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Faculty of Health Sciences

Research Day Abstracts

From Silos to Synergy: Transdisciplinary Science for Health Impact

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**Only the affiliation of the presenting author is included in this booklet, in the format provided by the presenter.*

ORAL PRESENTATIONS (18)

CETTI-O-01: Combined oral treatment of fluconazole plus flucytosine versus fluconazole alone for the treatment of HIV-associated cryptococcal antigenaemia: Results from the multicentre phase-3 EFFECT randomised trial

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Background: Fluconazole treatment for HIV-associated cryptococcal antigenaemia reduces risk of meningitis and death, yet mortality remains substantially higher than in CD4-matched cryptococcal antigen (CrAg)-negative individuals. We assessed whether adding flucytosine to fluconazole could reduce all-cause mortality among adults with cryptococcal antigenaemia. Methods: A phase-III open-label randomised-controlled trial conducted at 11 sites in South Africa and Tanzania. Adults living with HIV with CD4<100cells/µl and newly-diagnosed cryptococcal antigenaemia were randomised to 14 days of fluconazole (1200mg/day) plus flucytosine (100mg/kg/day)(intervention) or fluconazole alone (1200mg/day)(control). Participants were either CSF CrAg-negative or declined lumbar puncture (with no meningitis symptoms). Consolidation fluconazole (800mg/day) was administered for 8 weeks, thereafter 200mg/day. The primary endpoint was 6-month all-cause mortality. Baseline CrAg titre and semi-quantitative (SQ)-scores were available in South Africa. Results: 604 participants were included in the intention-to-treat (ITT) analysis. In the ITT analysis, 6-month all-cause mortality was 13% (40/304) in the intervention arm and 17% (50/300) in the control arm (risk ratio (RR) 0.79; 95%CI 0.54-1.16; p=0.23). Six-month all-cause mortality in the CrAg titre≥640 group was 6% (3/50) in the intervention arm and 19% (8/42) in the control arm (RR 0.32; 95%CI 0.09-1.11; p=0.07). The intervention was well tolerated with similar rates of adverse events in both arms. Conclusion: Combination treatment was not statistically superior to fluconazole. In hypothesis-driven sub-group analyses, we observed a signal of increased efficacy at higher baseline antigen concentrations. These groups could be targeted for a safe enhanced antifungal regimen in CrAg screening.

CETTI-O-02: Digital Microscopy in Practice: Evaluation of the Sysmex DI-60 in a Tertiary African Laboratory

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Background: Digital microscopy platforms such as the Sysmex DI-60 may improve efficiency and standardisation in peripheral blood smear review. However, real-world performance data in high-volume laboratories are limited, particularly in African settings. Aims: This study evaluated the DI-60 analyser in the NHLS Haematology laboratory at Chris Hani Baragwanath Academic Hospital. Methods: Morphological agreement between manual microscopy and the DI-60 was assessed in 55 routine full blood count samples. Differential count performance was further evaluated in 25 samples. Samples represented a broad range of white cell counts (1.3–84 × 10⁹/L) and included both normal and pathological cases. Analysis was performed by three pathologists and six technologists. Results: Improved alignment of reported morphological features was observed in 38.2% of samples using the DI-60. Additional abnormalities more readily detected included large platelets and right shift, both confirmed on review. Some false-positive reporting of toxic granulation occurred due to digital image characteristics. Differential count accuracy was influenced by sample features and user experience, with discrepancies more frequent in thrombocytopenic samples, those flagged for unreliable differentials, and cases with marked leukocytosis. Differential count agreement was improved in 6/25 cases, and diagnostic concordance achieved in 88% of pathological samples. Challenges included distinguishing lymphoblasts from lymphocytes and identifying abnormal plasma or lymphoma cells. Conclusion: The DI-60 demonstrated improved morphological consistency overall, but results were affected by sample characteristics and digital interpretation differences. Samples with thrombocytopenia, unreliable flags, or very high white cell counts should undergo manual review. The DI-60 shows value in high-throughput, resource-constrained laboratories requiring efficient reporting.

CETTI-O-03: Modifiable Risks for preventing neonatal deaths. Neonates with bloodstream infections in lower-tier hospitals in South Africa: a cross-sectional study
BHSc alumni

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Background: Bloodstream infections (BSI) are an important cause of neonatal deaths in low- and middle-income countries. Methods: We conducted a cross-sectional study of culture-confirmed BSI in neonates aged <28 days at six lower-tier South African hospitals (October 2019–September 2020), comparing maternal and infant characteristics between preterm and term neonates and identifying modifiable risk factors. Results: Of 907 BSI episodes, clinical data were available for 676 neonates.

Median gestational age was 33 weeks (IQR, 29–37), and 70% (472/676) were preterm. Compared with term neonates, preterm neonates had longer median hospital stays (19 vs. 11 days; p<0.001), more BSI episodes during days 3–27 of life (72% vs. 57%; p<0.001), higher maternal HIV prevalence (38% vs. 24%; p=0.001), and lower antenatal clinic attendance (86% vs. 94%; p=0.004). Crude mortality was higher among preterm than term neonates (31% vs. 8.3%; p<0.001), as was BSI-attributable mortality (death within 3 days of BSI) (21% vs. 5.4%; p<0.001). Preterm neonates had 3.7-fold higher adjusted odds of death (95% CI 1.71–8.14; p=0.001). Neonates kept nil per os (NPO) on clear intravenous fluids alone had 5.57-fold higher adjusted odds of death than fed neonates (95% CI 3.38–12.71; p<0.001). Conclusion: Preterm neonates with BSI were significantly more likely to die than term neonates. Strengthening infection prevention to reduce horizontal transmission in neonatal units, improving antenatal care to prevent preterm births and not keeping neonates NPO, could reduce BSI-related mortality.

CETTI-O-04: Outcomes of TNT in locally advanced rectal cancers at WDGMC

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Background: Total Neoadjuvant Treatment (TNT) has emerged as an alternative to surgery for locally advanced rectal cancer (LARC) aiming to improve tumour response, facilitate organ preservation, and enhance quality of life. TNT was adopted as standard care at Wits Donald Gordon Medical Centre (WDGMC) in 2022. This pilot study evaluates early outcomes of the TNT programme. Aims: To assess treatment completion, clinical response, surgical intervention rates, and outcomes in patients undergoing TNT. Disease-free survival (DFS) is the primary endpoint and organ preservation is the secondary endpoint. Methods: This retrospective study included 26 patients who received TNT between March 2022 and March 2025. Data collected included patient demographics, comorbidities, treatment regimens and completion, and clinical outcomes. Descriptive analyses were performed, and Kaplan-Meier analysis was used to estimate survival outcomes. Results: Twenty-six patients completed TNT, with a median follow up time of 1.2 years. The median age was 61 years; 58% were male, and 31% had a BMI ≥ 30. 73% of patients had a family history of cancer and 24% had severe comorbidities (CCI ≥ 5). 23/26 patients completed the full TNT regimen. Poor clinical response led to a recommendation of surgery in 42% of patients, of which only 36% underwent surgery. One-year DFS was 96% (95% CI: 73-99), 2 patients had recurrent disease (distant metastasis), and surgery-free survival (organ preservation) was 58% (95% CI: 36-75). Conclusion: TNT demonstrated high treatment completion rates, excellent one-year DFS, and organ preservation outcomes comparable to international reports. Longer follow-up is required to evaluate long-term survival and recurrence, particularly in patients managed non-operatively.

