oral presentation or poster.

Abstract Detail
Title: THE EFFECTS OF IN UTERO HIV AND ANTIRETROVIRAL THERAPY EXPOSURE ON INFANT T-CELL AND MONOCYTE ACTIVATION, FUNCTION, AND REGULATION OF IMMUNOMODULATORY PATHWAYS

Background: HIV infection is characterized by chronic, systemic immune activation. It is unclear how this affects the immune system of infants born to mothers living with HIV (MLWH). This study assessed whether maternal HIV status impacts infant T-cell and monocyte activation, regulation, and responsiveness to stimulation at birth and early infancy.

Method: Pregnant women were recruited from antenatal clinics in Southwest Tshwane. Mothers with comorbidities were excluded. Maternal blood samples were taken at 28 weeks and paired maternal-infant samples taken at birth, ten weeks, and six months postpartum. Key maternal, foetal, and post-partum clinical data were captured on standardized validated forms. Multicolor flow cytometry was used to characterize T-cell, and monocyte activation with multi-analyte cytokine assays to characterize the cytokine profiles.

Results & Discussion: A total of 53 mothers [29 MLWH and 24 mothers without HIV (HIV-)] and their infants participated in the study. Despite equivalent gestational age and negative HIV status, HIV-exposed uninfected (HEU) infants had stunted growth when compared to HIV unexposed, uninfected (HUU) infants. They also had increased monocyte activation and increased expression of CD57 on CD4+ and CD8+ T-cells, indicating immune exhaustion. By 6 months, HEU infants had significantly lower PD1 expression on CD4+ and CD8+ cells. Only soluble CD14 was increased in MLWH and IL-4 in HEU infants.

Conclusion: These results are indicative of disrupted immune regulation which could impair initial T cell activation, fine-tuning of T cell differentiation and effector functions, and development of immunological memory. Further work is ongoing to test this hypothesis.

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Theme: Collaborate
Methodology: Interdisciplinary study

Disclaimer:
The review committee reserves the right to allocate your abstract to a specific category, i.e. oral presentation or poster.

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Abstract Detail
Title: INNOVATIVE DESIGN OF A NEAR-PATIENT TEST FOR THE EARLY DETECTION AND MONITORING OF MATERNAL AND NEONATAL SEPSIS

Background: The early diagnosis of neonatal sepsis is crucial for improved survival. There is an urgent need for better diagnostic tools. Seroxo has developed the Leukocyte ImmunoTest (TM)(LIT(TM)), a portable, rapid near-patient test for immune dysfunction. In two studies it identified sepsis, using a single drop of blood, within a 10-minute time-frame. Results were comparable to C-reactive protein (CRP), with a much quicker response time.

This project enabled partners in the UK to work with University of Pretoria clinicians to develop a new product design, with a specific focus of improving usability in South African settings.

Method: This product design/usability research project involved four main steps:
i) FORESIGHT- People & Planet-centered Design Research Planning including studying key user interactions with the product and the use of sustainable materials.
ii) CONCEPT - New device designs using planet-centered design.
iii) DETAIL - Detailed CAD design of chosen design concept.
iv) PROTOTYPE - 3D printing of demonstrator model.
Remote study calls were held between project partners and the usability research was conducted via clinical end-user focus groups, where design concepts were discussed and questionnaires used to capture usability feedback.

Results and Discussion
Study results include a high resolution 3D CAD model and a 3D printed demonstrator model of the chosen design concept and an animated video, communicating the use of LIT(TM) Mk-II.

Conclusion
As a 10-minute test for sepsis, requiring a single drop of blood, LIT(TM) could revolutionize our ability to promptly detect neonatal sepsis, enabling us to intervene swiftly and improve survival.

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Theme: Collaborate
Methodology: Interdisciplinary study

Disclaimer:
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Abstract Detail
Title: GENDER DIFFERENCES IN PHYSICAL SELF-PERCEPTION AND RESISTANCE TRAINING SELF-EFFICACY AND OUTCOME EXPECTANCY IN UNIVERSITY ATHLETES

Background: Adherence to physical preparation programmes is an essential component of athletic development and sports performance. An individual's perspective and attitude towards resistance training may affect their willingness to participate and comply with prescribed programmes. Gender differences that have been observed in strength and in elite sports may be influenced by psychosocial factors that affect adherence to resistance training. This study aimed to investigate physical self-perception and resistance training self-efficacy and outcome expectancy in male and female university athletes.

Methodology: Competitive athletes in the University of Pretoria's sports programme were invited to participate in the study. After providing informed consent, participants completed the Physical Self-Perception Profile (PSPP) and Resistance Training Self Efficacy (SE) and Outcome Expectancy Scales (OE) through an online form. A sample size of 77 male and 44 female athletes from a variety of sporting codes completed the questionnaires. Between-group differences were analysed using independent sample t-tests with statistical significance accepted at $p < 0.05$.

Results & Discussion: Female athletes scored lower than males on all PSPP subscales (sport, body, strength and self-worth subscales: $p < 0.05$; condition subscale: $p = 0.055$). There were no differences in the SE (male: 17.7 ± 2.2; female: 17.3 ± 2.2) and OE (male: 22.2 ± 2.5; female: 21.8 ± 2.6) totals. Only the SE question that asks to what extent the athlete feels they have the skill and technique to complete resistance training exercises safely was lower in the female group.

Conclusion: Although the overall resistance training SE and OE was similar between genders, the female athletes' physical self-perception was lower than that of the males. Female athletes' perception of their ability to perform resistance training skills safely and with the correct technique was also lower than that in males.

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Theme: Collaborate
Methodology: Interdisciplinary study

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Abstract Detail
Title: ALLELE FREQUENCIES IN THE AFRICAN POPULATION IN CORONAVIRUS DISEASE-ASSOCIATED GENETIC LOCI

Background: Coronavirus 2019 (COVID-19) disease displays significant heterogeneity in clinical presentation. Many studies have been published identifying genetic variants that can affect COVID-19 susceptibility and severity outcomes. These studies have focused largely on the European population group with no studies performed on African populations. Due to the lack of data from the African continent, the aim of this study is to determine African population allele frequencies in genetic determinants that have been demonstrated to be associated with varying outcomes of COVID-19 in other population groups.

Methodology: The objectives of this study are to 1) Create a comprehensive list from the current literature of genetic loci reported to be associated with susceptibility to or severity of COVID-19 disease; 2) Determine the allele frequencies of these identified variants in the African population; and 3) Compare the allele frequencies obtained to other population groups.

Results and Discussion: A list of 54 individual COVID-19-associated genetic loci has been identified from the literature which encompasses a total of 151 genes for analysis. An in-house bioinformatics pipeline is being used to determine the variant allele frequencies by analysing secondary data that consists of more than 4000 sequences obtained from African ethno-linguistic groups. The allele frequency data will then be analysed and compared.

Conclusion: The African genome is rich in diversity and African patients will benefit from targeted population-based research aimed at understanding these patterns. This study will allow us to better understand whether variants already described in COVID-19 disease outcomes are also significant in the African population.

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Theme: Innovate
Methodology: Evidence Synthesis

Disclaimer:
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Abstract Detail
Title: INVESTIGATING THE EFFICACY OF VENTRICULO-SUBGALEAL SHUNTS AS A TEMPORISING MEASURE IN PEDIATRIC HYDROCEPHALUS

Background: Hydrocephalus is the build-up of fluid in the brain's ventricles that increases the head's size and pressurises the brain. Ventriculo-subgaleal (VSG) shunt insertion is a temporary measure for cerebrospinal fluid (CSF) diversion. This study was conducted to investigate how efficient its use in pediatric hydrocephalus is.

Method: A retrospective research study was conducted on twenty-two pediatric patients who presented with hydrocephalus between January 2019 and December 2021. Data collection and analysis took place at the Steve Biko Academic Hospital and conferred strict patient information confidentiality. Demographic and clinical variables were extracted from pre-existing data collected beforehand and stored in an Excel sheet for analysis for follow-up records 1 day and 1-week post-surgery. The shunt insertion and removal dates were assessed to determine the survival period. Infections and/or complications presented were also noted

Results and Discussion: The results showed that the average number of days a VSG shunt survived was thirty-five days. There were fewer cases of 'VSG malfunction' and more 'no complications' recorded. There was an overall good recovery time 1 day post the VSG shunt insertion and better results 1 week later. These results suggest that VSG shunts can effectively be used as a temporising measure in pediatric hydrocephalus with little to no infections/complications, especially in infants not developed enough for other CSF diversion methods like ventriculoperitoneal (VP) shunts

Conclusion: VSG shunts proved to be an efficient temporising measure to treat pediatric hydrocephalus. It is known to be a go-to treatment, especially for neonates still growing and developing and thus unable to get VP shunts inserted. VSG shunts provide an effective, simple, and safe means of temporisation and do not necessitate the need for other measures like frequent CSF drainage or external draining in unstable infants not able to handle VP shunts

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Theme: Collaborate
Methodology: Interdisciplinary study

Disclaimer:
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or poster.

Abstract Detail
Title: NEOPTERIN AND NEUROPHYSIOLOGICAL MEASUREMENTS AS MARKERS OF ANXIETY AND STRESS

Background: Mental health is an increasing global crisis. It has large social, economic, and health costs, with
stress and anxiety disorders accounting for a large portion of the impact. Biomarkers may help to improve the
understanding and management of mental health conditions. In this study, certain biomarkers were investigated
to complement the Depression, Anxiety, and Stress Scale (DASS-21).

Methods: A sample cohort of 158 respondents completed the DASS-21 and biographical questionnaire, which
were used to stratify Health Science university students between Group A (n=20), who had high levels of
symptoms, and Group B (n=20) who had normal levels of stress and anxiety. Neurophysiological measurements
were taken from these participants, namely heart rate variability (HRV), blood pressure (BP), blood-volume pulse
(BVP), electrodermal activity (EDA), and quantitative electroencephalography (qEEG). The participants also
donated a urine sample which was tested for neopterin concentration (a non-specific biomarker of
inflammation) using an enzyme-linked immunosorbent assay (ELISA).

Results & Discussion: Neopterin positively correlated with the stress and anxiety scores, while HRV and BVP were
negatively correlated with these scores. In terms of qEEG, delta and hibeta wave activity increased in the left
and frontal brain regions in participants with high mental health scores, whereas alpha wave activity decreased
in these regions. High DASS scores were associated with elevated neopterin concentration and
neurophysiological changes (brain waves, HRV, and BVP).

Conclusion: The associations between inflammation, neurophysiology, and mental health need to be addressed
and further investigated to mitigate further health and economic burden.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: IN VITRO EFFECTS OF SURAMIN ON OSTEOCLAST FORMATION AND FUNCTION IN RAW264.7 MURINE MACROPHAGE CELLS

Background: Osteoporosis is a condition where the skeletal bones become fragile and brittle and related injuries occur. Bone resorption is the process of breaking down bone by osteoclasts. When osteoclasts are overactive than osteoblasts, bone diseases such as osteoporosis occur. Osteoporosis is common in post-menopausal women due to low oestrogen levels. This is accompanied by high levels of follicle stimulating hormone (FSH) which has also been seen to play a role in the onset of post-menopausal osteoporosis. The aim of this study was to determine the effects of, suramin, a synthetic drug that can antagonise FSH receptor (FSHR), osteoclasts derived from RAW264.7 murine macrophages.

Methods: A resazurin assay was conducted to determine the effects of suramin (1-100 µm) on the viability of the undifferentiated RAW264.7 cells. Tartrate-resistant acid phosphatase (TRAP) staining and activity was conducted to determine the effect of suramin (1-100 µm) on osteoclast formation. TRAP is a marker for osteoclast differentiation. Wes

Results and Discussion: Suramin showed no effect on cell viability in RAW264.7 cells. However, suramin significantly reduced the number of TRAP stained osteoclasts as well as TRAP activity in the cells. Suramin was demonstrated to be a potent inhibitor of osteoclast formation.

Conclusion:This study demonstrates that suramin may have potential as a therapeutic in the treatment of osteoporosis. This study provides a new and valuable clinical indication for a drug that is already being produced and administered. Further studies are needed to show that suramin can antagonise FSHR in the RAW264.7 cells.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: ANTIBIOTIC SUSCEPTIBILITY AND RESISTANCE GENES DETECTED IN ENTEROCOCCUS FAECALIS ISOLATES CAUSING COMMUNITY-ONSET URINARY TRACT INFECTIONS IN PRETORIA, SOUTH AFRICA

Background: Enterococcus faecalis (E. faecalis) is a common Gram-positive pathogen causing urinary tract infections (UTIs) worldwide. This study aimed to assess the antibiotic susceptibility profiles and prevalence of antibiotic resistance genes associated with E. faecalis isolates from patients presenting with community-onset UTIs in Pretoria.

Methods: Seventy-two E. faecalis UTI isolates were obtained from patients presenting with UTIs attending emergency departments and outpatient departments at public hospitals in Pretoria. Routine phenotypic antibiotic susceptibility testing (AST) was performed by a public diagnostic laboratory using the VITEK® 2 system. Multiplex-PCR (M-PCR) assays were used to detect antibiotic resistance genes, including: blaZ (ampicillin), efrA, efrB, lsa (efflux pumps), ermA, ermB (erythromycin), cfr, optrA, poxtA (linezolid), oqxA, oqxB, qnr (quinolones) and vanA, vanB, vanC (vancomycin).

Results and Discussion: Phenotypic AST showed high-level resistance to erythromycin [100% (72/72)] and tetracycline [82% (59/72)]. The M-PCR assays confirmed the presence of resistance genes, including: ermB [35% (25/72)], erfAB and lsa efflux pumps [100% (72/72)]. No ermA gene was detected. Phenotypic AST indicated low-level resistance to ciprofloxacin [17% (12/72)], despite the prevalence of qnr [46% (33/72)] and oqxB [28% (20/72)] genes. Gentamicin [18% (13/72)] and streptomycin [14% (10/72)] resistance levels were also low. No phenotypic or genotypic resistance were detected for ampicillin, benzylpenicillin, linezolid or vancomycin.

Conclusion: Enterococcus faecalis isolates exhibited no resistance to antibiotics commonly used for E. faecalis UTI treatment such as ampicillin, linezolid and vancomycin. However, the prevalence of erythromycin and quinolone resistance genes highlights the importance of continuous surveillance for emerging antibiotic resistance in community-onset E. faecalis UTIs.

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Theme: Innovate
Methodology: Experimental study

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Abstract Detail
Title: ASSESSING THE ROLE OF THE KISS 1 RECEPTOR IN BREAST CANCER CELL BEHAVIOUR WITH THE USE OF CRISPR-MEDIATED GENE EDITING

Background:The role of the kisspeptin receptor (KISS1R) in breast cancer remains controversial with research demonstrating both pro-metastatic and anti-metastatic effects. Using CRISPR-Cas9 technology, this project aimed to generate a KISS1R knockout MDA-MB-231 cell line, to determine the role of KISS1R in triple negative breast cancer (TNBC).

Methods: To create KISS1R knockout cell lines, single guide RNAs (sgRNAs) were designed and cloned into a Cas9-GFP plasmid. The two sgRNAs with the highest non-homologous end joining efficiencies were electroporated into MDA-MB-231 cells. GFP positive cells were single cell sorted to ensure clonal selection, followed by genomic DNA (gDNA) isolation. A T7 endonuclease assay in conjunction with sanger sequencing, was conducted to identify clones positive for heterozygous or homozygous mutations in KISS1R.

Results and discussion: Electroporation conditions were optimised for MDA-MB-231 cells with a 16% efficiency being achieved. Single GFP-positive cells were sorted into a 96-well plate and further expanded. A T7 endonuclease assay was used to screen the 28 successfully expanded colonies, of which six were positive for a mutation in KISS1R. Of these colonies, four have frameshift mutations for KISS1R in both alleles.

Conclusion and outlook: This study aimed to establish a CRISPR-Cas9 mediated knockout TNBC cell line for studying gene function of KISS1R which is implicated in breast cancer progression. Our efforts have resulted in the establishment of several MDA-MB-231 clones with frameshift mutations in the KISS1R gene. Functional studies are being conducted to determine how knockout of KISS1R affects cancer hallmarks in TNBC.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: VIRULENCE GENE PROFILES OF ENTEROPATHOGENIC ESCHERICHIA COLI ISOLATED FROM STOOL SAMPLES OF CHILDREN PRESENTING WITH DIARRHOEA IN PRIVATE CLINICS IN GAUTENG, SOUTH AFRICA

Background: The enteropathogenic Escherichia coli (EPEC) pathotype is the leading cause of infant diarrhoea in low-income countries and infections are highest among children younger than five years of age. This study reported the virulence profiles of EPEC isolates obtained from children under the age of five years presenting with diarrhoea attending private clinical settings in Gauteng.

Methods: Total genomic DNA was extracted from 20 EPEC isolates obtained from a private diagnostic laboratory. Multiplex-polymerase chain reaction (M-PCR) assays were employed for species and pathotype identification by targeting the adhesion (eae) and metabolism (uid) genes and to determine the virulence profiles by screening for the adhesion (iha), bacterial auto-aggregation (saa), biofilm formation (csgA and crl) and shiga toxin (stx1 and stx2) genes.

Results and discussion: Species pathotype identification confirmed that 60% (12/20) of the isolates were EPEC (uid and eae positive). The virulence profile analysis indicated that the crl [75% (9/12)], csgA [33% (4/12)] and iha [25% (3/12)] genes were harboured by the EPEC isolates, while the saa, stx1 and stx2 genes were not detected. The genes detected are associated with biofilm and microcolony formation in the intestines that causes persistent infections.

Conclusion: The EPEC isolates carried important virulence genes that have the potential to worsen diarrhoeal disease in the children from the study setting. It is important to understand the pathogenesis and virulence potential of EPEC infections to assist clinicians with treatment and prevention strategies.

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Theme: Collaborate
Methodology: Experimental study

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Abstract Detail
Title: RESPIRATORY PATHOGENS ASSOCIATED WITH SUDDEN UNEXPECTED DEATHS DURING THE COVID-19 PANDEMIC IN GAUTENG, SOUTH AFRICA

Background: In South Africa the medico-legal death investigation in sudden deaths in the young and in adults, associated with COVID-19 and other respiratory and neurological infections has not been well studied. We want to investigate these deaths to describe the incidence and variants of COVID-19 and other respiratory pathogens and its differential diagnosis.

Methodology: The study will be conducted on all cases admitted as sudden unexpected deaths following the COVID-19 pandemic. Prospective sampling of post-mortem samples (2023-2024). We screened brain and lung tissue and NP swabs for SARS-CoV-2 and screened NP swabs and lung tissue with an FTD-21 respiratory panel.

Results and Discussion:35 cases collected and 30 cases have been screened to date, 24 males and 11 females. Three patients tested positive for SARS-CoV-2 on NP swabs. One of the patients; a 7 y/o female with autism, tested positive on brain tissue and a NP swab for COVID-19. The other 2 patients aged 13 and 43 years, with co-infections of HPIV 2, 4 and hCoV NL63, respectively. In addition, 16.6% of tested cases are positive for HAdV, 20% positive for HRV, 10% positive for hCoV NL63, 0.03% positive for hCoV OC43, HPIV 2, 4 and HBoV.

Conclusion: This study suggests that SARS-CoV-2 may be associated with unexplained deaths in children and adults and potentially cause neurological infections in fatal cases. Common respiratory viruses (50%) were detected in cases and should be investigated further. To the best of our knowledge neurological infections with SARS-CoV-2 has not previously been described in sudden unexpected deaths in South Africa.

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Theme: Innovate
Methodology: Evidence Synthesis

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Abstract Detail
Title: A RETROSPECTIVE REVIEW OF FATAL FALLS, JUMPS AND PUSHES FROM HEIGHTS ADMITTED TO THE PRETORIA MEDICO-LEGAL LABORATORY OVER A FIVE-YEAR PERIOD, 2017-2021

A fall is defined as an involuntary movement from a high to low position in a relatively rapid manner. Contrastingly, jumping is defined as the acute vertical deceleration from a surface and into the air. In the context of this study, falling, jumping, and being pushed from a height usually results in blunt force injuries and/or fatalities on impact. Therefore, this will be a retrospective analysis on the abovementioned fatalities through the perusal of case reports written during the process of medicolegal autopsies performed at PMLL from 2015 to 2022.

The aim of this study is to evaluate the nature, prevalence, and demographic characteristics of falls, jumps and pushes from heights and their relation to the fatalities. The nature of these fatalities includes but not are not limited to; height and speed, site of injury, the type of surface of impact, the environment of the incident, as well as the reason for the fall, jump and/or pushes (for example suicides, homicides, and accidental cases). Furthermore, the demographic characteristics consist of; age, gender, race, and socio-economic status of the individuals. Through this, the prevalence of such fatalities will be determined and identified.

Faculty Research Day 2023
Abstract no: 2023114

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: INVESTIGATING THE ANTIFUNGAL ACTIVITY, CYTOTOXICITY, ANTIOXIDANT ACTIVITY AND STABILITY OF GOLD NANOPARTICLES CONJUGATED WITH OS-C(W5) IN CANDIDA ALBICANS

Background: Antimicrobial resistance has become a global issue. Commonly resistant infections include diseases caused by the commensal agent Candida albicans. The search for novel therapies to help combat resistance has identified Antimicrobial Peptides (AMPs) as potential treatments. AMPs are a vast group of amphiphilic peptides that display activity against microbes. Os-C(W5) is a soft tick-derived peptide that has shown activity against planktonic C. albicans with vulnerability to protease degradation.

Methodology: In this study, Os-C(W5) was conjugated to gold nanoparticles producing GNP@Os-C(W5) to bolster protease stability and peptide applicability. GNP@Os-C(W5) was formed and characterised through transmission electron microscopy and spectrophotometry.

Results and Discussion: The resazurin assay showed that the Minimum Inhibitory Concentration (MIC50) of GNP@Os-C(W5) in planktonic C. albicans was 13.21 ± 0.15 μM. The 50% Biofilm Inhibition Concentration (BIC50) and Biofilm Eradication Concentration (BEC50) were determined with the resazurin and crystal violet assays. The BIC50 of GNP@Os-C(W5) was 8.93 ± 1.24 μM and the BEC50 was >37.5 μM. Scanning electron microscopy showed that GNP@Os-C(W5) interferes with C. albicans cell wall integrity and causes drastic changes to the fungal cell morphology. As tested with the resazurin assay, GNP@Os-C(W5) was non-cytotoxic at the MIC50 concentration in human leukocytes, red blood cells and keratinocytes. The ORAC and TEAC antioxidant activity assays showed that GNP@Os-C(W5) had minimal radical scavenging ability. Using the resazurin assay, GNP@Os-C(W5) proved more stable to trypsin degradation than Os-C(W5).

Conclusion: Ultimately, this study showed that GNP@Os-C(W5) is a promising non-toxic drug candidate with trypsin stability and antifungal activity.

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Theme: Collaborate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: IN VITRO EFFECTS OF ENVIRONMENTALLY RELEVANT CONCENTRATIONS OF PARA-NONYLPHENOL AND SELECTED PYRETHROID METABOLITES ON A MOUSE SERTOLI CELL LINE

Background: Evidence suggests that there may be associations between exposure to toxic environmental chemicals and a decrease in male fertility. Simultaneous developments in the chemical industry, climate change, agricultural activities have resulted in the presence of thousands of chemicals in the environment, exacerbating the problem and increasing the incidence rate of infertility. These chemicals may possess estrogenic, anti-estrogenic, anti-androgenic properties and are referred to as EDCs, exerting their effects by interfering with the normal hormonal homeostasis thus playing a major role in male reproductive system dysfunctions.
Aim: The aim of the study was to evaluate the in vitro effects of the environmentally relevant concentrations of para-nonylphenol and selected pyrethroids in mouse Sertoli cells.

Methods: TM4 cells were treated with para-nonylphenol, cypermethrin, deltamethrin, rac-trans permethrinic acid and 3-BPA for 24 hours. Cells were assessed for toxicity using MTT assay, for oxidative stress using a ROS activity assay kit and for morphological changes using H&E stain and analyzed using a spectrophotometer, fluorometer and a light microscope.

Results and discussion: After exposure to the pesticides, 80% of the cells remained viable. The cells produced low levels of ROS, indicating minimal cell damage. Aberrant morphological alterations were observed, particularly in cells exposed to nonylphenol. This study demonstrated that exposure to pyrethroids and nonylphenol may be toxic to mouse Sertoli cells

Conclusion: Although there was minimal ROS production, reduced cell viability and morphological alterations were observed. Future studies are needed to explore the effects of prolonged in vitro exposure with environmental concentrations found in SA.

Faculty Research Day 2023
Abstract no: 2023116

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Theme: Collaborate
Methodology: Nominal Group Technique (NGT)

Disclaimer:
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Abstract Detail
Title: PREVALENCE OF SINGLE NUCLEOTIDE VARIATIONS ASSOCIATED WITH HUMAN LEUKOCYTE ANTIGEN ON THE DIAGNOSIS OF PSORIASIS PATIENTS FROM A TERTIARY ACADEMIC HOSPITAL IN TSHWANE

Psoriasis is an autoimmune heritable skin and joint inflammatory condition; 125 million people were affected worldwide in 2022. This study investigated the possible association between HLA-C*06:02 & SNVs (ERPA1: rs30187 and rs27044) and psoriasis susceptibility.

This was part of an umbrella study, samples were already collected from the recruited patients and stored. DNA extracted from whole blood was used. The presence of HLA-C*06:02 and ERAP1 was investigated in 5 psoriasis diagnosed patients and 5 healthy controls. HLA typing was done through PCR and SNVs genotyping was done using real-time PCR.

HLA-C*06:02 was present in 4 of the 5 psoriasis patients. 80% of the patients expressed HLA-C*06:02. For rs30187, 2 patients and 2 controls had the predisposing allele, 2 patients and 3 controls had the heterozygous allele, 1 patient and zero controls had the wild type allele. For rs27044, 2 patients and 2 controls had the predisposing allele, 2 patients and 3 controls had the heterogenous allele, 1 patient and zero controls had the wild type allele. Patients expressing the predisposing allele were more than those expressing the wild type allele. These biomarkers are present in most psoriasis patients, the results show a possible association between these biomarkers and psoriasis susceptibility.

Due to a small sample size of this study, population generalized conclusions cannot be drawn, large sample size studies need to be done to associate these biomarkers with psoriasis susceptibility, this will be helpful in implementing routine laboratory diagnosis and prognosis of psoriasis for better management of the condition.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
The review committee reserves the right to allocate your abstract to a specific category, i.e. oral presentation or poster.

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Abstract Detail
Title: EFFECT OF 2-METHOXYESTRADIOL ON EARLY- AND LATE-STAGE MOUSE MAMMARY TUMOUR GROWTH AND FORMATION OF LUNG METASTASES

BACKGROUND: The prevalence of breast cancer (BC) continues to increase and is the leading cause of cancer deaths in many countries. Numerous studies have demonstrated that 2-methoxyestradiol (2-ME) has antiproliferative and antiangiogenic effects in BC, thereby inhibiting tumour growth and metastasis. We investigated the effect of 2-ME on early and late-stage BC in a transgenic mouse model – FVB/N-Tg(MMTV-PyVT) – of spontaneous mammary carcinoma that forms pulmonary metastases.

METHODS: Mice received 100 mg/kg of 2-ME immediately when palpable mammary tumours were identified (early-stage BC; experimental group 1) and 28 days after palpable mammary tumours were detected (late-stage BC; experimental group 2). Mice received 2-ME orally three times a week for 28 days; control group received the vehicle. Mammary tumours were measured weekly, and at termination, blood, mammary and lung tissue were collected for analyses.

RESULTS: In early-stage BC, treatment with 2-ME led to lower levels of mammary tumour necrosis, while tumour mass and volume increased. Additionally, necrotic lesions and anti-inflammatory CD163-expressing macrophages were more frequent in pulmonary metastatic tumours. In contrast, 2-ME treatment of late-stage BC supressed tumour growth and resulted in increased intratumoral CD3+ T-cell number and tumour necrosis in the primary tumour microenvironment (TME). Furthermore, 2-ME treatment decreased pulmonary metastasis but did not increase the overall survival of late-stage BC mice.

CONCLUSION: This study demonstrates that 2-ME treatment has an antitumour effect on late-stage BC with no increase in survival rate. The treatment failed to demonstrate any benefit in early-stage BC.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: SOLUTE CARRIER FAMILY 7 MEMBER 8 (SLC7A8) GENE AS A POTENTIAL TARGET FOR COMBATING OBESITY DEVELOPMENT

Background: The prevalence of obesity and obesity-related comorbidities is increasing at an alarming rate. The expansion of adipose tissue plays a significant role in the development of obesity. Previous studies in our laboratory identified a solute transporter, SLC7A8, to be critical for adipogenesis in human adipose derived stromal/stem cells. Solute transporters play a role in adipose tissue dynamics through lipid homeostasis, metabolism, lipolysis and oxidation which is critical to obesity development. Hence this study investigates the role of SLC7A8 in obesity using a mouse model of diet-induced obesity.