CETTI-O-05: Effects of prenatal Fluoxetine exposure on placental development in Sprague-Dawley Rats
BHSc alumni

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Background: Maternal depression during pregnancy is commonly treated with selective serotonin reuptake inhibitors (SSRIs), particularly fluoxetine. However, prenatal fluoxetine exposure has been associated with congenital anomalies such as neural tube defects. The mechanisms underlying these adverse outcomes remain poorly understood and hence the focus of this study. The placenta represents an important but underexplored probable target of SSRI-induced teratogenicity. Aims: The study aimed to investigate the effects of prenatal fluoxetine exposure on placental folate transporters, vascular regulators, and stress-response genes. Methods: Pregnant Sprague-Dawley rats were randomly assigned to a fluoxetine-treated group, a vehicle control group, or an untreated control group. On embryonic day 18, placentas were collected for quantitative PCR analysis of folate receptor alpha (FOLR1), proton-coupled folate transporter (PCFT), endothelial nitric oxide synthase (eNOS), and glucocorticoid receptor (NR3C1). Histological evaluation of the placental labyrinth zone was performed to assess vascular morphology. Results: Prenatal fluoxetine exposure did not alter the placental expression of FOLR1, PCFT, eNOS, or NR3C1. However, histological analysis revealed reduced placental capillary area, suggesting impaired placental vascular development. Conclusion: Prenatal fluoxetine exposure disrupts placental vascular architecture without producing detectable changes in the expression of key placental folate transport and stress-response genes. These findings suggest that placental dysfunction may contribute to the teratogenic effects of fluoxetine and highlight the placenta as a potential mechanistic target in SSRI-associated congenital anomalies.

CETTI-O-06: Development and validation of a rapid liquid chromatography high-resolution mass spectrometry method for pesticide screening in serum in Soweto, South Africa

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Background: Pesticide poisoning remains an important public health concern, particularly in low- and middle-income

countries where unregulated pesticide products are widely available and contribute to preventable morbidity and mortality. Rapid compound-specific identification in serum is rarely available in acute poisoning cases, and the composition of informal-market products is frequently unknown. Aims: To develop and validate a rapid targeted LC–HRMS workflow for confirmatory screening of organophosphate and carbamate pesticides in serum, and to evaluate its application to compositional characterisation of unregulated pesticide products. Methods: A targeted LC–HRMS method was developed using accurate mass, retention time agreement, and qualifier-ion presence as confirmation criteria. The method was evaluated in matrix-matched rodent serum and solution across 100–1000 ng mL^{-1} and subsequently applied to seven unregulated pesticide products obtained from informal sources in Soweto, South Africa. Results: Of 44 candidate compounds, 37 were retained in the final screening panel, with all 37 confirmed at 750 ng mL^{-1} or above. Quantitative performance met predefined reporting criteria for most analytes, although selected compounds required higher reporting limits of quantification where confirmation criteria were not met at the lowest calibration level. Freeze-thaw assessment showed stability for most analytes, with compound-dependent variability observed. Application to unregulated pesticide products identified multiple pesticidal compounds, including organophosphates, carbamates, and piperonyl butoxide. Conclusion: This targeted LC–HRMS workflow provides a practical, rapid framework for confirmatory pesticide screening in serum and compositional characterisation of unregulated pesticide products. This method may support clinical toxicology, forensic investigations, and public health surveillance in resource-limited settings where access to compound-specific analytical confirmation is limited.

CETTI-O-07: Development of a method for simultaneous quantification of anti-tuberculosis drugs using liquid chromatography-tandem mass spectrometry (LC-MS/MS).
BHSc alumni

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Background: Therapeutic drug monitoring (TDM) optimises drug dosing by measuring plasma drug concentrations to maximise efficacy while minimising toxicity. Despite its established role in several therapeutic areas, TDM is not routinely applied to anti-tuberculosis (TB) therapy, partly due to a lack of efficient analytical methods. Subtherapeutic plasma concentrations of first-line anti-TB drugs may contribute to poor treatment outcomes in patients with drug-susceptible TB. Aims: To develop and validate an LC-MS/MS method to simultaneously quantify four first-line anti-TB drugs; isoniazid, rifampicin, ethambutol, and pyrazinamide in plasma for TDM applications. Methods: Chromatographic separation was achieved using a Fortis SpeedCore Diphenyl analytical column with gradient elution consisting of 5mM ammonium formate in water (mobile phase A) and acetonitrile containing 2mM ammonium formate and 0.01% formic acid (mobile phase B). Analysis was completed at a flow rate of 0.25mL/min and an injection volume of 1µL. Detection was performed on a Sciex 5500 Triple Quadrupole LC-MS/MS system operating in positive ion mode. Results: A cost-effective method enabling simultaneous quantification of isoniazid, ethambutol, pyrazinamide, and rifampicin was successfully developed. Lower limits of quantification were 0.1µg/mL for isoniazid and ethambutol, 1.0µg/mL for pyrazinamide, and 0.75µg/mL for rifampicin. Bias was <5% for all analytes except pyrazinamide (6.8% at medium control level), while imprecision remained <10% across all analytes. Conclusion: The method met Food and Drug Administration (FDA) bioanalytical validation criteria, demonstrating acceptable accuracy and precision. The method is suitable for plasma analysis in TB patients and provides a practical platform for implementing TDM to improve TB treatment outcomes, support dose optimization, and prevent resistance.

CETTI-O-08: Exploring Polydopamine as a Novel Nanocarrier Platform for BCNU Delivery in Glioblastoma: A Head-to-Head Comparison with Liposomal and Polymeric Systems

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Background: GBM is the most aggressive primary CNS malignancy in adults, with a median survival of ~15 months despite multimodal therapy.1 Locally implanted BCNU wafers circumvent systemic limitations but add only ~3 months' survival, as BCNU's lipophilicity and hydrolytic instability restrict CNS effective penetration. Aims: This study developed and characterised three BCNU-loaded nanoformulations – PEGylated liposomes, Poloxamer 188-stabilised PLGA and PEGylated polydopamine (PDA) NCs – to meet CNS-specific size, surface charge and biocompatibility criteria. Methods: PEGylated liposomes were prepared via thin-film hydration, Polox-PLGA by nano-precipitation and PEG-PDA via oxidative self-polymerisation of dopamine with mPEG-SH conjugation. Formulations were lyophilised and characterised for size, zeta potential, morphology (SEM), thermal behaviour (DSC/TGA), chemical structure (FTIR/XRD), %EE, %DLC and 7-day colloidal stability in artificial CSF. Results: All formulations achieved CNS-optimised diameters (81-83 nm), low PDIs (0.13-0.22) and negative zeta potentials (-24.10 to -32.07 mV), within brain-penetration thresholds. SEM revealed spherical liposomes and PEG-PDA but a porous Polox-PLGA matrix; FTIR confirmed PEGylation and BCNU encapsulation. %EE/%DLC were highest for BCNU-PEG-Liposomes (78.21%; 10.24%), then BCNU-PEG-PDA (51.36%; 7.47%) and BCNU-Polox-PLGA (46.43%; 3.54%). In aCSF, PEG-PDA was most stable (83-94 nm over 7 days), liposomes grew moderately (~195 nm) and Polox-PLGA aggregated severely (>3000 nm) within 5 days. Conclusion: Three nanoplatforms were developed, with BCNU-PEG-PDA showing the most favourable physicochemical and stability profile. In vitro release, MTT cytotoxicity and in vivo studies are ongoing to select the optimal formulation for clinical translation. By stabilising

BCNU within CNS-optimised nanoformulations, these platforms could overcome current wafer limitations and offer a more durable local nanotherapeutic for GBM.