Method: Slc7a8 knockout (KO) and wild-type (WT) C57BL/6J mice were fed a control diet (CD) or high-fat diet (HFD) over a 14-week period. Animal weight, food consumption and glucose tolerance test were measured followed by histological and immunohistochemical analyses of various tissues.

Results: Both WT and KO on HFD gained significantly more weight than their CD counterparts. Importantly however, the weight gain by WTHFD was significantly mitigated in KOHFD. Also, the deletion of Slc7a8 improved glucose tolerance and significantly decreased adipocyte hypertrophy in various fat depots thereby leading to a significant reduction in macrophage infiltration into these depots. Finally, the increased in lipid accumulation at peripheral organs and tissues observed in WTHFD was reduced in slc7a8 deficient mice.

Conclusion: This study demonstrates Slc7a8 could be a potential candidate for combating obesity development by preventing excess lipid accumulation in organs and tissues.

THE IMMUNOMODULATORY PROPERTIES OF ADIPOSE-DERIVED MESENCHYMAL STROMAL/STEM CELLS CULTURED IN HUMAN PLATELET LYSATE OR FETAL BOVINE SERUM

Faculty Research Day 2023
Abstract no: 2023119

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
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Abstract Detail
Title: THE RELATIONSHIP BETWEEN VITAMIN D LEVELS AND PERIODONTAL DISEASE: A CROSS-SECTIONAL DESCRIPTIVE STUDY

BACKGROUND
Research has demonstrated the role vitamin D plays in skeletal health and its homeostatic function on a wide-range of organs, However, the evidence regarding the causal association between vitamin D deficiency and periodontal disease is weak. The purpose of this cross-sectional study was to investigate whether or not deficiency of vitamin D is a risk factor for severe periodontal disease.

METHODS
This cross-sectional study was undertaken at the University of Pretoria Oral Health Centre (UPOHC). A total of seventy (70) adult participants ranging in age from 18-69 years attending UPOHC, Department of Periodontics and Oral Medicine, who were diagnosed with periodontitis were selected. Vitamin D status was determined by measuring serum 25-hydroxyvitamin D (25(OH)D) levels. Descriptive statistics include the mean and standard deviation for the continuous variables as well as proportions and percentages for the categorical variables.

RESULTS
Of the 70 patients, 23 (33%) were males and 47 (67%) were females and the mean (SD) age of the study population was 41 (10) years. Sixty seven percent of the patients had sufficient levels of vitamin D and 33% had insufficient, none of the patients had deficient levels of vitamin D. Eighty nine percent of the patients were diagnosed with generalised periodontitis, 61% stage 3 and 63% grade C.

CONCLUSION
The relationship between vitamin D and the severity of periodontal disease was investigated descriptively. None of the patients in the study population had deficient levels of vitamin D, although most of the patients had stage 3, grade C periodontitis. More research is needed to investigate what would have been the response to periodontal treatment if these patients would have received vitamin D supplementation to boost their vitamin D levels.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: THE CLINICAL PROFILE OF HEAD AND NECK EBV+ B-CELL LYMPHOMAS IN PATIENTS WITH HIV INFECTION

Background: The incidence of haematolymphoid neoplasms amongst people living with HIV and AIDS (PLWHA) is reported to be higher than in the general population, and is a significant source of morbidity and mortality. Epstein-Barr virus (EBV) infection of B-lymphocytes is known to contribute to the development of these lymphoproliferative disorders.

Method: Patients with head and neck Hodgkin lymphomas (HL) and non-Hodgkin lymphomas (NHL) cases diagnosed from 1 January 2011 to 31 December 2021 with clinical, pathology and oncology reports were included.

Results and Discussion: 228 head and neck lymphomas (HNL) cases were reviewed, these were 9 HL and 219 NHL. 134 lymphoma patients were HIV+, 23 were HIV-, and 71 patients with unknown immune status. Only 190/228 (83.3%) of the lymphoma cases had EBER-ISH status, of which 114/190 (60%) were EBER-ISH positive and 76 /190 (40%) EBER-ISH negative. Seventy-four of the HIV+ lymphoma cases were EBER-ISH positive. Ann Arbor staging was available for 35/134 HIV-positive patients, 5/35 (14.2%) were stage I, 7/35 (20%) were stage II, 8/35 (22.9%) were stage III and 15/35 (42.9%) were stage IV. HIV-positive patients who presented at higher clinical stages had plasmablastic lymphoma (3/8 at stage III and 10/15 at stage IV) and DLBCL (5/8 at stage III and 5/15 at stage IV).

Conclusion: Plasmablastic lymphoma was the common EBV-driven lymphoma in HIV+ patients. The patients presented at median CD4+ cell count of 147 cells/mm3 and had the highest Ann Arbor staging. HIV+ patients had a lower overall survival rate compared to HIV- patients.

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
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Abstract Detail
Title: VITAMIN D STATUS, WEIGHT STATUS AND BODY COMPOSITION OF FEMALE ADOLESCENTS ATTENDING PRIVATE SCHOOLS (TSHWANE, SOUTH AFRICA)

Background: Some research suggests a relationship between vitamin D and both obesity and body composition, however, this relationship has not been extensively researched in adolescents. The aim of this study was to identify the relationship between vitamin D status and both weight status and body composition in female adolescents.

Methods: Ninety adolescent females aged 13-19 years were conveniently sampled from two private schools in Tshwane, Gauteng. Levels of 25-hydroxyvitamin D (25[OH]D) were assessed using dried blood spots analysed through liquid chromatography tandem-mass spectrometry (LC-MS/MS). Weight status [body mass index (BMI)-for-age z score] and body composition were assessed using the digital, wireless SECA 274 stadiometer and SECA medical Body Composition Analyser (mBCA) 514. Pearson correlation and linear regression analysis was used to examine the relationship of weight status and body composition parameters with 25(OH)D.

Results: Thirty-nine percent of participants were over nourished, 60% were of an ideal weight and 1% was thin. The mean (SD) 25(OH)D was 88.2 (±24.7) nmol/L, classifying them as sufficient. Sixty-eight percent of participants had a sufficient vitamin D status, 29% were insufficient and 3% were deficient. No correlation existed between 25(OH)D and weight status (BMI-for-age), fat free mass (FFM) and fat free mass index (FFMI). A significant low negative correlation was identified between 25(OH)D and fat mass (FM) ($p<0.001$), fat mass index (FMI) ($p<0.001$) and Percentage body fat (%BF) ($p<0.001$).

Conclusion: No relationship was found between vitamin D level and weight status. A small inverse relationship was found between 25(OH)D and body fat (FM, FMI, %BF).

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: VOICE OF THE VULNERABLE: A SITUATIONAL ANALYSIS INTO FETAL DOSIMETRY AMONG PREGNANT RADIOGRAPHERS

Introduction and Background: Pregnant radiographers are considered a vulnerable group of radiation workers due to the sensitive nature of the developing fetus's cells. Fetal dosimeters are therefore a compulsory occupational health and safety measure used to monitor fetal radiation doses. The aim of the study was to create a situational analysis to determine fetal dosimeter usage among pregnant radiographers in South Africa

Methodology: Data was collected through a national survey using an electronic questionnaire. The study population included 6886 registered female radiographers in South Africa. Purposive sampling was used to include responses from only pregnant and previously pregnant radiographers, working in private or public practices. Data was collected from January 2021 to April 2021.

Results: Eighty-nine participants responded whose data was analyzed using descriptive statistics. Of the responses, 53.9% (n=48) were not issued with a fetal dosimeter. Of those with access to fetal dosimeters, 46.1% (n=41), only 56% (n=28) indicated that they wore it "always". An alarming 52% (n=26) admitted to never consistently recording their readings from the dosimeters. Seventy-four 74% (n=37) of participants did not receive training on the dosimeter.

Conclusion: Most pregnant radiographers from South Africa, lack access to fetal dosimeters, mainly as a result employers not procuring dosimeters due to financial constraints. Training in fetal dosimetry is severely lacking, in terms of how to physically use the device and record measurements from it. These unique findings pose a serious occupational risk for both pregnant radiographers and their unborn child.

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
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or poster.

Abstract Detail
Title: JULY 2021 CIVIL UNREST: SOUTH AFRICAN DIAGNOSTIC RADIOGRAPHY STUDENTS LIVED EXPERIENCES

Background: South Africa (SA), in 2021, experienced a wave of civil unrest following political events which led
to mass looting and the destruction of property. Civil unrests, among other disruptions, have been seen to cause
ripple effects on health care education, particularly for radiography students who undergo work integrated
learning within hospitals and universities during these times of these unrest.
Aim: To explore and describe undergraduate diagnostic radiography students' experiences of the civil unrest
that occurred in 2021.

Setting: The study was conducted across five universities in South Africa, offering the diagnostic radiography
program

Methods: A qualitative, interpretive phenomenological design was employed as it enabled the researchers to
gain an in depth insight into the lived experiences of the students during this time. Five focus group interviews
were conducted with undergraduate radiography students from first to fourth year.
Findings Four themes emerged from the study data, namely, 1) Students' emotional and psychological wellbeing,
2) The availability of support mechanisms, 3)The influence of disruptions on clinical training and 4)
Recommendations to support students in future disruptions.

Conclusion: The participants from this study described the negative effects that the civil unrest had on their
emotional and mental wellbeing. There is a need for increased support mechanisms from higher education
institutions during times of disruptions, such as improved communication and contingency plans to ensure
student safety, whilst maintaining compliance towards clinical hours. The findings can be generalized to other
Healthcare science students, who also have clinical components within their course work.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: THE TRAINING NEEDS OF NURSES IN A SELECTED REHABILITATION HOSPITAL IN ENHANCING THE SELF-CONCEPT OF PATIENTS WITH SPINAL CORD INJURY

Background: The prevalence of spinal cord injury is 75 in 1 million people around the world. Spinal cord injury occurs to any part of the spinal cord due to trauma with the most devastating outcome being disability. Self-concept is defined as the perception one holds about themselves and patients who have sustained spinal cord injury often suffer from an altered self-concept due to the physical and psychological changes that occur post injury. Nurses working in the rehabilitation hospital care for patients with spinal cord injury with an altered self-concept with no training on how to enhance their self-concept which often leads to patients being demotivated and refusing to partake in rehabilitative activities leading to poor health outcomes.

Method: An exploratory, descriptive, qualitative design was used. 20 nurses of all categories i.e., RN, EN and ENA were interviewed, using one-on-one, semi-structured interviews. Purposeful sampling was used on participants who care for patients with spinal cord injury.

Results and Discussion: Nurses' knowledge regarding the self-concept varies even between nurses of the same category. The nurses were however able to identify an alteration in the patients' self-concept being displayed in behavior and emotions and cared for patients' basic needs to enhance the self-concept.

Conclusion: The need for training on care directed to enhance the self-concept was expressed for uniformity as presently there is no guide for care. There is little knowledge regarding the self-concept of spinal cord injury in South Africa and this study will allow further research in this field.

Faculty Research Day 2023
Abstract no: 2023125

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
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Abstract Detail
Title: RISK FACTORS ASSOCIATED WITH FOOTBALL INJURY AMONG MALE PLAYERS FROM A SPECIFIC ACADEMY IN GHANA: A PILOT STUDY

There seems to be no information on the incidence of injury and associated risk factors for academy football players in Ghana. We determine the risk factors associated with match and training injuries among male football players at an academy in Ghana. Preseason measurements of players' height, weight, and ankle dorsifexion (DF) range of motion (ROM) were measured with a stadiometer (Seca 213), a digital weighing scale (Omron HN-289), and tape measure, respectively.

The functional ankle instability (FAI) of players was measured using the Cumberland Ankle Instability Tool (CAIT), and dynamic postural control was measured with the Star Excursion Balance Test. Injury surveillance data were collected by resident physiotherapists throughout one season. Selected factors associated with injury incidence were tested using Spearman's rank correlation at a 5% signifcance level. Age was negatively associated with overall injury incidence ($r = -0.589$, $p = 0.000$), match ($r = -0.294$, $p = 0.008$), and training incidence ($r = -0.314$, $p = 0.005$). Previous injury of U18s was associated with training injuries ($r = 0.436$, $p = 0.023$). Body mass index (BMI) was negatively associated with overall injury incidence ($r = -0.513$, $p = 0.000$), and training incidence ($r = -0.395$, $p = 0.000$). CAIT scores were associated with overall injury incidence ($n = 0.263$, $p = 0.019$) and match incidence ($r = 0.263$, $p = 0.029$). The goalkeeper position was associated with match incidence ($r = 0.241$, $p = 0.031$) while the U16 attacker position was associated with training incidence.

Exposure hours was negatively associated with overall injury incidence ($r = -0.599$, $p = 0.000$). Age, BMI, previous injury, goalkeeper and attacker positions, ankle DF ROM, and self-reported FAI were associated with injury incidence among academy football players in Ghana.

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
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Abstract Detail
Title: EPIDEMIOLOGY AND CLINICAL CHARACTERISTICS OF FOOTBALL INJURIES AMONG ACADEMY PLAYERS IN GHANA

Background: There seems to be no information on the epidemiology of injuries among Ghanaina academy football players.The study determined the epidemiology and clinical characteristics of match and training injuries among football players at an academy in Ghana.

Method: In this prospective observational study, we followed 80 youth and adult football players at a Ghanaian academy over a season of 39 weeks. Medical attention and time-loss injuries as well as, exposure times of players were recorded by resident physiotherapists using a standardised injury surveillance form. The average weekly injury prevalence was calculated. Injury incidence rates were calculated per 1000 exposure h, with significance indicated as 95% confidence intervals, (CIs).

Results and Discussion: Overall, 126 injuries were recorded during the season with an average weekly injury prevalence of 4.1%. The overall injury incidence was 4.5 [95% CI 3.8–5.4] injuries per 1000 h with U14 (5.8 [3.3–10.2]/1000 h) and U18 players (5.7 [4.4–7.4]/1000 h) recording a higher incidence than U16 (5.1 [3.5–7.4]/1000 h) and senior players (2.7 [1.9–3.9]/1 000 h). Match injury incidence was 13 times higher than training injury incidence (27.4 [21.5–34.9] vs 2.3 [1.8–3.0] injuries/1000 h). Injuries to the lower extremities had the highest incidence (3.9 [2.1–7.2] injuries/1000 h), with the knee being the most commonly injured site (n = 30, 23.8%). The most common type of injury was a joint sprain (1.9 [1.5–2.5] injuries/1 000 h), and the most common injury mechanism was direct contact with another player (1.5 [1.1–2.0] injuries/1 000 h). Most injuries were moderate in severity (2.0 [1.5–2.6] injuries/1000 h).