CETTI-O-09: Comparative effectiveness of antidiabetic drug classes on glycaemic control and vascular complications in adults with type 2 diabetes: A systematic review

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Background: Type 2 diabetes mellitus (T2DM) affects an estimated 462 million individuals globally and is a major contributor to morbidity and mortality. Chronic hyperglycaemia increases the risk of cardiovascular and microvascular complications, making effective glycaemic control essential. Although multiple antidiabetic drug classes are available, their effects on both glycaemic control and cardiovascular outcomes remain unclear. Aims: The aim of the study was to evaluate the effects of antidiabetic drug classes on glycaemic control and cardiovascular outcomes in adults with T2DM. Methods: A systematic review and meta-analysis of randomised controlled trials was conducted using PubMed, Web of Science and Scopus. The risk of bias assessment and meta-analyses were performed using the Joanna Briggs Institute (JBI) SUMARI software. Mean differences with 95% confidence intervals were calculated for glycaemic control and relative risks for vascular outcomes. Heterogeneity was assessed using I^2 and Chi-square tests. Results: Forty-eight studies were included, with 35 in meta-analyses. The GLP-1 receptor agonists (GLP-1 RAs), SGLT-2 inhibitors and DPP-4 inhibitors significantly reduced HbA1c, highlighting improved glycaemic control. Additionally, the GLP-1 RAs reduced myocardial infarction, stroke and cardiovascular death 0.89). The SGLT-2 inhibitors reduced cardiovascular death and heart failure hospitalisation. Both GLP-1 RAs and SGLT-2 inhibitors also improved renal outcomes. The DPP-4 inhibitors showed no significant cardiorenal benefit and evidence for other classes was limited. Conclusion: The results indicated that GLP-1 RAs and SGLT-2 inhibitors provide the greatest cardiorenal benefits in addition to glycaemic control. These findings support prioritizing GLP-1 RAs and SGLT-2 inhibitors in T2DM management to reduce cardiovascular and renal risk, informing clinical guidelines and therapeutic decision-making.

CETTI-O-10: The effect of Novel Copper Complexes on a pancreatic cancer cell line and the expression of P-glycoprotein.
BHSc alumni

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Background: Pancreatic cancer, the 13th most prevalent cancer, the 7th most common cause of death worldwide, and responds poorly to treatment, with therapy resistance posing a significant clinical challenge. High activity and expression of P-glycoprotein (P-gp) plays a major role in clinical drug resistance in cancer. One proposed mechanism of combating P-gp induced resistance is the use of P-gp inhibitors that decrease the expression of P-gp. Copper complexes are currently being investigated as potential anticancer agents, given their ability to induce apoptosis and modulate P-gp expression in cancer cell lines. Aims: This study aimed to investigate how P-gp expression in MIAPaCa2 pancreatic cancer cells is impacted by four novel copper complexes, namely AD3, OM, L1Cu, and L6Cu. Methods: An MTT assay was performed to determine the IC_{50} values of the copper complexes. Fluorescence microscopy was used to evaluate the effects of the copper complexes on cell morphology, and immunofluorescence microscopy was employed to determine their effects on the expression of P-glycoprotein. Results: MIAPaCa2 cells were sensitive to the copper complexes, and the copper complexes were more active and exhibited higher cytotoxicity than Doxorubicin. The MIAPaCa2 cells treated with the test compounds caused the formation of apparent apoptotic features. The copper complexes inhibited the induction of P-gp expression in the treated MIAPaCa2 cells. Conclusion: and Implications The ability of the copper complexes to increase cytotoxicity, induce apoptosis and inhibit the induction of P-gp expression in MIAPaCa2 cells indicates that copper complexes could potentially be developed for the treatment of pancreatic cancer.

CETTI-O-11: Impact of antenatal screening for Chlamydia and Gonorrhea on pregnancy outcomes in South African women

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Background: We evaluated the impact of diagnosing and treating curable sexually transmitted infections (STIs) during pregnancy on adverse outcomes in Cape Town, South Africa. Methods: Women aged >15 years without HIV, attending first antenatal care (ANC) visit before 28 weeks' gestation, were enrolled. Participants were tested for Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (NG) using either on-site GeneXpert or laboratory-based diagnostic testing. Women received either immediate (≤7 days), delayed treatment or remained untreated during pregnancy. We assessed CT/NG prevalence, time to

treatment and poor pregnancy outcomes (individual and composite outcomes). Logistic regression evaluated the association between time to treatment and poor pregnancy outcomes, adjusting for maternal characteristics. Results: Among 1,237 women, CT/NG prevalence at first ANC visit was 28% (24% CT; 8% NG). Of 345 women with CT/NG, 54% received immediate treatment, 34% delayed treatment (median 28 days; IQR 15–57), and 12% remained untreated. Miscarriage (12%) and stillbirth (9%) were most frequent among untreated women, compared to delayed (4% and 3%) and immediate treatment (1% and 2%). Composite adverse outcomes occurred in 28%, 23%, and 29% of women with immediate, delayed, and no treatment, respectively, compared to 22% in women without CT/NG at enrolment (p=0.05). Untreated CT/NG was associated with increased odds of pregnancy loss compared to immediate treatment (adjusted odds ratio (aOR) 3.27; 95% CI 1.09–9.80) and no infection (aOR 5.05; 95% CI 2.23–11.43). Conclusion: Untreated CT/NG during pregnancy increased the risk of pregnancy loss. These findings suggest potential benefits of STI screening with prompt treatment to improve pregnancy outcomes, and need for randomized trials to clarify these effects.

CETTI-O-12: Development and optimisation of pediatric nano-formulations for multidrug-resistant tuberculosis treatment

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Background: The scarcity of age-appropriate formulations for paediatric oral treatment of multidrug-resistant tuberculosis is a critical, ongoing issue that requires urgent solutions. Developing scientifically sound formulations helps end reliance on the manipulation of adult formulations for paediatric use. Aims: and Objectives: This research aimed to optimise paediatric formulations of bedaquiline, clofazimine, linezolid, and moxifloxacin using a Self-Microemulsifying Drug Delivery System (SMEDDS) and to compare their characterisations with those of extemporaneous preparations. Methods: Each MDR-TB drug was formulated as an extemporaneous preparation using simple syrup, and two formulations were developed as Self-Micro-Emulsifying Drug Delivery Systems using excipients and compositions informed by solubility testing and ternary diagrams. The formulations were characterised by determining particle size, polydispersity index (PDI), zeta potential, morphology, turbidity, drug concentration, and in vitro drug dissolution over a 90-day stability study. Results: Extemporaneous preparations contained residues, whereas SMEDDS had uniform particle sizes. The drug content was below 90% on day 30 for extemporaneous preparations, compared with SMEDDS. SMEDDS showed droplet sizes below 200nm, variable zeta potential, PDI below 0.300, and a single peak in the droplet size distribution. Extemporaneous formulations showed particle sizes greater than 200nm, zeta potential less than ±30 mV, PDI above 0.300, and multiple particle-size peaks. SMEDDS exhibited sedimentation, creaming, and flocculation, whereas the extemporaneous formulation showed particle aggregation. During morphology analysis, SMEDDS appeared spherical, whereas the extemporaneous preparation showed variation in shape and size. Conclusion: SMEDDS offers a sophisticated approach to increasing bioavailability and enhancing the stability of child-friendly formulations. The findings underscore the importance of adopting a multifaceted approach to patient care.

CETTI-O-13: Beyond Viral Suppression: A Narrative Review and pragmatic approach to immuno-virological discordance in HIV

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Background: Despite sustained virological suppression on antiretroviral therapy (ART), a substantial proportion of people living with HIV fail to achieve adequate CD4 cell count recovery, a phenomenon known as immuno-virological discordance (IVD). IVD is associated with increased risks of AIDS-related and non-AIDS morbidity and mortality, yet universally accepted definitions and practical management guidelines remain lacking. Aims: To synthesise the current evidence on IVD and propose a pragmatic, resource-appropriate framework for its definition, evaluation, investigation, and management. Methods: A narrative review was conducted using PubMed, Scopus, Web of Science, and the Cochrane Library. Original studies, systematic reviews, meta-analyses, clinical guidelines, and key reference lists were reviewed. Evidence relating to definitions, epidemiology, mechanisms, risk factors, clinical outcomes, and management strategies was narratively synthesised to develop a practical clinical approach. Results: IVD definitions varied considerably across the literature. A pragmatic definition based on persistent CD4 cell count <200 cells/μL despite ≥12 months of sustained virological suppression is proposed, alongside two clinically relevant phenotypes. Major contributors include impaired immune regeneration, persistent immune activation, chronic co-infections, medication-related immunosuppression, metabolic and nutritional disorders, bone marrow dysfunction, psychosocial factors, and structural barriers to care. A five-step clinical framework was developed to guide confirmation of true discordance, identification of reversible contributors, targeted investigations, evidence-informed management, and appropriate referral. Conclusion: IVD remains an important yet under-recognised complication of treated HIV. Standardised definitions and a structured clinical approach may improve recognition and facilitate targeted management in routine practice. This pragmatic framework provides clinicians, particularly in resource-limited settings, with an implementable approach to evaluating and managing IVD while highlighting priorities for future research and guideline development.

CETTI-O-14: Anti-drug antibody assay (ADA) testing in the CAPRISA 012B clinical trial excludes ADA as a mechanism for loss of neutralization of passively immunized CAP256V2LS

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Background: Passive immunisation with broadly neutralizing antibodies (bNAbs) is a promising HIV-1 prevention strategy but may be impacted by anti-drug antibodies (ADA). In the CAPRISA 012B trial, participants received CAP256V2LS, a potent V2-apex-directed bNAb. Despite stable pharmacokinetics (PK), CAP256V2LS neutralization activity declined post-administration, suggesting ADA as a potential cause. Aims: We aimed to determine whether ADA caused the decline in CAP256V2LS neutralization. To do this, we optimised an ADA assay using plasma spiked with an anti-idiotypic (ID) antibody, measured ADA activity in participant plasma samples and assessed if repeated bNAb administrations increased anti-ID levels. Methods: ADA was measured using a modified neutralization assay, quantifying the ability of anti-ID antibodies in plasma to block CAP256V2LS activity. The assay was optimised with spiked plasma. Following optimisation, 330 longitudinal plasma samples from 24 participants receiving 5, 10, or 20 mg/kg CAP256V2LS were tested. ADA titers were expressed as ID50 values, defined as the reciprocal dilution at which anti-IDs reduced neutralization by 50%. Results: The optimised assay did not show any non-specific reactivity in unspiked plasma or samples spiked with unrelated anti-ID antibodies. Spiked CAP256V2LS plasma displayed dose-dependent responses. ADA screening of all CAPRISA 012B samples revealed no measurable anti-ID activity in any participant, regardless of dose or number of administrations. Conclusion: Mechanisms beyond ADA contribute to the in vivo loss of CAP256V2LS neutralization in CAPRISA 012B participants. These findings direct future studies toward alternative causes for CAP256V2LS neutralizing activity loss such as structural instability and support advancing long-acting bNAbs for HIV-1 prevention.

CETTI-O-15: Distinct Evolutionary Pathways towards Fc Effector Function and Neutralization within an HIV-Specific Antibody Lineage
BHSc alumni

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Background: While neutralization and Fc effector functions are often evaluated independently, a successful HIV vaccine will likely require induction of antibodies with a polyfunctional profile. Whether the ontogeny of neutralization and Fc effector functions is similar is unknown and important for vaccine development. Aims: and objectives We compared evolution between neutralization and Fc effector functions in the well-defined HIV-directed CAP88-CH06 antibody lineage. Methods: We tested polyfunctionality of 21 CAP88-CH06 lineage antibodies isolated 8-108 weeks post infection, measuring binding capacity, neutralization activity, CD16 signalling, antibody dependent complement deposition (ADCD), cellular phagocytosis (ADCP) and neutrophil phagocytosis (ADNP). Antibodies were assayed against 7 autologous gp120 proteins, 7 env-pseudo typed viruses and 6 viral mutants from multiple time points. Results: Neutralization and Fc effector functions evolved via distinct pathways, with potent ADCP elicited by early less mature antibodies, whereas complement deposition, CD16-signalling and neutralization potency were associated with increased somatic hypermutation (SHM) in late-infection antibodies. Phylogenetic analysis of the antibody variable regions revealed two distinct clusters distinguished by differential ADCP potency. Chimeras between H7 (potent ADCP) and CH06 (weak ADCP) antibodies revealed complementarity-determining-region 1 (CDRH1) was critical for ADCP function. Viral escape mutations differentially impacted antibody functions, with E343K resulting in complete escape from neutralization activity but having no effect on ADCP by early antibody intermediates. Conclusion: Neutralization and Fc effector functions evolve through distinct pathways, shaped by different antibody variable region mutations and viral escape mechanisms. Understanding divergent evolutionary pathways of polyfunctional antibodies will enable rational vaccine design targeting both arms of antibody-mediated immunity.