Conclusion: Ghanaian academy football players have a substantial risk of sustaining injuries especially among younger players. Further studies should focus on developing specific injury prevention programmes in under-researched football playing populations.

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Theme: Collaborate
Methodology: Inter-disciplinary study

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Abstract Detail
Title: GASTROINTESTINAL SIDE EFFECTS EXPERIENCED BY ONCOLOGY PATIENTS UNDERGOING CHEMOTHERAPY AT AN OUTPATIENT CLINIC IN TSHWANE.

Background: Cancer incidence is increasing globally and there are several adverse effects associated with the treatment. Chemotherapy is the commonly used treatment in South Africa with little known regarding the gastrointestinal (GI) side effects experienced.

Methods: A quantitative, non-experimental, cross-sectional study was conducted. The Gastrointestinal Symptom Rating Scale questionnaire was used to collect data on the prevalence of GI side effects experienced among cancer patients undergoing chemotherapy at an outpatient clinic in Tshwane.

Results and Discussion: A total of 41 patients (mean age: 53) were interviewed with various cancers and breast cancer being the most frequent (42%). 'Nausea and vomiting' was the most frequently experienced at 66%. It was the most severe upper GI side effect for all cancers(22%).In relation to the number of chemotherapy sessions received, the 'feeling of incomplete evacuation' was the most frequent lower GI side effect (22%) and the most severe lower GI side effect for non-infectious origin cancers(71%). 'Loose stools' were the most severe lower GI side effect for infectious origin cancers(71%). In relation to the number of chemotherapy sessions received, 'feeling of incomplete evacuation' and 'loose stools' were the most severe lower GI side effects experienced.

Conclusion: This information aids the dietetic profession in oncology outpatient management, contributes to knowledge on the frequency and severity of GI side effects occurring from chemotherapy and is an onset for future longitudinal studies in assessing the long term impact of chemotherapy GI related side effects.

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Theme: Innovate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: ASSESSMENT OF DIETARY DIVERSITY OF WOMEN OF REPRODUCTIVE AGE RESIDING IN AN INFORMAL SETTLEMENT IN PRETORIA EAST, SOUTH AFRICA.

Background: The rapid growth of informal settlements due to economic instabilities and high rates of unemployment, places women of reproductive age at risk of limited dietary diversity.

Aim: To determine the dietary diversity of women of reproductive age (18-49 years) in an informal settlement in Pretoria East using the Minimum Dietary Diversity for Women (MDD-W) indicator.

Methodology: Quantitative, observational descriptive study design was used to collect data from 111 female participants following non-probability convenience sampling. An open list 24-hour dietary recall was used to collect data for the MDD-W indicator,validated population-level tool, to reflect micronutrient adequacy. The results were analysed using Microsoft Excel spreadsheet where mean and standard deviation were calculated. The scores were based on 10 groups in the MDD-W added together. A score of < 5 indicated low dietary diversity, while a score of ≥ 5 indicated good dietary diversity.

Results: Eighty percent of women had a low dietary diversity score and 20% having a high dietary diversity score.The grains, cereal and tubers, and green leafy vegetables were the most consumed food groups daily while nuts and seeds, eggs and fruits were the least consumed.

Conclusion: More than half of the women were unable to afford and consume most of the food groups. There appears to be a link between employment, educational status, and low dietary diversity. Nutrition education is ;therefore vital for sufficient education on dietary diversity.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: INTEGRATED GROWTH ASSESSMENT IN THE FIRST 1000 DAYS OF LIFE: AN INTERDISCIPLINARY CONCEPTUAL FRAMEWORK

Background: Prenatal growth affects short- and long-term morbidity, mortality and growth, yet communication between prenatal and postnatal healthcare teams is often minimal. This research aimed to develop an integrated, interdisciplinary framework for foetal/ infant growth assessment, contributing to continuity of care across the first 1000 days of life.

Methods: A multidisciplinary think-tank (consisting of obstetricians, paediatricians, dietitians/ nutritionists, and a statistician) met regularly over many months to share and debate their practice and research experience related to foetal/ infant growth assessment. Brainstorming sessions focused on growth assessment practices that are feasible and valuable in resource-limited, low- and middle-income country (LMIC) settings. Participants' personal practice and knowledge was verified against and supplemented by published research.

Results and discussion: Numerous measurements, indices and indicators were identified for growth assessment in the first 1000 days. Relationships between foetal, neonatal and infant measurements were elucidated and integrated into an interdisciplinary framework. Practices relevant to LMICs were then highlighted: antenatal Doppler screening, comprehensive and accurate birth anthropometry (including proportionality of weight, length and head circumference), placenta weighing, and incorporation of length-for-age, weight-for-length and mid-upper arm circumference in routine growth monitoring. The need for appropriate, standardised clinical records and corresponding policies to guide clinical practice and facilitate interdisciplinary communication over time became apparent.

Conclusions: Integrating growth assessment across the first 1000 days is possible with currently available tools. Clearer communication between prenatal, perinatal and postnatal health care providers, within the framework of a common understanding of growth assessment, is a prerequisite to ensure continuity of care.

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Theme: Innovate
Methodology: Non-Randomised Controlled Trial

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Abstract Detail
Title: HOUSEHOLD FOOD INSECURITY IN WOMEN OF REPRODUCTIVE AGE (18-49 YEARS) RESIDING IN AN INFORMAL SETTLEMENT IN PRETORIA EAST

Background: South African households particularly those in informal settlements are food insecure. Within these households, women of reproductive age (WRA) suffer the consequences of hunger and a poor quality diet to their own health and generations to come. This study investigated food insecurity and nutritional status of WRA residing in an informal settlement in Pretoria East.

Method: A cross-sectional study on a convenience sample of 115 WRA aged 18-49 was conducted at the clinic in Woodlane informal settlement in Pretoria East. The Household Food Insecurity Access Scale (HFIAS) was used to measure food insecurity. Body mass index (BMI) determined from height and weight, and mid-upper arm circumference (MUAC) evaluated nutritional status.

Results and discussion: BMI was normal in 34.0% of participants, most were overweight (37.0%), and 28.7% were obese. MUAC > 23cm determined all participants as well-nourished. The prevalence of food insecurity was high at 96%, with 75%, 18% and 3% found to be severely, moderately and mildly food insecure respectively. Participants reported high levels of anxiety and uncertainty about food supply (83.8%). Most WRA with severe food insecurity were between 18-29 years old, overweight or obese, and unemployed. These results concur with other studies where overweight and food insecurity co-exist likely due to overconsumption of energy dense diets.

Conclusion: Food insecurity in WRA living in Woodlane informal settlement is highly prevalent and severe. Collaborative efforts between government and private stakeholders together with development of sustainable solutions such as poverty alleviation, employment and education need to be considered.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
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Abstract Detail
Title: EVALUATION OF AN UBUNTU-INFORMED TRAINING OF COMMUNITY HEALTH WORKERS ON THE MANAGEMENT OF TUBERCULOSIS, HIV AND AIDS IN GAUTENG PROVINCE, SOUTH AFRICA

Background: Community Health Workers (CHWs) provide promotive and preventive healthcare to the communities to reduce the burden of diseases including tuberculosis (TB), human immunodeficiency virus (HIV), and acquired immunodeficiency syndrome (AIDS). Unfortunately, there is no standardized training of CHWs on the management of TB, HIV and AIDS despite their expanding scope of practice in the country. This study evaluated the effectiveness of a five-day training of the CHWs on the management of TB, HIV and AIDS.

Methods: A pre-and post-test was administered to 349 CHWs who attended an Ubuntu informed training on the management of TB, HIV and AIDS in Gauteng province. The test comprised 40 multiple choice questions based on modules included in the training manual. In addition, the participants completed an evaluation form at the end of the training. SPSS version 28 was used to analyse the data.

Results and discussion: Out of the 349 participants, 257 (73.6%) passed the test while 92 (26.4%) failed the test before the training. At the end of the training, the number of participants who passed the test increased to 301 (86.2%) while 48 (13.8%) failed. The difference between the mean scores before (M=21.74, SD=4.24) and after the training (M=24.58, SD=4.79) was statistically significant (p <0.05). Most of the participants rated the training as 'very relevant'.

Conclusion: The findings highlight the need for a targeted training intervention to improve the knowledge of CHWs on TB and HIV/AIDS. Further research could explore innovative training approaches that integrate Ubuntu principles.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: ASSESSMENT OF DIETARY DIVERSITY OF WOMEN OF REPRODUCTIVE AGE RESIDING IN AN INFORMAL SETTLEMENT IN PRETORIA EAST, SOUTH AFRICA

Background: The rapid growth of informal settlements due to economic instabilities and high rates of unemployment, places women of reproductive age at risk of limited dietary diversity. Aim: To determine the dietary diversity of women of reproductive age (18-49 years) in an informal settlement in Pretoria East using the Minimum Dietary Diversity for Women (MDD-W) indicator.

Methodology: Quantitative, observational descriptive study design was used to collect data from 111 female participants following non-probability convenience sampling. An open list 24-hour dietary recall was used to collect data for the MDD-W indicator,validated population-level tool, to reflect micronutrient adequacy. The results were analysed using Microsoft Excel spreadsheet where mean and standard deviation were calculated. The scores were based on 10 groups in the MDD-W added together. A score of < 5 indicated low dietary diversity, while a score of ≥ 5 indicated good dietary diversity.

Results: Eighty percent of women had a low dietary diversity score and 20% having a high dietary diversity score.The grains, cereal and tubers, and green leafy vegetables were the most consumed food groups daily while nuts and seeds, eggs and fruits were the least consumed.

Conclusion: More than half of the women were unable to afford and consume most of the food groups. There appears to be a link between employment, educational status, and low dietary diversity. Nutrition education is ;therefore vital for sufficient education on dietary diversity.

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Theme: Innovate
Methodology: Experimental Study

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Abstract Detail
Title: VIRULENCE GENE PROFILES OF ENTEROPATHOGENIC ESCHERICHIA COLI ISOLATED FROM STOOL SAMPLES OF CHILDREN PRESENTING WITH DIARRHOEA IN PRIVATE CLINICS IN GAUTENG, SOUTH AFRICA

Background: The enteropathogenic Escherichia coli (EPEC) pathotype is the leading cause of infant diarrhoea in low-income countries and infections are highest among children younger than five years of age. This study reported the virulence profiles of EPEC isolates obtained from children under the age of five years presenting with diarrhoea attending private clinical settings in Gauteng.

Methods: Total genomic DNA was extracted from 20 EPEC isolates obtained from a private diagnostic laboratory. Multiplex-polymerase chain reaction (M-PCR) assays were employed for species and pathotype identification by targeting the adhesion (eae) and metabolism (uid) genes and to determine the virulence profiles by screening for the adhesion (iha), bacterial auto-aggregation (saa), biofilm formation (csgA and crl) and shiga toxin (stx1 and stx2) genes.

Results and discussion: Species pathotype identification confirmed that 60% (12/20) of the isolates were EPEC (uid and eae positive). The virulence profile analysis indicated that the crl [75% (9/12)], csgA [33% (4/12)] and iha [25% (3/12)] genes were harboured by the EPEC isolates, while the saa, stx1 and stx2 genes were not detected. The genes detected are associated with biofilm and microcolony formation in the intestines that causes persistent infections.

Conclusion: The EPEC isolates carried important virulence genes that have the potential to worsen diarrhoeal disease in the children from the study setting. It is important to understand the pathogenesis and virulence potential of EPEC infections to assist clinicians with treatment and prevention strategies.

KEYWORDS: infant diarrhoea; enteropathogenic E. coli; virulence profiles

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: TRADITIONAL HEALTH PRACTICES IN TREATING MENTAL ILLNESS: A QUALITATIVE STUDY IN SOSHANGUVE TOWNSHIP

Background: Mental health care users consult traditional health practitioners, mental healthcare practitioners, or both. Some family members believe that traditional health practitioners offer holistic care, a sense of well-being, belonging and security. There is limited information regarding mental health interventions deployed by traditional health practitioners.

Aim: The aim of this study was to explore and describe the practices of traditional health practitioners regarding the treatment of mental illness in Soshanguve Township.

Methods: This study adopted a qualitative design to explore and describe the practices of traditional health practitioners in treating mental illness. The target population were all traditional health practitioners in Soshanguve Township who treat mental illness. Purposive and snowballing sampling were used to select participants for 10 semi-structured interviews to collect data until data saturation was obtained. Thematic analysis was used to obtain themes and categories.

Results: The following themes constructed the study findings: The training and knowledge of traditional health practitioners regarding mental illness, diagnostic assessment and interventions of different types of mental illness, including traditional medicine and referral to hospital for management. The problems encountered by traditional health practitioners while treating mental illness were also discussed.

Conclusion: The results might help to establish a safe referral pathway between mental health care practitioners and traditional health practitioners. It is beneficial for mental health care users and professionals if the practices of registered traditional health practitioners are documented for comprehensive and holistic mental health care.

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Theme: Innovate
Methodology: Experimental Study

Disclaimer:
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Abstract Detail
Title: THE FEASIBILITY OF THE DIGITAL SCALE TO MEASURE LOWER LIMB WEIGHT BEARING IN STROKE PATIENTS

Background: Assessment of lower limb weight bearing (LLWB) is imperative in stroke rehabilitation. Various assessment methods have been identified; namely force plates, pressure mats and clinical scales, however, the feasibility of these tools are often questioned. The digital scale (DS) has not been well-researched with regards to LLWB. The aim of this phase was to determine the feasibility of the DS to measure LLWB in a clinical setting.

Methods: A quantitative, cross-sectional, feasibility study on nine qualified physiotherapists, in both government and private settings was conducted. The Systems Usability scale (SUS) was used to determine the views of the therapists.

Results and discussion: All participants agreed that the DS was effective, efficient, simple, consistent, easy to use, as they required no assistance to use the instrument, similarly noted by Hyytiäinen et al. (2012:390). The DS was suggested as portable and useful in many environments, as supported by Hurkmans et al. (2003:576). The DS provided visual input for LLWB distribution (noted by almost 80% of the participants), allowing patients to be motivated and encouraged (mentioned by seven participants) in their rehabilitation, similarly echoed by Hustedt et al. (2012:119) and Matsuyama (2018:14).