CETTI-O-16: Beyond the Clinic: Implementing Tuberculosis Tongue Swab Screening Across Diverse Community Settings

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Background: Tuberculosis (TB) remains a major global public health challenge. The World Health Organisation's 2026 recommendation of tongue swab testing offers an opportunity to expand TB screening through simple, non-invasive specimens that can be collected outside traditional healthcare facilities. Evidence on its implementation in community settings remains limited. Aims: To describe participant demographics and geographies where the ACT-TB study implemented tongue swab-based TB screening across multiple community outreach settings. Methods: A mixed-methods study enrolled adults aged ≥18 years with access to a mobile phone from taxi ranks, malls, informal settlements, shopping centres, workplaces, and colleges. Eligible participants provided informed consent, agreed to self-collect a tongue swab, and were not receiving TB treatment. Demographic and symptom data were collected using a standardised questionnaire. Descriptive statistics were used to describe demographics and screening geographies. Results: A total of 5,750 participants were enrolled, with a mean age of 39(38-49) years. Most were female, 3507/5750(61%), 577/5750(10%) reported previous TB, and 623/5750 (11%) were living with HIV,

of whom 572/623(92%) were on ART. TB screening uptake was highest at community 1907/5750(33%), workplaces 1601/5750(28%) and shopping centres 1419/5570(25%), followed by universities 419/5750(7%), soccer tournament 262/5750(5%) informal settlements 142/5570(2%). Of the 5,750 participants enrolled, 5,672 (99%) had a swab tested, resulting in 51 (1%) TB-positivity across all cohorts. Conclusion: Tongue swab TB screening was feasible across diverse community outreach settings and achieved broad population coverage, particularly in community, workplaces and retail. These findings support implementing tongue swab screening in community settings to enhance access to TB screening and strengthen active case-finding in high-burden communities

CETTI-O-17: Immunogenicity testing of conventional and self-amplifying HIV mRNA vaccines

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Background: Conventional mRNA-based platforms have been adapted for HIV vaccine design with the aim of eliciting broadly neutralizing antibodies (bNAbs). The self-amplifying RNA (saRNA) platform may improve this approach through sustained immunogen expression. Aims: The aim of this study was to test the immunogenicity of conventional mRNA and saRNA HIV vaccines in rabbits. Vaccines were based on the HIV Envelope (Env) from CAPRISA donor CAP256, who developed bNAbs targeting the V2/apex epitope. Methods: The rabbits were immunized with either mRNA encoding CAP256 Env and Gag proteins or an saRNA-based CAP256 Env and Gag vaccine. The immunogens were administered at 0, 8, 16 and 24 weeks. Immunogenicity was assessed using rabbit sera in an enzyme-linked immunosorbent assay and pseudovirus-based neutralization assay. Results: Vaccination elicited binding and neutralizing antibodies which were detectable from week 10 post-vaccination in both groups and responses were sustained up to week 26. Rabbits who received the saRNA version mounted binding responses faster than the conventional mRNA group but the neutralizing responses only targeted an easy-to-neutralize virus and not the immunogen-matched strain. Mutations in the V2/apex region reduced the binding responses by up to 3-fold and the neutralizing antibody response by up to 2-fold in rabbits who received the conventional mRNA suggesting V2/apex specificity. Conclusion: Conventional mRNA vaccination induced neutralizing antibodies directed at the V2/apex, whereas the saRNA vaccine regimen only elicited weakly neutralizing antibodies. The conventional mRNA platform elicits robust, sustained and targeted anti-HIV antibody responses. However, the saRNA platform requires further optimization.

CETTI-O-18: Simulation-Based Training for Delivering Bad News in Head and Neck Cancer Care

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Head and neck cancer care requires both technical and counselling skills because treatment causes permanent changes to voice, breathing and appearance that affect identity and social participation. Undergraduate speech-language pathology programmes prioritise biomedical content over training in difficult conversations, leaving graduates underprepared for emotionally complex clinical encounters. This study explored how a structured counselling exercise embedded in a final-year head and neck cancer module supports development of counselling competencies and readiness for clinical practice. A qualitative, exploratory design involved the full cohort of final-year speech-language pathology students. Participants engaged in a preoperative total laryngectomy counselling simulation using the SPIKES protocol with a patient and family member; students also role-played the patient. Data sources included video recordings, debrief discussions, and facilitator reflections. Thematic analysis following Braun and Clarke identified patterns in verbal and nonverbal counselling behaviours, emotional responsiveness, and reflective learning. Results: indicated that theoretical grounding was necessary for effective counselling. Core skill themes were acknowledging and reaffirming the patient, managing timing and amount of information, and using reflective responses. A novel finding was the intensity of emotions elicited in students and the need to regulate both patient and self-emotion. Role-playing the patient enhanced perspective taking and possible nfluence future practice. Participants emphasised creating a safe space to support empathic communication when delivering bad news. Conclusion: Structured SPIKES-based simulation showed emerging evidence that it strengthened students' ability to deliver news and heightened empathy and improved communication. The implication is the use of this for use in interprofessional education and other healthcare professional training modules.

POSTER PRESENTATIONS (109)

CETTI-P-01: Forensic psychiatric outcomes of adult male defendants charged with minor offences: single outpatient versus inpatient observations at Sterkfontein Hospital
BHSc alumni

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Background: Sections 77 and 78 of the Criminal Procedure Act (CPA) deal with fitness to stand trial and criminal

responsibility for an accused charged with an offence. If mental illness or intellectual disability (ID) is questioned, a court-ordered 30-day inpatient psychiatric observation usually takes place. However, minor offences may be conducted in a single outpatient interview. Advantages and disadvantages exist for each method. The outpatient system was introduced for minor offences at Sterkfontein Hospital (SFH) between 2010 and 2017, due to increasing referrals from courts. The success of this system is based on sound conclusions on matters of fitness and criminal responsibility. This study aimed to compare the forensic outcomes of minor offences utilising inpatient and outpatient observation methods. Methods: A retrospective analysis was conducted, using records of inpatient and outpatient adult males between 2010 and 2017 at SFH. Clinical, conversion (from outpatient to inpatient) and forensic data were obtained from CPA reports and hospital records. Results: 482 inpatient and 256 outpatient records were obtained (total 738). Following observation, significantly more outpatients (89.8%) than inpatients (73%) were found to have a mental illness/ID ($\chi^2 = 5.77$, df = 1, p = 0.016). However, neither fitness nor criminal responsibility differed significantly between the groups. Conclusion: The higher prevalence of mental illness in outpatients following observation maybe due to more of them having pre-existing mental illnesses and their higher prevalence of substance use prior to observation. The outcomes of fitness and responsibility between inpatients and outpatients show similar findings, thereby supporting increased utilisation of the resource-conserving outpatient observation method.

CETTI-P-02: The use of cognitive interviews in validating questionnaires in a head and neck multidisciplinary study

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Background: The use of questionnaires as data collection tools is often preferred by researchers, mainly because of their ease of use and cost effectiveness. The validation of new questionnaires can be challenging; cognitive interviews are one of the methods used and were used in this study. Aims: The aim was to use cognitive interviews to establish how the participants perceived and interpreted the questions in their discipline specific questionnaires and to address the problematic areas therefore improving the questionnaires' content validity. Methods: The participants were from the specialties of Ear Nose and Throat surgery, Plastic and Reconstructive surgery, Maxillofacial and Oral surgery, Ophthalmology and Prosthodontics. It also included Dental Technicians/Technologists. Each group, represented by four or five participants, was interviewed using a questionnaire designed specifically for their specialty. In total, twenty-six participants were interviewed, and the 'think aloud' and 'concurrent probing' methods were used. Results: The number of items in the six questionnaires ranged from thirty to thirty-nine. Participants found some items in the questionnaires to be unclear, confusing or difficult to respond to or to recall the required information. These were classified as problems of understanding, retrieval, and response formatting. All the problematic items were revised, and the questionnaires could then be used on an online platform. Conclusion: Cognitive interviews proved to be very valuable in the validation process of the questionnaires in this study and the pretesting allowed for the acceptable use of the questionnaires on an online platform.

CETTI-P-03: Enablers and Barriers of Effective Perioperative Teamwork: a Narrative Review

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Background: Effective teamwork leads to improved clinical outcomes and greater professional satisfaction. Nontechnical skills play an essential role in forming effective teams. Aims: To provide a comprehensive overview of the factors that influence effective perioperative teamwork, including key enablers and barriers, with a focus on non-technical skills and organisational factors. Operating theatre. Methods: A targeted literature search was conducted across the following databases: PubMed, Scopus, Web of Science and Cochrane. The focus was on studies related to teamwork and the factors influencing its effectiveness. Results: Seven key determinants that influence effective teamwork were identified. Leadership, communication, situational awareness and shared mental models work together to create a psychologically safe environment. This environment can be affected by organisational culture, stress and fatigue. Each factor has enablers and barriers that influence effective perioperative teamwork. Conclusion: Although the factors influencing teamwork are well documented in the literature, teamwork as a core value in healthcare is frequently overlooked. Simulation and training programs for developing these skills are often neglected. The enablers of effective teamwork should be promoted, and the barriers should be overcome. Contribution Understanding that teamwork is a core value in medicine, enablers and barriers can be addressed by enhancing ongoing non-technical skills training throughout a medical career.

CETTI-P-04: The knowledge, attitudes, and practices of surgeons regarding compliance with the prescription of antibiotics as surgical prophylaxis at a tertiary hospital in Johannesburg, South Africa.

Ebenezer Hammond*, *Sarah Stacey, Mahavishnu Moodley, Stephanie Leigh*

*School of Therapeutic Sciences

Background: Surgical site infections (SSIs) are common yet largely preventable complications that contribute significantly to morbidity, mortality, and healthcare costs. Surgical antibiotic prophylaxis (SAP) reduces SSI risk; however, its effectiveness

depends on adherence to guideline recommendations. Aims: To evaluate surgeon's knowledge, attitudes, and compliance with SAP guidelines at a South African tertiary hospital and identify factors influencing prescribing practices. Methods: A mixed-methods study was conducted in the cardiothoracic, orthopaedic, obstetrics and gynaecology, and general surgery departments. Seventy surgeons completed a knowledge questionnaire, ten participated in semi-structured interviews, and compliance was assessed through retrospective review of 1,021 surgical cases against the South African Society of Anaesthesiologists (SASA) and Standard Treatment Guidelines (STG) recommendations. Results: Surgeons demonstrated moderate SAP knowledge (mean score: 50.6%), with gaps in operational prescribing domains. Although attitudes were generally positive, prescribing practices were influenced by routine behaviour, hierarchy, and departmental culture. Adherence was high indication (SASA 94.1%; STG 94.2%), timing (84.8%; 84.8%), route (97.6%; 97.6%), and number of doses (94.8%; 94.8%). Lower adherence was observed for antibiotic choice (66.4%; 58.3%), dose (61.5%; 56.3%), and duration (71.1%; 52.5%). Overall compliance was sub-optimal and varied by guideline framework (37.6%; 20.1%) and surgical department. Conclusion: Moderate knowledge and positive attitudes did not consistently translate into guideline-compliant SAP practices. Prescribing behaviour was influenced by knowledge gaps, clinical culture, variable guideline interpretation, and systemic constraints. Targeted education, harmonised locally relevant guidelines, strengthened antimicrobial stewardship, regular audit and feedback, and improved system-level support are needed to improve SAP compliance and optimise antibiotic use in surgical practice.

CETTI-P-05: Early Mortality in Hodgkin Lymphoma: A Hyperinflammatory Phenotype Suggestive of Haemophagocytic Lymphohistiocytosis

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Background: Classical Hodgkin lymphoma (cHL) in the South African public sector is frequently associated with advanced disease, HIV infection, and poor outcomes. Early mortality remains a significant challenge, often occurring before definitive therapy can provide clinical benefit. This study aimed to identify the clinical and laboratory features associated with early mortality in newly diagnosed cHL. Methods: A prospective cohort of 25 consecutive patients with newly diagnosed cHL was enrolled over seven months at Chris Hani Baragwanath Academic Hospital. Baseline demographic, clinical, pathological, and laboratory data were collected. Patients were stratified according to early mortality, defined as death within three months of diagnosis. Comparative analyses focused on clinical presentation, cytopenias, inflammatory markers, and bone marrow involvement. Results: Early mortality occurred in 20% (5/25) of patients. All patients in the early mortality group were HIV-positive, presented with B-symptoms, and had bone marrow involvement by lymphoma. Clinically apparent lymphadenopathy was uncommon in this subgroup. Compared with survivors, these patients demonstrated severe cytopenias, including profound anaemia, thrombocytopenia, leucopenia, and lymphopenia. Markers of systemic inflammation were markedly elevated, including ferritin and triglyceride levels, and hypoalbuminaemia was more pronounced. Bone marrow biopsies showed universal Epstein–Barr virus-encoded RNA (EBER) positivity. H-scores ranged from 226 to 266, supporting the presence of a significant hyperinflammatory state. Conclusion: Early mortality in cHL was concentrated among young HIV-positive patients with marrow-predominant disease, severe cytopenias, and marked hyperinflammation. This constellation of findings is suggestive of secondary haemophagocytic lymphohistiocytosis, with EBV co-infection potentially acting as a co-driver. Recognition of this high-risk phenotype may facilitate earlier diagnosis and intervention. Future studies incorporating soluble IL-2 receptor measurement will further evaluate the contribution.

CETTI-P-06: Emergency Nurses' Disaster Preparedness Competencies: A Focused Mapping Synthesis Review

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*School of Therapeutic Sciences

Background: Emergency nurses are at the front line of a health institution and are deemed competent to manage various situations, with disaster being one of them. Preparing for disaster is crucial as it eliminates delays in providing care in situations that would be abnormal in the daily running of an emergency department and ultimately reduces the number of fatalities. Thus, emergency nurses are expected to be prepared and manage such an occurrence diligently. Aims: To identify emergency nurses' disaster preparedness competencies Methods: Articles published between 2006 – 2022 were searched utilising 'Emergency nurses disaster competencies, disaster nursing, disaster nursing competencies, and 'disaster nurses' preparedness' as keywords in databases such as SCOPUS, Sabinet, EBSCO host, ProQuest, PubMed, and Google Scholar. From articles that met the inclusion criteria, data were extracted onto an extraction table where themes were developed. Results: Thirty-eight articles were identified after duplicates were removed from 323 articles, however, 15 articles were included following an abstract review and full-text download. Communication, incident management, safety and security, preparedness, and planning are the identified integral domains within other identified domains. Conclusion: The review outlined competencies that are important for emergency nurses' disaster preparation and management. Integrating these competencies in disaster plans, policies and procedures, and continuous education and training of emergency nurses will grant nurses confidence in preparing for and managing a disaster occurrence. Implication: This review will additionally provide disaster preparedness and management knowledge and skills for emergency nurses and influence education and training for undergraduates and postgraduate nursing students curricula.