Conclusion: The participants agreed that the DS was an effective, efficient, useful, and cost-effective outcome measure to evaluate LLWB, that required minimal training and could be used in different settings by physiotherapists. Furthermore, they expressed that the DS provided visual feedback and psychological benefits for patients and caregivers.

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Theme: Innovate
Methodology: Evidence Synthesis

Disclaimer:
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Abstract Detail
Title: CAMPUS FOOD ENVIRONMENT AS PERCEIVED BY UNIVERSITY STUDENTS

Background: The food environment is the interface that mediates people's food acquisition and consumption, and it includes personal domains such as accessibility, affordability, convenience, and desirability. The aim of this study was to investigate how university students perceive their campus food environment relating to the personal domain that influence students' food choice.

Method: Convenient non-probability sampling was applied among full time undergraduate students enrolled at the Faculty of Health Sciences, during the 2023 academic year. Data was collected through an online survey on Qualtrics. The data analyses included descriptive statistics reported as frequency distributions.

Results and discussion: 82 undergraduate students from three Schools in the Faculty of Health Sciences participated. Although 90% of students purchase food and beverages on campus, 52% of food/beverages consumed on campus comes from non-university outlet. Students want access to healthier foods and beverages on campus and desire visual aids on the menus and nutritional information (82%). Students want more affordable healthier options (94%) and rewards points when making healthier food choices (89%). They would also like access to variety of food and beverages in vending machines (80%). Overall satisfaction with food and beverages provided on Prinshof campus were only indicated by 18% of students.

Conclusion: Students perceive the food environment on Prinshof Campus as expensive, but mostly accessible. Students would like more affordable healthy food and access to more freshly prepared foods. For convenience, more vending machines and variety of food and beverages were favoured requests.

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Theme: Co-Create
Methodology: Delphi Technique

Disclaimer:
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Abstract Detail
Title: HEALTHCARE SUPPORT PERSONNEL'S UNDERSTANDING OF THE RADIATION SAFETY MEASURES IN THE RADIOLOGY DEPARTMENT: AN EXPLORATORY DESCRIPTIVE STUDY

Background: The shortage of radiographers in radiology departments often leads to radiographers calling on healthcare support personnel to assisting with holding immobile patients or the image receptor during radiological examinations. The researchers have observed that healthcare support personnel were not compliant with the radiation safety principles. Therefore, the aim of this study was to explore and describe the healthcare support personnel's understanding of radiation safety measures in the radiology department.

Method: An exploratory-descriptive qualitative research study was conducted to identify what is understood about radiation safety measures through seeking the participant's viewpoints. A purposive sampling was used to enable a sample selection based on the researchers understanding of the phenomenon. Semi-structured interviews were conducted on 23 participants to permit follow up questions. The interviews were audio recorded and transcribed by the researchers. Data was analysed through content analysis to identify similar patterns, categories, and themes. The study adhered to trustworthiness and ethical principles.

Results: The three themes that emerged from the data analysis were (a) healthcare support personnel's understanding of radiation safety measures; (b) healthcare support personnel's understanding towards the concept of radiation; and (c) the need for radiation safety training among healthcare support personnel. Which were further examined into various categories.

Conclusion: The researchers concluded that the healthcare support personnel has limited understanding of radiation safety measures and suggested that training be given. The findings enabled the researchers to comprehend the healthcare support personnel's understanding of radiation safety measures through different perspectives as narrated by the participants.

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Theme: Innovate
Methodology: Randomised Controlled Trial

Disclaimer:
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Abstract Detail
Title: THE CASE FOR INSPIRATORY MUSCLE TRAINING: A (TRUE) SOUTH AFRICAN STORY

Background: Respiratory morbidity is common among children with neuromuscular diseases (NMD). Inspiratory muscle training (IMT) aims to reduce respiratory complications and improve health-related quality of life (HRQoL). This study aimed to describe South African physiotherapists' knowledge, respiratory management strategies and the safety and efficacy of IMT for children with NMD.

Methods: Four phases were conducted: i) a quantitative survey; ii) a systematic review; iii) a prospective, observational study and iv) a prospective, cross-over randomised controlled trial (RCT).

Results and discussion: South African physiotherapists (n=64) favoured manual airway clearance techniques, but supported IMT as part of chronic management. The systematic review (7 studies; n=168) found insufficient evidence to guide clinical practice. The pre-experimental, pilot study (n=8) suggested that a 6-week IMT programme was safe, viable, acceptable and associated with a significant increase in inspiratory muscle strength. The cross-over RCT (n=23) found no adverse events related to a 12-week IMT programme. Inspiratory muscle strength (Pimax) and peak cough flow showed a significant change of 14.6(±15.7) cmH2O and 32.3(±36.6) L/min respectively during intervention compared to 3.0(±11.9) cmH2O and -16.6(±48.3) L/min during the control period There was no evidence of a change in hospitalisations, respiratory infections, spirometry, function or total HRQoL scores. Participant satisfaction with IMT was high and adherence was good.

Conclusion: Inspiratory muscle training was well tolerated, safe and associated with significant improvements in inspiratory muscle strength and cough efficacy. This intervention may therefore be a cost-effective, adjunct treatment strategy to consider among children with NMD in SA to reduce respiratory morbidity.

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Theme: Collaborate
Methodology: Inter-disciplinary study

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Abstract Detail
Title: CULTURAL BELIEFS INFLUENCING THE UPTAKE OF CERVICAL CANCER SCREENING AMONG WOMEN IN A COMMUNITY HEALTHCARE CENTRE IN SOUTH AFRICA

Background: In South Africa, cervical cancer is a common cancer diagnosed in women. Despite this fact, the uptake of cervical cancer screening in a designated community centre in the Tshwane district in the Gauteng Province of South Africa is low. The study aimed to explore and describe the cultural beliefs influencing the uptake of cervical cancer screening among women in a designated community.

Method: A qualitative descriptive study was done through focus group interviews with 24 purposively selected women 35 years and older who haven't made use of cervical cancer screening services before, and who attended the healthcare centre for other reasons than for screening for cervical cancer.

Findings: A thematic analysis of the data revealed four categories: "fear of positive results of cervical cancer screening", "cervical cancer perceived to be caused by indecent behaviour", "spousal approval needed for cervical cancer screening" and "women should talk to women about gynaecological health issues". These beliefs prevented the participants to make use of cervical screening.

Conclusion: Cultural beliefs disempowered the participants to be responsible for their own health. Spouses made decisions for their partners' health-related issues and participants respected that regardless of how they felt about cervical cancer screening.

Implications for nursing/health policy: Culture-congruent health education regarding the importance of cervical cancer screening is crucial. An understanding of cultural barriers to cervical cancer screening may enable healthcare professionals to deliver person-centred healthcare.

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Theme: Innovate
Methodology: Evidence Synthesis

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Abstract Detail
Title: KNOWLEDGE BASE OF RELATIONAL LEADERSHIP: A SCOPING REVIEW

Background: For nurse leaders to ensure high-quality care, their leadership style and the subsequent influence on the follower and their work environment is important. Leadership in the study hospital was considered as impersonal and autocratic and it had a negative outcome on both nurses and patients. Therefore, the need to conduct a study with the aim to develop a programme to enhance the relational leadership skills of unit managers in the hospital was identified.

Method: A scoping review indicated the existing knowledge base of relational leadership, to what extent these skills are used by the nurse managers, and what content should be included in a programme to enhance relational skills. The steps as outlined by Arksey and O'Malley (2003) were used to guide the scoping review: identify the research question, identify relevant studies, select studies, chart the data, and report the results.

Results and Discussion: Various databases such as CINAHL, EbscoHost were searched, and 37 articles were included in addressing the three questions posed. Several key findings indicated that leaders have a baseline knowledge about relational leadership, use certain skills that are related to relational leadership, and it was emphasised that a programme to enhance relational leaderships should be based on strong evidence.

Conclusion: The key findings support the notion that a programme should be developed to enhance the relational leadership skills of nurse managers in the designated hospital, because it could lead to improved patient outcomes, teamwork, shared leadership, and open communication amongst all nurses in the hospital.

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Theme: Innovate
Methodology: Non-Randomised Controlled Trial

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Abstract Detail
Title: RELIABILITY AND COMPARATIVE VALIDITY OF A WEB-BASED MOBILE APPLICATION AS A DAIRY INTAKE SCREENER FOR SOUTH AFRICAN ADULTS

Background: The "Dairy Diary" is a user-friendly web-based dairy intake screener. The reliability and validity are unknown. We aimed to evaluate the screener in terms of test-retest reliability and comparative validity**.**

Method: In a diagnostic accuracy study, a purposefully recruited sample of 79 (age: 21.6±3.8 years) undergraduate dietetics/ nutrition students from three South African universities completed three non-consecutive days of weighed food records (reference standard) within a seven-day period (comparative validity), followed by two administrations, two weeks apart of the screener (index test). (reliability). For product serving scores (PSS) and dairy serving scores (DSS) mean differences, t-tests, correlations, Bland-Altman, Kappa, McNemar's, and diagnostic accuracy were determined.

Results and Discussion: For reliability, mean PSS and DSS did not differ significantly (p>0.05) between the screener administrations. Mean PSS were strongly correlated: milk (r=0.69; p<0.001), maas (fermented milk) (r=0.72; p<0.001), yoghurt (r=0.71; p<0.001), cheese (r=0.74; p<0.001). For DSS, Kappa was moderate (k=0.45; p<0.001). Non-agreeing responses suggest symmetry (p=0.334). For validity, the PSS of the screener and food records were moderately correlated [milk (r=0.30; p=0.0129), yoghurt (r=0.38; p<0.001), cheese (r=0.38; p<0.001),] with k=0.31 (p=0.006) for DSS. Bland-Altman analyses showed acceptable agreement for DSS (bias: -0.49; 95%CI: -0.7 to -0.3). Categorised DSS had high sensitivity (81.4%) and positive predictive value (93.4%), yet low specificity (55.6%) and negative predictive value (27.8%). The area under the receiver operating characteristic (ROC) curve (0.7) was acceptable.

Conclusion: The "Dairy Diary" is test-retest reliable and has moderate comparative validity to screen for dairy intake in the study population.

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Theme: Co-Create
Methodology: Delphi Technique

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Abstract Detail
Title: CREATING A CURRICULUM FRAMEWORK FOR THE TEACHING OF VOCATIONAL REHABILITATION AS PART OF THE FIRST PROFESSIONAL OCCUPATIONAL THERAPY DEGREE

Background: Goal 8 of the International Labour Organization's Sustainable Development Goals, aims to achieve decent work for all people. Vocational rehabilitation is a strategy to facilitate engagement or re-engagement in work for people with health related limitations. However, no little curriculum guidelines existed for preparing occupational therapy students for this area of practice. This study aimed to develop a proposed vocational rehabilitation curriculum theme framework.

Method: A four-phase convergent parallel mixed methods design was used collect qualitative and quantitative data. Educators from all eight higher education institutions offering occupational therapy, participated in the study. Phase One focused on the planned curriculum and a document analysis was conducted on curriculum-related documentation. Phase Two's focus was on both the planned and delivered curriculum from an educator's perspective through the use of semi-structured interviews. During Phase Three, the views of occupational therapy graduates were obtained using an online survey. The proposed vocational rehabilitation curriculum theme framework was created during Phase Four during which data was integrated and synthesised into the framework.

Results and discussion: Data analysis revealed a unique occupation-centred approach to vocational rehabilitation. Consistent with curriculum related research in health science, it was found that although the educators had limited experience in curriculum development. Educators should be encouraged and supported to further research, pedagogy of educating occupational therapy students within an occupational science perspective.

Conclusion: The framework offers a practical, flexible guideline that educators can consider during curriculum revision. Further research should be undertaken to validate the framework.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: THE PERSPECTIVES OF HEALTHCARE PROFESSIONALS REGARDING INTERPROFESSIONAL COLLABORATION AMONG THREE TERTIARY HOSPITALS IN THE TSHWANE DISTRICT, GAUTENG

Interprofessional collaboration (IPC) entails the synergy among healthcare professionals (HCP) to optimise positive patient outcomes. Perspective of IPC in hospitals among HCP differs, attributed to poor competencies.

The study aimed to establish the perspectives of healthcare professionals regarding IPC in tertiary hospitals in the Tshwane district.

A quantitative cross-sectional study was conducted among 77 HCP from April to June 2023. The study participants included all HCP registered with the Health Professions, Nursing, and the Social Service Professions Councils. Exclusion criteria included those worked less than a week. Ethical approval was granted by the University of Pretoria (660/2022) and the chief executive officers of the three hospitals. An online questionnaire was sent via google link using snowball sampling method. The data were analysed using the Statistical Package for Social Science version 28.

A significant difference between hospitals for the feedback of shared goals, trust, strategic guidelines, shared leadership, support for innovation, protocolisation, and information systems was observed. The lowest scored variables that the largest percentage of the participants agreed on, was support for innovation and forums for meetings. Thirty-seven percent perceived minimum support for innovation and 33.8% of the population agreed on fewer forums for meetings.

A moderate level of collaboration between healthcare professionals was identified due to a lack of trust, shared leadership, support for innovation, forums for meetings, and information systems. We recommend that more focus is placed on these aspects to improve interprofessional collaboration between healthcare professionals in tertiary hospitals as the collaboration improves patient care.

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Theme: Collaborate
Methodology: Inter-disciplinary study

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Abstract Detail
Title: ORAL HEALTH STATUS AND ANTHROPOMETRICAL MEASUREMENTS OF CHILDREN IN AN INFORMAL SETTLEMENT IN PRETORIA WEST, SOUTH AFRICA.

Objectives: Early childhood caries in low socio-economic communities are increasing. The objective was to determine the oral health status and the nutritional status of children attending crèches in the informal settlement and investigate possible associations.

Methods: Oral health data including dental caries (DC), soft tissue lesions, fluorosis, erosion and trauma were recorded using the World Health Organization (WHO) recommended methods. The examiners were calibrated and all examinations took place at the crèches under natural sunlight. Weight for age, (WFA), height-for-age (HFA), mid-upper-arm-for-age (MUAC/A) and body mass index for age (BMI/A) z scores were calculated using the WHO Anthro program.

Results and discussion: There was a total of 169 participants (49.7% females and 49.3% males). The prevalence of DC was 39.1% with half of these (20%) having 4 or more carious teeth. The mean dmft and plaque scores (OHI) were 1.58 (± 2.70) and 0.65 (± 0.43) respectively and the mean dmft score increased with increasing age. The mean d component contributed 99% of the total mean dmft score (1.56). The mean BMI/A z-score decreased significantly (p=0.009) while the OHI increased significantly (P<0.001) as the number of carious teeth increased.