CETTI-P-07: Investigating the Prevalence and Morphological Characteristics of the Third Layer (Coronoid Part) of the Masseter Muscle in a Select South African Cadaveric Population
BHSc alumni

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Background: The masseter muscle is traditionally described as consisting of superficial and deep layers; however, recent anatomical evidence suggests the existence of a third layer associated with the coronoid process of the mandible. This layer, termed the "coronoid part" of the masseter muscle, remains inconsistently described and has not been investigated in a South African population. Aims: The aim of this study was to determine the presence and morphological characteristics of the coronoid part in a South African population. Methods: A cadaveric study was conducted on 50 embalmed adult body donors (25 male, 25 female) from the University of the Witwatersrand. Standardised macroscopic dissections were performed bilaterally to expose the masseter muscle layers, and the presence of the coronoid part was assessed. Morphometric measurements of muscle length, width and thickness were obtained for the superficial, deep and coronoid layers. Statistical analyses were performed to assess bilateral symmetry, comparative differences and sex-based variation. Results: The coronoid part was identified bilaterally in all individuals, demonstrating a 100% prevalence. It was located deep and medial to the deep layer, enveloped by a distinct fascial sheath and exhibited fibres oriented diagonally. Morphometric analysis revealed that the coronoid part was significantly smaller than the superficial and deep layers. No significant left-right asymmetry was observed, while males demonstrated greater morphometric values across most parameters. Conclusion: These findings provide strong anatomical evidence supporting the coronoid part as a distinct and consistent part of the masseter muscle in a South African population, warranting its inclusion in anatomical descriptions and consideration in clinical practice.

CETTI-P-08: Experiences and motivations to use long-acting cabotegravir (CAB-LA) among pregnant and breastfeeding women accessing primary healthcare settings in South Africa: a qualitative study

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Background: Pregnant and breastfeeding women (PBW) are at heightened risk of HIV, increasing the risk of vertical transmission. The South African Health Products Regulatory Authority (SAHPRA) has approved long-acting cabotegravir (CAB-LA), lenacapavir, and oral PrEP for use among PBW. Injectable PrEP can overcome challenges with daily pill-taking and stigma, supporting improved PrEP use. We explored experiences of CAB-LA use among PBW accessing South African clinics to inform real-world implementation of lenacapavir. Methods: Individuals ≥15 years enrolled in a parent cohort who had ever used CAB-LA were purposefully invited for in-depth interviews. Between June and July 2025, 70 interviews were conducted across six sites in South Africa; 11 (16%) were with PBW (20–41 years) and constituted this sub-analysis. Interviews explored motivations for CAB-LA uptake and challenges in pregnancy and breastfeeding, and were conducted in private settings, audio-recorded, transcribed, and analysed thematically. Results: Motivations for using CAB-LA were multifaceted, including easier adherence, long-term protection, previous oral PrEP side effects, encouragement, CAB-LA safety counselling, and reduced stigma. Some women experienced injection-site reactions, and concerns about CAB-LA safety for the foetus were noted. Nonetheless, most (82%; n=9) continued CAB-LA, driven by reassurance of its safety, absence of side effects, and perceived efficacy. Reasons for discontinuing CAB-LA included misinformation from non-study healthcare providers concerning its safety during pregnancy and misalignment between antenatal and CAB-LA visits. Conclusion: PBW described multiple factors influencing CAB-LA use in real-world settings. Our findings can inform lenacapavir rollout in antenatal settings by strengthening counselling and provider training on its safety and use in pregnancy to support uptake and use.

CETTI-P-09: Interprofessional training for undergraduate rehabilitation therapy students at the University of the Witwatersrand enhancing cancer rehabilitation in South Africa

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Background: The national cancer strategy emphasises collaborative, team-based rehabilitation to improve patient outcomes. Interprofessional engagement is central to effective cancer care; however, undergraduate exposure to oncology and team-based practice remains limited. Embedding authentic interprofessional education (IPE) within training may strengthen readiness for collaborative clinical practice. Aims: To evaluate final-year rehabilitation students' interprofessional competency development and explore their experiences of an authentic, patient-centred IPE intervention in cancer rehabilitation. Methods: A cross-sectional mixed-methods study was conducted with final-year physiotherapy, occupational therapy, and speech-language pathology students following an IPE session involving a cancer survivor. Quantitative data were collected using the Interprofessional Education Collaborative (IPEC) competency framework via REDCap, and qualitative data were obtained from open-ended responses. Results: Of 140 eligible students, 64 participated. High levels of agreement were reported across

all IPEC domains, with the strongest outcomes in teamwork. Qualitative analysis identified three themes: enhanced understanding of professional roles, development of collaborative teamwork, and the value of authentic learning experiences. Engagement with a cancer survivor strengthened empathy, ethical awareness, and appreciation of coordinated care in complex clinical contexts. Conclusion: Authentic, context-specific IPE enhances interprofessional competencies and preparedness for collaborative cancer rehabilitation practice. Integrating patient-informed learning into curricula supports translation of teamwork principles into clinically relevant skills. Clinical Implications: Embedding cancer-focused IPE aligns with national priorities and strengthens collaborative practice. This scalable approach may improve patient-centred care, with future research needed to assess translation into clinical practice.

CETTI-P-10: Assessing the effects of maceration techniques on the teeth of immature Sus scrofa domesticus using micro-CT

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Background: and aims: While maceration is widely used to prepare adult remains for forensic anthropological, teaching and research purposes, little is known about the effects of different maceration techniques on immature remains, particularly dental hard tissues. This study aimed to investigate the effects of cold water and invertebrate maceration on the dentine and enamel of immature Sus scrofa domesticus. Methods: The study sample included 30 piglets, 15 for cold water and 15 for invertebrate maceration. The split-mouth method was used for experimental and control samples. The teeth were scanned using a micro-CT x-ray unit and analyzed for total volume and mean gray values of enamel and dentine using VGStudio Max. Results: Total volume of enamel and dentine from water experimental samples were significantly lower than the water control samples. Water experimental samples had significantly lower total enamel volume when compared to their invertebrate equivalent. The mean gray values of enamel and dentine macerated in water were significantly lower than those of the invertebrate maceration. Conclusion: The lower enamel volume in water maceration experimental samples may be attributed to the prolonged exposure to water. Prolonged water exposure promotes demineralization and hydrolytic breakdown of immature enamel prisms, leading to crenulation and destruction of enamel. The dissolution of immature enamel and dentine is also promoted by acidic nature of the maceration water as a result of decomposition. Thus, while invertebrate maceration using larvae preserved the immature enamel and dentine, water maceration appears to be more destructive on these dental hard tissues.