Conclusion: The prevalence of caries was relatively high and those with caries had multiple decayed teeth. The d component contributed almost 100% to the mean score which indicated a lack of access to dental care. The BMI-for age z scores were inversely associated with the number of carious teeth which could imply an association between dental caries and nutritional status

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Theme: Collaborate
Methodology: Inter-disciplinary study

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Abstract Detail
Title: ORAL HEALTH, DIET INTAKE AND ANTHROPOMETRIC MEASUREMENTS OF CHILDREN IN AN INFORMAL SETTLEMENT IN PRETORIA, SOUTH AFRICA

Objectives: Dietary intake data of children three to six years are limited, especially among children living in informal settlements. Describing anthropometric measurements and dietary intake data of children attending early learning centres and investigating the associations with oral health status was the objective of this inter-disciplinary study.

Methods: Dental caries (DC), soft tissue lesions, fluorosis, erosion and trauma were recorded using the World Health Organization (WHO) recommended methods. Weight for age (WFA), height for age (HFA), mid-upper-arm for age (MUAC/A) and body mass-index for age (BMI/A) were calculated with WHO Anthro program and z-scores determined. Diet diversity score was calculated and intake were compared with dietary recommended intake (DRI) for age. Dietary adequacy and anthropometric measurements were compared with the oral health status.

Results and discussion: There was a total 169 participants (49.7% females and 49.3% males). The prevalence of caries was relatively high and those with caries had multiple decayed teeth. The d component contributed almost 100% to the mean score which indicated a lack of access to dental care. The anthropometric data indicate chronic nutritional deficiencies (stunting) being the predominant nutritional defect, while underweight are still prevalent with overweight also visible among children in the informal settlements. Diet diversity and nutrition adequacy indicates a community in nutrition transition affect the eating behaviour of children towards processed and sugar sweetened food and drinks.

Conclusion: An association between dental caries, dietary intake and anthropometric results were investigated and possible associations were found.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: EFFICACY OF A NOVEL PORTABLE MRI AS A SCREENING TOOL IN NEONATES WITH NESHIE (NEONATAL ENCEPHALOPATHY WITH SUSPECTED HYPOXIC ISCHEMIC ENCEPHALOPATHY)

Background: The aim is to investigate the efficacy of a novel 64mT portable MRI (pMRI) device as a screening tool for NESHIE in LMICs versus the traditional 1.5T MRI device. In South Africa, we have a high prevalence of NESHIE, up to 10-fold higher than the global average of 1-2/1000 live births. MRI is the imaging procedure of choice for babies with NESHIE, however given the long MRI waiting times in government hospitals, most of these babies go home without a proper diagnosis and an understanding of the extent of brain injuries sustained during the hypoxic-ischemic event.

Method: Term neonates identified by NESHIE neonatologists as asphyxiated, were included. Neonates born after hours were excluded. 20 neonates from Kalafong Hospital and 10 from Chris Hani Baragwanath Hospital who had undergone both pMRI and 1.5T MRI, formed the study population. The scans were analyzed by the NESHIE radiologists and reported on the case report form (CRF). The researcher compared the CRFs from pMRI and 1.5T MRI. Comparison criteria included overall structural resolution, visualization of the cortical regions, splenium, and deep grey matter regions. Loss of normal signal from within the posterior limb of the internal capsule (PLIC) was assessed for its prognostic significance in NESHIE.

Results and Discussion: On the pMRI assessment of the PLIC, results were equivocal due to graininess in the basal ganglia thalamus region, resulting from a poor signal-to-noise ratio (SNR). On the 1.5T MRI this region is clearly visualized, and the spatial resolution of structures is clearly delineated. Gross pathology in the cortical regions is seen on both the pMRI and 1.5T MRI, which suggests that the pMRI can be a good screening tool for gross pathology in the brain should the traditional 1.5T not be available.

Conclusion: Screening with both pMRI and 1.5T MRI is needed in our public hospitals to combat the long MRI waiting times and aid in timeous diagnosis and treatment for NESHIE babies.

Faculty Research Day 2023
Abstract no: 2023147

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Theme: Co-Create
Methodology: Discrete Choice Experiement (DCE)

Abstract Detail
Title: THE ACCEPTABILITY OF A BREAST MILK BANK AND DONATED HUMAN MILK AMONG MOTHERS IN PHILADELPHIA HOSPITAL IN SEKHUKHUNE DISTRICT, LIMPOPO PROVINCE

Background: A human breast milk bank (HBMB) is a service that recruits breast milk donors, collects, pasteurizes, and stores donor milk, tests the milk for bacterial contamination, and distributes donor milk to recipient infants and families. When a mother's milk is unavailable, alternative enteral nutrition for preterm is either donor human breast milk (DHBM) or artificial formula. This study is aimed to explore and understand the reasons for the low willingness to donate human breast milk among mothers at Philadelphia Hospital.

Methodology: A phenomenological study was conducted in Limpopo Province. The study used purposive sampling in selecting twenty-three mothers in postnatal and neonatal wards. Data collection was via in-depth interviews. Manual data analysis using an interpretative phenomenological analysis (IPA) framework was used in data coding. The coding resulted in the generation of themes.

Results: Mothers expressed a lack of information about HBMB because it was the first time, they heard about it during their admission. Terms and conditions about accepting DHBM were highlighted, such as safety and contracting HIV through DHBM, participants highlighted that they would accept DHBM if the milk was "cleaned" due to the unknown status of some donors and if there is a hospital liability concern form signed.

Conclusion: This study has shown that although participants were not aware of the existence of the bank prior to being admitted to the hospital, they were willing to donate. Concerns regarding the safety of DHBM related to HIV and cultural beliefs affected milk donation and uptake. Sustainable Development Goals (SDG) 2 and SDG 3 can be achieved by strengthening health systems supporting DHBM.

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
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Abstract Detail
Title: ASSESSING OXIDATIVE STRESS AND IDENTIFYING PHARMACEUTICALS IN WATER SOURCES OF MPUMALANGA PROVINCE, SOUTH AFRICA

Background: The ubiquitous occurrence of emerging micropollutants in the environment is a growing concern due to their potential negative impacts on natural ecosystems and humans. These chemicals can contribute to oxidative stress by promoting reactive oxygen species (ROS) generation. Oxidative stress, an imbalance between ROS and the body's defense mechanisms, can lead to cellular damage, inflammation, DNA mutations and increased disease risk. An example of emerging contaminants with potential ROS activity is pharmaceuticals in water sources. The AREc32 reporter gene bioassay uses the Nrf-2-mediated oxidative stress response pathway which serves as an early and sensitive indicator of the presence of chemical stressors. Therefore, the aim of this study was to screen for pharmaceuticals and apply the AREc32 cell line to assess oxidative stress in different water sources.

Method: Surface water, natural wetland, groundwater, drinking water and wastewater treatment plant samples were collected from a town in Mpumalanga. Chemical screening was done using UHPLC-QTOF-MS to determine the presence of pharmaceutical compounds. The induction of oxidative stress response was assessed using the AREc32 reporter gene assay.

Results and Discussion: A total of 32 compounds from various classes were identified of which 16 were pharmaceuticals. All samples exhibited oxidative stress ranging from 2.61 - 229.72 dichlorvos-equivalents (µg/L). The highest oxidative stress response was measured in the wetland sample indicating that the health of the wetland may be under threat.

Conclusion: The results of this study indicate that the AREc32 assay can complement traditional chemical screening for water quality monitoring. Further investigation is warranted.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
The review committee reserves the right to allocate your abstract to a specific category, i.e. oral presentation
or poster.

Abstract Detail
Title: DRIVERS OF MALARIA IN THE EASTERN VHEMBE DISTRICT, LIMPOPO PROVINCE

The Limpopo Province accounts for ~60% of South Africa's malaria burden localised in the Vhembe District.
Despite the implementation of sustained vector control strategies and public health interventions, persistent
residual malaria transmission remains in this region. The drivers of malaria transmission in the Vhembe District
are currently poorly understood.

This study investigated i) the regional vector density through surveillance of anopheline composition ii)
anopheline species breeding behaviour and iii) identify factors that contribute to biological and human-related
drivers of infection by comprehensive questionnaires, with Pf RDT tests and blood spot collections.
Across all study sites, 2022 mosquito community composition was dominated by Anopheles (73.26%), with
Anopheles funestus s.l. (36.61%) being the dominant group followed by Anopheles gambiae s.l. (17.62%). Among
species identified were Anopheles rivulorum, Anopheles rivulorum-like, Anopheles leesoni, Anopheles parensis,
and Anopheles quadriannnulatus. More than 50% of houses across all study sites had openings between
windows, doors, and eaves, and often within close proximity of open water sources with livestock and domestic
animals roaming freely between properties. Community activities continued after sunset including socialising,
sleeping, and working. Personal preventative measures were mostly associated with non-treated bed nets
and/or long-sleeved clothing.

The high abundance of Anopheles mosquitoes highlights the need for surveillance to identify vector species to
allow for guiding and adjusting control methods and strategies accordingly. There is a need for targeted control
methods, education and adherence of communities to control practices. Overall, this study will contribute to
understanding the driving factors of malaria transmission in the Vhembe District.

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Theme: Collaborate
Methodology: Inter-disciplinary study

Disclaimer:
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Abstract Detail
Title: EXAMINATION OF THE ASSOCIATION BETWEEN TEMPERATURE VARIABILITY AND CARDIOVASCULAR AND RESPIRATORY MORTALITY IN SOUTH AFRICA, 2006-2016.

Background
This study aimed to evaluate the association between temperature variability (TV) and cardiovascular and respiratory disease mortality in South Africa.

Methods
Daily mortality and meteorological data in five South African cities (Bloemfontein, Cape Town, Durban, Johannesburg, and Port Elizabeth) were collected from Statistics South Africa and the South African Weather Service. TV was calculated from the standard deviation of the minimum and maximum temperature during exposure days. Three TV cutoff values were defined using the 25th (low), 75th (high) and 99th (extreme) percentiles. The city-specific risks were estimated using quasi-Poisson regression models combined with distributed lag nonlinear models, adjusting for potential confounders. A meta-analysis was conducted to obtain national estimates. The analysis was stratified by age and gender.

Results
In eleven years, a total of 213875 cardiovascular and 114887 respiratory deaths occurred in the five cities. The effect estimates were higher for respiratory mortality as compared to cardiovascular mortality. At the national level, significant RD mortality risks (RR=1.21;95% CI:1.04,1.38) were associated with a 1°C increase in low TV at 0-2 days. Stratified analysis showed the elderly and women as more vulnerable. The greatest risks of RD mortality for the elderly appeared after 0-2 days of exposure to high TV. No significant results were observed for CVD mortality.

Conclusion
This study demonstrated that more attention should be paid to unstable weather to mitigate the grave effects of climate variability and protect human health. The results can help in preparing health systems to cope with the health risks arising from climate change.

Faculty Research Day 2023
Abstract no: 2023151

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
The review committee reserves the right to allocate your abstract to a specific category, i.e. oral presentation or poster.

Abstract Detail
Title: FEASIBILITY AND ACCEPTABILITY OF A COVID19 VACCINATION SITE FOR PATIENTS AT AN ACADEMIC HOSPITAL, SOUTH AFRICA

Background: Access to convenient vaccination delivery plays a crucial role in increasing vaccination uptake. Hospital patients with co-morbidities are a vulnerable group and stand to benefit from access to vaccination during their routine hospital visit.

Objectives: Evaluate the feasibility and acceptability of a hospital-based vaccination site for hospital outpatients. To assess uptake and coverage of vaccination among people with multi-morbidities attending hospital. Additionally, to document implementation and assess acceptability of the vaccination project among hospital staff and patients.

Methods: Mixed-method study using quantitative and qualitative methods.

Results: 317 participants were enrolled. 296 participants were eligible for vaccination and included in the analysis. The most significant factor associated with vaccination uptake was age, with a mean of 50,8 years in those vaccinating and 40,6 years in those not vaccinating. Interviews were conducted with 44 participants, including patients and staff. Emerging themes included perceptions of vulnerability, vaccine safety and efficacy concerns, information gaps regarding vaccinations, the value of convenience in decision to vaccinate and cognisance of the vaccination site.

Conclusions: Age influences perception of vulnerability to COVID-19 infection, influencing decision to vaccinate. Access and convenience of the vaccination site influences decision-making, increasing opportunity to vaccinate. However, vaccine hesitancy remains prevalent. Strengthening health education and patient-clinician engagement on vaccination is required.

Key Recommendations: The COVID-19 vaccination site proves feasible. This concept can be expanded to other centres as part of hospital services for clinically vulnerable patient groups. This needs to be coupled with clinician-patient engagement on vaccination, individual risk assessment and guided decision-making.

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Theme: Collaborate
Methodology: Inter-institutional study

Disclaimer:
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Abstract Detail
Title: COVID-19 VACCINATION OF UNDOCUMENTED AND HARD-TO-REACH POPULATIONS IN SOUTH AFRICA. UNIVERSITY OF PRETORIA (UP) COPC RESEARCH UNIT.

Background: In light limited healthcare access experienced by vulnerable populations such as the undocumented and hard-to-reach populations, an intervention to provide covid vaccination was implemented through collaboration of multiple stakeholders. The UP COVID-19 Vaccination Project, sponsored by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and implemented in collaboration with MSF, aimed to assist the Gauteng Department of Health to register & vaccinate these populations.

Objectives: To provide covid vaccination for undocumented and hard to reach populations.

Methods: Five Gauteng municipalities were included and the vaccination process was divided into two 7 month phases that took place from July 2021 to April 2023.Access sites included fixed sites ,mobile sites and hybrid sites.Target populations were mapped into their respective types.Health promotion assessments were also conducted on all approached individuals. A follow up study was also conducted by the COPC team to evaluate the sustainability of this intervention.

Results: In the above-mentioned municipalities, 7666 people were vaccinated of which 30% (n= 2304) were undocumented individuals.Majority of vaccinations took place in phase 1,with 79% (n= 6106) of all vaccinations provided during phase 1 and the remaining 21% in phase 2 (n=1560).26972 health assessments were conducted.

Conclusion: Undocumented and hard to reach individuals account for a significant proportion of municipalities in Gauteng posing a challenge in delivering adequate health care services.Mobile sites were found to be more effective than fixed sites.

Recommendations: Sustainability in these populations is highly dependent on building trust. Multisectoral collaboration is essential in efficient delivery of services to these populations.

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Theme: Co-Create
Methodology: Discrete Choice Experiement (DCE)

Disclaimer:
The review committee reserves the right to allocate your abstract to a specific category, i.e. oral presentation
or poster.

Abstract Detail
Title: REINTEGRATION EXPERIENCES OF CLINICAL RESEARCH PARTICIPANTS INTO PUBLIC HEALTH SERVICES IN
JOHANNESBURG'S INNER CITY: A QUALITATIVE STUDY

BACKGROUND: Clinical trials recruit participants from public healthcare facilities, and upon trial completion,
they are referred back. There is little evidence indicating a smooth re-integration of them into public health
facilities. This study aimed to explore research participants' experiences with reintegration into public health
services and to identify factors influencing their adherence to antiretroviral therapy (ART) after completing
clinical trials in Johannesburg, South Africa.

METHODS: This cross-sectional study used a qualitative research approach. The study population consisted of
people with HIV who had successfully completed participation in either of two clinical trials (DORA and
ADVANCE) at the Ezintsha Research Center in Johannesburg, South Africa. In-depth interviews were completed
using a semi-structured guide, until saturation was reached. All recorded data was transcribed verbatim.
MAXQDA software was used for thematic analysis.

RESULTS: A total of 12 participants with mean age of 40 ± 7.2 years were enrolled, and the majority (67%) were
females. Main themes emerged from the data: challenges of reintegration, barriers to adherence and
recommendations by participants. Negative attitudes of healthcare workers, waiting times and inadequate
patient-provider communication were cited, which contrasted with the experiences received at the clinical trial
clinics.

CONCLUSION: The findings highlight issues with post-clinical trial reintegration into public health facilities for
continuum of care. This emphasizes the importance of offering good care as it influences patients' satisfaction
and adherence. Clinical trial sites need to foster better stakeholder engagement between themselves and the
referral public health facilities to facilitate a more seamless transition back into public healthcare.

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Theme: Innovate
Methodology: Evidence Synthesis
Disclaimer:
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Abstract Detail
Title: TRENDS AND DISTRIBUTION PATTERNS OF INFANT MORTALITY AND MATERNAL HIV POSITIVITY IN SOUTH AFRICA: A DECADE REVIEW (2007 - 2016)

Background
Infant mortality rate remains high in South Africa, well above the recommended sustainable development goal (SDG) 3 of 12 deaths per 1000 live births.

Methods
The study employed a cross-sectional study design through analysis of secondary data of infant mortality from the 2007 and 2016 Statistics South Africa community surveys (CS), as well as the data from the 2007 National Antenatal Sentinel HIV and syphilis Prevalence Survey. Descriptive and inferential statistics were used to assess the trends and distribution of infant mortality between the year 2007 and 2016. All analyses were performed using STATA version 16.0.

Results
A total sample of 87805, comprising 43922 (50%) males and 43883 (50%) females, was included in the analysis. The results revealed a decline in infant mortality rate (IMR) of 55% in 2007 to 32% in 2016 deaths per 1000 live births. Overall, there was a significant decrease in the mortality rate from 2007 to 2016. The infant mortality proportions by province show Kwa-Zulu Natal Province having the highest IMR (17.5 % in 2007 and 6.3% in 2016 deaths per 1000 live births). Males had a higher IMR (28% in 2007 and 17.7% in 2016 deaths per 1000 live births) compared with the females at 26.7% in 2007 and 13.8% in 2016 deaths per 1000 live births. Infant mortality rate data from the 2007 community survey was correlated to the 2007 National Antenatal Sentinel HIV and syphilis Prevalence Survey. (28% HIV prevalence in 2007), using the Spearman's rank-order correlation, that showed a moderate correlation of 0.58.

Conclusions
The study findings show a reduction in the trends of infant mortality between 2007 and 2016 in South Africa, despite the reduction, disparities are continual. There is a correlation evident between maternal HIV prevalence and IMR in South Africa.

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Theme: Innovate
Methodology: Evidence Synthesis

Disclaimer:
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Abstract Detail
Title: ACCESS AFFECTING QUALITY OF ADOLESCENT HEALTH SERVICES IN PRIMARY HEALTH CARE (PHC) SETTINGS: A SCOPING REVIEW PROTOCOL

Introduction: the WHO recommends that the primary responsibility for child and youth wellbeing lie with PHC (rather than specialist) level, close to communities and with young peoples' active engagement in care. The primary health service is the first port of entry for an adolescent into a health system. It should align with their needs, determine their problems and provide services without any barrier. The type and quality of the services provided should not vary based on ethnicity, caste, culture, religion, sexual preference, socioeconomic status, family size, educational level.

Objective: to identify barriers and facilitators that might affect the quality of adolescent health services in primary health care (PHC) settings.

Methods: This scoping review will be based on searching databases (MEDLINE, CINAHL, Scopus, Web of Science, Science Direct, JBI EBP Database, PubMed Central, and Cochrane Library. Sources of grey literature will include ProQuest Dissertations and Theses, PaperFirst, and MedNar). The review will include studies published in English since 1994 and follow the JBI guidelines for scoping reviews. Two independent reviewers will screen the titles and abstracts, followed by the full text. Data from relevant studies will be extracted using the tool created by the reviewers.

Results: The results of preliminary search using the following terms "(("adolescen*"[MeSH Terms]AND"primary health care"[MeSH Terms])AND"Access"AND((y_10[Filter])AND (fft[Filter])AND(english[Filter]))) on 22 June, 2023 retrieved 124 articles.

Conclusion: This study will assist in identifying research gaps in adolescent health services in primary health care (PHC) settings and will hopefully assist in developing evidence based interventions.

Faculty Research Day 2023
Abstract no: 2023157

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Theme: Innovate
Methodology: Evidence Synthesis

Disclaimer:
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Abstract Detail
Title: ANALYSIS OF ROUTING ADOLESCENT DATA FROM A SMALL GEOGRAPHICAL AREA IN PRETORIA

Introduction: According to the WHO, there are approximately 1.2 billion adolescents aged 10 to 19 in the world, most of who are resident in developing countries. In South Africa, adolescents make up 17.4% of population. However, this number varies in different geographical regions within a country and it is important to study that in small geographical areas. In 2017, the WHO recognised that Adolescents often face disproportionate health risks, and yet adolescents' health is traditionally approached from multiple entry points such as through the HIV and reproductive Health or sexual and reproductive health programmes.

Aim: To describe the epidemiology adolescent health in the Atteridgeville, a small geographical area in Pretoria based on analysis of routinely collected data.

Methodology: The study was based on analysis of routinely collected data from DHIS for a period of one year in 2022.

Results: Adolescent population varies between 7% - 17% in six different sub-population catered by six clinics in Atteridgeville. There were Low utilization of PHC services by the adolescents in comparison to the adult population, which varies within the same area. Seasonal variation exists with low headcount at the beginning of the year.

Clinic	Headcount: mean (range)
ATTRC	127(48-277)
BOPC	111(71-149)
GAZC	121(17-199)
LOTC	191(141-253)
PHOC	205(12-457)
SAUC	167(70-240)

Conclusion: The findings of this study stimulated further research to identify the cause of this variability and low utilization rate among adolescents.

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Theme: Innovate
Methodology: Evidence Synthesis

Abstract Detail
Title: COVID-19 CALL CENTRE UNDOCUMENTED MIGRATES

Background: South African Government decided to vaccinate all residents with COVID-19 vaccination. However, EVDS system used for vaccine-registration disqualified undocumented-migrants from being vaccinated. Therefore, a COVID-19 call-centre at UP was established on behalf of the Department of Health to facilitate their registration using an unique-code (UC-number). It is accessible to health professionals and community members during working hours. Callers can get information about COVID-19 symptoms, testing guidelines, treatment and vaccine protocols, and post-vaccination questions from the call centre.

Objective: to document activities of the call-centre operations since its inception on 26/04/2022 for 36 working days.

Methods: The study was a cross-sectional study based on data collected on the activities of the call-centre.

Results: The call centre registered 2391 undocumented individuals from four provinces (with an average of 11/day), listed below:

Districts	No:	Age mean+SD	Male	Female	Pfizer	J&J	New patient
Gauteng	226	32.4±10.9	130	94	94	130	212
Limpopo	1710	32.2±11.2	1088	622	607	1103	1654
Mpumalanga	3	28	2	1	2	1	3
North West	444	31.4+13.2	266	178	203	241	402
Northern Cape	8	35.9+11.5	7	1	1	10	5

The call-centre is used extensively by the two border provinces namely Limpopo and North-West, the majority were female, received J&J and the first dose of vaccination.

Conclusion: The call-centre provides an opportunity to register and vaccinate undocumented people and bring them into the mainstream health system as a part of NHI roll-out.

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Theme: Innovate
Methodology: Evidence Synthesis

Abstract Detail
Title: IMPROVING SUPPLY CHAIN MANAGEMENT FOR POINT-OF-CARE DIAGNOSTICS IN RESOURCE-LIMITED SETTINGS: POLICY BRIEF

Policy Background: Resource-limited settings face challenges in implementing accurate testing methods like reverse transcription polymerase chain reaction (RT-PCR) due to the lack of sophisticated laboratory equipment. Point-of-care (POC) testing offers a viable solution but is hindered by poor supply chain management (SCM), resulting in limited availability and uneven distribution of point-of-care (POC) diagnostics.

Policy Objective: This policy brief advocates for the adoption of an intersectoral POC diagnostic framework to improve SCM for POC diagnostics in resource-limited settings. The objective is to enhance accessibility and availability of POC diagnostics.

Research Activities and Proposed Framework: To address this issue, a comprehensive mixed-methods study was conducted to identify SCM challenges in resource-limited settings. The study revealed non-compliance in procurement, inventory management, storage, distribution, and human resource capacity. Based on these findings, an intersectoral evidence-informed framework was developed, emphasizing collaboration, digitalization, visibility of information, and standardized procurement policies.

Policy Recommendations: The policy recommendations include engaging stakeholders for collaborative decision-making, developing forecasting models, improving storage conditions, establishing procurement policies and guidelines, implementing quality assurance measures, optimizing distribution routes, and enhancing inventory management and human resource capacity.

Potential Impact: Implementing the proposed framework can lead to improved SCM for POC diagnostic services. The adoption of this framework in resource-limited settings can enhance accessibility, reduce stockouts, improve inventory management, and contribute to better health outcomes. Key stakeholders, including the National and Provincial Departments of Health, need to support the implementation of this framework to ensure its success in resource-limited settings.

Faculty Research Day 2023
Abstract no: 2023160

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Theme: Innovate
Methodology: Experimental study

Abstract Detail
Title: THE EFFECTS OF MATERNAL TENOFOVIR DISOPROXIL FUMARATE TREATMENT ON THE GROWTH OF BREASTFEEDING INFANTS

Background: In South Africa, nearly a quarter of women of reproductive age are HIV-positive, resulting in a growing population of infants exposed to HIV and antiretroviral (ARV) medications both in utero and postpartum. This research aimed to address critical concerns regarding the impact of ARV medication, particularly tenofovir disoproxil fumarate (TDF), on the growth of infants breastfed by HIV-positive mothers.

Method: This study utilized previously obtained breast milk samples and growth data from the UmbiBaby study. Breast milk samples were collected from 26 HIV-positive mothers on TDF treatment and from a control group of 65 HIV-negative mothers. Macronutrient contents were assessed using a MIRIS Human Milk Analyzer (HMA). Infant growth parameters were extracted from the REDCap database and assessed using a retrospective cohort design, focusing on mean anthropometry z-scores based on WHO standards, comparing HIV-exposed but uninfected (HEU) and HIV unexposed and uninfected (HUU) infants from 6 weeks to 24 months of age.

Results and Discussion: A significant difference in length-for-age z-scores, indicating smaller stature among infants exposed to HIV and TDF was found. The precise role of TDF exposure in the pathogenesis of growth stunting remains unclear.

Conclusion: This study highlights the complex interplay between HIV exposure, TDF and other ARV treatments, breastfeeding, macronutrient content and infant growth. The findings will contribute to optimizing ARV strategies for pregnant and lactating women living with HIV, ultimately fostering infant health.

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Theme: Innovate
Methodology: Experimental study

Disclaimer:
The review committee reserves the right to allocate your abstract to a specific category, i.e. oral presentation or poster.

Abstract Detail
Title: THE IMMUNOMODULATORY PROPERTIES OF ADIPOSE-DERIVED MESENCHYMAL STROMAL/STEM CELLS CULTURED IN HUMAN PLATELET LYSATE OR FETAL BOVINE SERUM

Background: Adipose-derived mesenchymal stromal/stem cells (AD-MSCs) are an attractive tool for cellular therapy. In vitro, the effect of AD-MSCs on immune cells when cultured using medium supplemented with fetal bovine serum (FBS) is well described, but less is known about the immunomodulatory properties of AD-MSCs cultured in medium supplemented with pooled human platelet lysate (pHPL). In order to comply with GMP requirements for therapeutic purposes, it is necessary to move away from xenogeneic products (FBS).

Method: The capacity of AD-MSCs to modulate the immune system was evaluated, and whether pHPL affects this process. AD-MSCs were cultured in 10% FBS or 10% pHPL and co-cultured with peripheral blood mononuclear cells (PBMNCs) using direct and Transwell® co-cultures. The percentage CD3+ T-lymphocytes expressing CD25 was measured using flow cytometry to determine the degree of cellular activation.

Results and Discussion: In FBS, the proportion of CD25 expressing CD3+ T-cells was increased in stimulated, direct co-cultures (71.146% ± 3.14) when compared to stimulated, monoculture controls (32.641% ± 8.549). Immune activation in stimulated, direct co-cultures (71.146% ± 3.14) was greater than in stimulated Transwell® co-cultures (57.956 ± 8.519), suggesting cell-cell contact plays a supportive role in activation. Significant differences between FBS and pHPL were noted (P>0.05). The proportion of CD25 expressing CD3+ T-cells in stimulated, direct and Transwell® co-cultures, in pHPL were 17.227% ± 4.856 and 15.604% ± 3.122 respectively.

Conclusion: In FBS, co-cultures show greater activation when compared to monoculture controls, implying a synergistic, immune-stimulatory effect. This provides further insight into the influence of the micro-environment on the activity of AD-MSCs. AD-MSC immuno-stimulatory activity does not occur to the same extent in pHPL as it does in FBS, although a similar trend was observed.

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Theme: Innovate
Methodology: Transdisciplinary Study

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Abstract Detail
Title: EMPLOYMENT IN DIFFERENT URBAN FORMS IN TSHWANE – SAPRIN BASELINE OBSERVATIONS

Background: The purpose of the investigation was to identify urban form-specific socio-economic characteristics of households in informal settlement dwelling (ISD) and formal townships dwellings (FTD) that may contribute to vulnerability regarding economic challenges.

Method: The South African Population Research Infrastructure Network (SAPRIN) prospectively collects individual and household data from populations in impoverished and developmentally-constrained communities. Cross-sectional baseline demographic and household data were analysed to investigate the prevalence of common vulnerability indicators in different urban forms by calculating proportions.

Results and Discussion: Household members across the sites totalled 12498 in FTD of which 47% were males and 8170 in ISD of which 52% were males. Employment rates for males: females were lower in FTD than in ISD, the respective rates being 36%:23% and 55%:28% and considerably lower in females compared with males. Self-employment/total employed rates were similar for both sites (20%). The main reason for unemployment, and more so in ISD, was scarcity of jobs (63% and 85% respectively for FTD and ISD). Perceptions regarding income relative to average and above average income were similar in FTD and ISD (31% vs. 32%). Thirty-two% of participants in FTD received at least one government grant compared with 23% in ISD.

Conclusion: Although about 30% of all respondents regarded their income to be average and above, employment rates were considerably lower in FTD. These preliminary observations suggest that communities residing in informal settlements may not be more vulnerable regarding socio-economic status that those in other urban forms. More in-depth analyses are indicated.

Faculty Research Day 2023
Abstract no: 2023163

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Theme: Innovate
Methodology: Experimental Study

Disclaimer:
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Abstract Detail
Title: THG-009 ([123I] I-PARPi) SPECT IMAGING IN THE MANAGEMENT OF ONCOLOGY PATIENTS.

Background:
Poly(ADP-ribose)polymerase-1(PARP-1) plays a role in cancers by mediating DNA damage repair, transcriptional regulation, and nuclear hormone-receptor signalling. THG-009([123I]-PARPi) (new and novel radiolabelled PARPi-inhibitor) is a highly-promising radiotracer for SPECT/CT imaging that reflects active PARP-expression. We report on the first-in-man clinical translation to assess biodistribution and tumor uptake in patients with head and neck (HN), cervical, ovarian, small-cell-neuroendocrine lung(SCNL), and breast cancers.
Methods:

We prospectively evaluated 11-patients (age:40-68years) with histopathologically-confirmed HN(5), SCNL(1), breast(3), cervical(1), and ovarian cancers(1). The synthesis of THG-009 was performed as previously reported by Wilson et al. High molar activity and radiochemical purity THG-009(Activity Range:370-555MBq), adjusted for patient weight was injected intravenously for the SPECT/CT scan. All scans were performed 1 h, 4 h, and 24 h after injection of THG-009 and the vitals were assessed before and after administration.

Results:
The biodistribution analysis revealed high THG-009 avidity in 7/11 patients. THG-009 had focal uptake in all primary lesions (n = 7, L/B = 2.8 ± 1.2) and all PARP-positive lymph nodes (n = 4). Focal uptake of tracer in primary and nodal lesions was corroborated by CT alone or in combination with [18F] FDG PET/CT. THG-009 was well-tolerated by all 11-patients without any safety concerns.

Conclusion:
We present the first evidence of the diagnostic potential of THG-009 SPECT/CT in patients with breast, SCNL, and HN cancers. Based on the Auger-electron emitting properties of I-123, THG-009 should be evaluated in larger studies for both diagnostic imaging and, possibly, targeted therapy of cancers with a high content of PARP-expression.

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Theme: Innovate
Methodology: Transdisciplinary Study

Disclaimer:
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Abstract Detail
Title: ^{68}GA-NITROIMIDAZOLE IMAGING OF TUMOUR HYPOXIA IN CANCER OF THE CERVIX UTERI

Aim / Introduction: Hypoxia in solid tumours is associated with increased tumour aggressiveness and resistance to chemoradiotherapy. Hypoxia in cervical cancer has been associated with a poor prognosis. Molecular markers and PET imaging methods have been investigated for hypoxic lesions. Several 18F-labelled and 60/64Cu tracers have been studied for imaging hypoxia in cervical cancer with variable yet encouraging results. Over the years 68Ga labelled nitroimidazoles have been studied and have shown improved kinetics with improved tumour to background ratios. We present the first translational imaging of hypoxia PET in cervical cancer with 68Ga Nitroimidazole derivative and 18F-FDG PET/CT.

Materials and Methods: We prospectively recruited twenty women with histologically proven cervical cancer who underwent both 18F-FDG and 68Ga-Nitroimidazole PET/CT imaging. The 68Ga-Nitroimidazole PET was performed at 30 and 60-minutes post tracer injection. Qualitative and semiquantitative analyses were performed on both scans, with 68Ga-Nitroimidazole scans being scored qualitatively from 0 – 3 and a score above 2 considered as positive. We also documented SUVmax and SUVmean of the primary lesions as well as tumour to muscle ratio (TMR), tumour to blood (TBR), metabolic tumour volume (MTV) and hypoxic tumour volume (HTV).

Results: The mean age of the population was 44.65±11.43years. Twelve patients had uptake considered positive on 68Ga-Nitroimidazole PET. The median SUVmax, SUVmean, MTV, TMR, TBR of the primary tumour on 18F-FDG were 17.41, 6.78, 150.51cm3, 28.50 and 9, respectively. The median SUVmax, SUVmean, HTV, TMR, TBR on 68Ga-Nitromimidazole PET were 3.63, 1.49, 60.85cm3, 10.50 and 3.27, respectively. The areas of 68Ga-Nitroimidazole uptake in the primary lesion were smaller than the metabolic area on 18F-FDG PET, with the hypoxic subvolume as a percentage of the MTV ranging from 2% - 98% (median 37%).

Conclusion: Two-thirds of the patients demonstrated hypoxia on 68Ga-Nitroimidazole PET imaging. 68Ga-Nitroimidazole PET may play a complementary role in patients with a high index of suspicion for hypoxia.

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Theme: Innovate
Methodology: Experimental Study

Disclaimer:
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Abstract Detail
Title: ^{18}F-FDG PET/CT IN EVALUATION OF PENIS SQUAMOUS CELL CARCINOMA INGUINAL LYMPH NODE METASTASES IN HIV POSITIVE AND NEGATIVE MALES

Background:
Penis squamous cell carcinoma (PC) is rare with variable prognosis. Lymph node involvement is a major prognostic indicator. The role of 18 F- Fluorodeoxyglucose positron emission tomography/computed tomography (18 F-FDG-PET/CT) in staging PC is still uncertain. Additionally, interpretation of inguinal nodal involvement on PET/CT may be limited by HIV-associated reactive lymphadenopathy. The objective of this retrospective study was to assess the accuracy of 18 F-FDG-PET/CT in evaluating inguinal nodal metastases of PC in HIV positive men.

Methods:
Sixteen men (10 HIV positive) with PC had 18 F-FDG-PET/CT performed. Median age was 49 years (36-81). Inguinal node metastatic status was confirmed on histology or follow-up. SUVmax values of inguinal nodes were reported and correlated with metastatic status.

Results:
Five patients had PET/CT for initial staging and 11 for restaging post penectomy. In the HIV positive group, increased metabolic activity was seen in unilateral inguinal nodes in 3/10 patients, all were true-positive for metastases. Increased metabolic activity was seen in bilateral inguinal nodes in 6/10 patients, 4 were false-positive while 2 were true-positive. One patient had no increased inguinal node metabolic activity. SUVmax was not able to differentiate metastatic nodal involvement (mean=11.25) from reactive HIV-adenopathy (mean=10.16). In the HIV negative group, 5/6 patient had increased metabolic activity in inguinal lymph nodes, 1/5 was unilateral and 4/5 were bilateral. All were true-positives. One patient had no increased metabolic activity in inguinal nodes.

Conclusion:
In HIV positive patients with PC, 18 F-FDG-PET/CT may have greater value in detection of inguinal lymph node metastases when there is unilateral involvement.

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Theme: Innovate
Methodology: Experimental Study

Disclaimer:
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Abstract Detail
Title: PERFORMANCE OF [68]GA-FAPI COMPARED WITH 18 FDG PET/CT IN CERVIX CARCINOMA

Background / Aims
Cervical cancer is the fourth commonest cancer in women worldwide. The tumor microenvironment contains cancer-activated fibroblasts. The FAP inhibitor has been explored for PET imaging of cancers as 68 Ga-FAPI. The aim of this study was to explore the uptake patterns of 68 Ga-FAPI-46 in cervical cancer lesions and compare this to the current standard of care tracer for oncologic imaging, 18 F-FDG.

Methods
We prospectively recruited women with histologically confirmed cervical cancer who were referred for an 18 F-FDG PET/CT for staging or restaging to undergo an additional 68 Ga-FAPI-46 PET/CT scan. Lesion detectability and the uptake of lesions quantified by the maximum and mean standardized uptake value (SUVmax and SUVmean), FAPI tumor volume (FAPI-TV) and metabolic tumor volume (MTV) and target-to-background ratio (TBR) were compared between the two modalities.

Results
We included thirteen women with a mean age of 47.15 ±11.17 years. All patients demonstrated tracer uptake in the primary site or region of the primary for patients referred for restaging on both scans. All the patients demonstrated lymph node metastases. Five patients had distant visceral or skeletal metastases. The mean SUVmax, SUVmean, FAPI-TV and TBR of the primary lesion or local recurrence was 18.89, 6.88, 195.66cm 3 and 27.21, respectively. The mean SUVmax, SUVmean, MTV and TBR on 18 F-FDG were 13.65, 5.08, 205.48cm 3 and 23.75, respectively. In four patients, 68 Ga-FAPI PET detected additional lesions not seen on 18 F-FDG PET.

Conclusion
The findings on 68 Ga-FAPI-46 are comparable to those on 18 F-FDG PET/CT, however a third of the patients had incongruencies between the two scans (wherein Ga-FAPI-46 PET/CT outperformed [18F]FDG PET/CT).

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Theme: Collaborate
Methodology: Inter-disciplinary Study

Disclaimer:
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Abstract Detail
Title: RELATIONSHIPS BETWEEN PRE-MATCH WELL-BEING AND INTERNAL LOAD IN FEMALE HOCKEY PLAYERS DURING COMPETITION

Background:
Limited literature exists for monitoring female athletes during competition. Pre-match well-being and match-play internal load (IL) during a congested hockey tournament were investigated for 16 female players (19.9 ± 1.8 y; 163.4 ± 5.9 cm; 63.4 ± 9.4 kg).

Method:
Data collected using a smartphone application was analysed (ethics clearance #519/2019). Volunteers signed informed consent. Within-day relationships were investigated using Spearman's Rho. Changes were analysed using the Wilcoxon Signed Ranks test. Statistical significance was $p<0.05$.

Results and Discussion:
Moderate-to-large statistically significant increases occurred for motivation (21%, $p = 0.034$) and session rating of perceived exertion - sRPE (14%, $p = 0.035$) from Day 1 to mid-tournament, and for fatigue (33%, $p = 0.022$), soreness (47%, $p = 0.012$), stress (37%, $p = 0.004$), sRPE (34%, $p = 0.005$) and IL (43%, $p = 0.017$) from Day 1 to final match-play. Statistically significant moderate relationships were shown for motivation and IL on Day 1 ($r = 0.5$, $p = 0.021$), and stress and sRPE on the final day ($r = 0.5$, $p = 0.038$). The worsening of well-being over the course of competition concur with results from similar studies. On the final day, elevated stress was associated with elevated perceptions of match-play demand.

Conclusion:
Motivation levels at the beginning, and stress levels at the end of a tournament may be predictors for IL during a congested hockey tournament. Future research should consider the use of a larger sample size and biological measures of well-being and IL variables.

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Theme: Collaborate

Disclaimer:
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Abstract Detail
Title: ASSESSING A STUDENT'S KNOWLEDGE OF DENTAL MATERIALS DURING CLINICAL TEACHING AND LEARNING.

CCA has never been used to assess the competency of a student's knowledge of dental materials during clinical teaching and learning. An extensive literature search revealed that there is a gap in the literature on how to assess the competency of a student's knowledge of dental materials during clinical teaching and learning. This gap in the literature served as motivation to develop an analytic rubric to assess the competency of a student's knowledge of dental materials during clinical teaching and learning. It is the intention of this manuscript to inform dental educators how this rubric was developed and propose how it should be used.

Method :
A DOPS form was developed with a checklist consisting of five knowledge-based questions on 1) selection, 2) mixing, 3) transportation, 4) placement, and 5) the reasons for the success or failure of dental materials. The five evaluative criteria, each with its own level of performance and a score ranging from zero to four were adapted from concepts in the dental and medical literature.

Results and Discussion:
The five questions, the five evaluative criteria, their associated levels of performance and assigned scores were organized into a grid. Supervisors use the evaluative criteria to assess the competency of a student's knowledge of dental materials by allocating a CCA score during clinical teaching and learning.

Students use the evaluative criteria to assess the competency of their knowledge of dental materials by allocating a student self-assessment (SSA) score during clinical teaching and learning. Students must achieve a CCA score of 3 or 4 to be competent.

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Theme: Collaborate

Disclaimer:
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Abstract Detail
Title: RETROSPECTIVE ANALYSIS OF THE USE OF TOTAL TEMPOROMANDIBULAR JOINT REPLACEMENT

Introduction: Temporomandibular joint disorders are musculoskeletal conditions that can cause pain and disability in the head and neck. Alloplastic joints have become popular among surgeons as the prosthesis of choice in adult patients. Both patient factors and surgical experience can affect the outcomes and success of such surgery making it crucial to consider which patients are suitable for total joint replacement.

Methodology: A retrospective, cross-sectional observational study was undertaken at the Maxillofacial and oral surgery department of the University of Pretoria. The research object selection were patients diagnosed with conditions or disease affecting the TMJ.

Results: A total of 30 patients were included in the study. The mean age of patients was 39.47 (SD = 16.09). The proportion of patients with degenerative joint disease was 46.67%, post traumatic condylar deformity was 50% and congenital deformity was 3.33%. The most common indication for surgery was persistent pain refractory to other treatments (36.67%), and restricted mouth opening (26.67%). The pain improved in most patients with an initial complaint of pain and the maximal interincisal opening was deemed optimal in 70% of cases. The most common complication was facial nerve fallout (26.67%), followed by surgical site infection (10%).

Conclusions: TJR is a good modality for patients suffering from TMD and post traumatic condylar deformity regardless of age. Priority should be given to patients suffering from pain when all other options have been exhausted. Patients suffering from ankylosis should be treated early to improve quality of life.