CETTI-P-11: First-time and repeat testers for HIV: a comparative analysis of demographic and behavioural characteristics in South Africa

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Background: Despite efforts to increase HIV testing, knowledge of HIV status among some remains low. Understanding the differences between first-time and repeat testers may support tailoring programming and messaging to encourage testing and engagement with care. Aims: To describe and compare the characteristics of first-time and repeat HIV testers accessing sexual and reproductive health (SRH) services in South Africa. Methods: & Methods Integrated SRH services were offered in fixed and mobile facilities across three South African provinces. A descriptive analysis of routine clinical data from clients aged 15–65 years presenting at facilities for the first time between June 2023 and December 2024 was conducted. Chi-square compares the characteristics of first-time and repeat HIV testers. Results: From 14,867 clients, 9% were first-time testers who were younger, studying, unemployed and utilising a mobile facility outside a school. Fewer first-time testers reported ever having sex, but frequent condom use was higher. Although less first-time testers had a regular partner, a higher proportion had >1 sexual partner in the preceding month. Of female first-time testers, 37% reported prior contraceptive use, and 6% a history of pregnancy. PrEP services were the most frequently requested service in both groups. All clients received HIV testing, with 95% also receiving either PrEP, STI, and contraceptives services. Conclusion: The results highlight that mobile services, particularly outside educational institutions, can support individuals to access SRH care, but also missed opportunities for HIV testing among clients who had previously received contraception or been pregnant. Integrated services enhanced uptake of complementary SRH services despite individuals only seeking one.

CETTI-P-12: PrEP choice in South Africa: Determinants of CAB-LA uptake in a multi-product PrEP programme

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Background: Understanding uptake in a multi-product PrEP market is needed to expand and adapt service delivery programmes. Aims: To investigate product uptake and associated factors when offered three PrEP products (oral PrEP, dapivirine vaginal ring [DVR] and injectable cabotegravir [CAB-LA]) in South African public health facilities. Methods: HIV-negative individuals, aged 15-65 years were offered PrEP choice in six fixed and three mobile facilities in Mthatha,

Gqeberha and Tshwane. Biological males, minors, and pregnant or breastfeeding participants were not eligible to use DVR. Log binomial regression assessed factors associated with CAB-LA uptake. Results: Of 3780 participants, majority were aged 18-24 years (65.9%), female (87.4%), utilised a fixed facility (74.1%), had a regular partner (80.4%) and prior or current PrEP use (91.9%). Overall, 65.8% chose CAB-LA, 25.0% oral PrEP, 7.5% no PrEP and 1.7% DVR. Of those with prior access to oral PrEP and DVR, 46.4% of oral PrEP and 59.1% of DVR users switched to CAB-LA. 30.9% of DVR and 47.0% of oral PrEP users remained on their current product. Age and prior or current PrEP use were positively associated with CAB-LA uptake. Oral contraceptive users and those utilising a mobile facility were less likely to initiate CAB-LA. Conclusion: Uptake of CAB-LA was high with older populations and those with prior PrEP or injectable experience more likely to choose CAB-LA. There were some dedicated oral PrEP and DVR users highlighting the importance of PrEP choice. The data can inform planning for PrEP implementation; however, follow-up is necessary to assess continuation.

CETTI-P-13: Pre-Clinical Simulation: Supporting Clinical Readiness in Undergraduate Medical Education

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*School of Clinical Medicine

Background: Simulation-based learning sessions were introduced by UUME to MBBCh 4 students in 2023 as additional teaching and learning, with the aim of preparing medical students for the transition into their clinical years. Aims: 1. To identify the perceived benefits of pre-clinical simulation 2. To advocate for the inclusion of simulation in the MBBCH curriculum Methods A mixed methods design combining a cross-sectional quantitative online survey with one qualitative open-ended question at the end of each section was employed. Volunteers (N~80) from the MBBCh 5 class of 2024 responded to the questionnaire. Data was collected and then exported to Microsoft Excel for analysis, with assistance from a statistician. Results: Participants agreed that the simulation session realistically reflected the hospital setting, portrayed a realistic patient interaction, and was a valuable addition to their journey to becoming a practitioner. Feedback varied regarding how effectively students were able to apply their theoretical knowledge during the simulation session, but more than 90% (N~80) found that after the structured debrief, they had more self-awareness into their own errors and areas of weakness. Conclusion: Simulation-based learning is effective in enhancing skill development, reinforcing knowledge, and preparing students for clinical settings. This study highlighted the value of structured debriefing and the supportive environment for reflective practice it provides. For simulation to be more effective at UUME, it should be integrated into the curriculum and incorporate a wider variety of patient scenarios. Additional research needs to be carried out once more simulation sessions have been introduced.

CETTI-P-14: Development of an Ocular Dissolving Microneedle Platform for the delivery of HPV Vaccine-Loaded PLGA Nanoparticles

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Background: Human papillomavirus (HPV) remains a major global health burden despite effective vaccines. Alternative delivery strategies capable of inducing mucosal immunity and improving patient acceptability are needed. Ocular dissolving microneedles may target eye-associated lymphoid tissue, activating the common mucosal immune system. Aims: To develop and optimise Gardasil® 4 HPV vaccine-loaded poly(lactic-co-glycolic acid) (PLGA) nanoparticles incorporated into a dissolving ocular microneedle delivery system. Methods: A Box–Behnken design was used to optimise the nanoparticle formulation variables, including polymer concentration and content, and stirring time. Nanoparticles were characterised for particle size, polydispersity index (PDI), zeta potential, encapsulation efficiency, and release behaviour. Optimised nanoparticles were incorporated into dissolving microneedles composed of water-soluble polymers. Scanning electron microscopy (SEM) was used to evaluate nanoparticle and microneedle morphology. Results: Polyvinyl(alcohol) concentration significantly influenced encapsulation efficiency ($p = 0.004$), while stirring time affected particle size ($p = 0.016$). Optimised nanoparticles exhibited a mean particle size of 180 nm, PDI of 0.05, zeta potential of −25.8 mV, and encapsulation efficiency of 81.3%, with sustained release over approximately 8 h. SEM confirmed spherical nanoparticles and microneedle arrays with sharp needle tips. Nanoparticle-loaded microneedles exhibited a mean needle height of 213.7 μm and complete dissolution within 15 min. Conclusion: HPV vaccine-loaded PLGA nanoparticles were successfully incorporated into a dissolving ocular microneedle system with favourable physicochemical and morphological characteristics, supporting further investigation of ocular mucosal HPV vaccination as a minimally invasive alternative to conventional administration. This platform provides a foundation for evaluating whether ocular vaccination can induce systemic and mucosal immune responses against HPV through eye-associated lymphoid tissue-mediated immune activation.

CETTI-P-15: Development of a 3D-Printed Polymeric Scaffold loaded with Metal Nanoparticles for Enhanced Healing and Infection Control in Chronic Wounds.

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*School of Therapeutic Sciences

Background: Chronic wounds, such as diabetic ulcers, are highly susceptible to infection by antibiotic-resistant ESKAPE pathogens, including Staphylococcus aureus and Klebsiella pneumoniae, which are priority pathogens identified by the WHO. These infections may lead to severe complications such as sepsis, amputation, and death. Conventional wound dressings often lack sufficient antibacterial activity, moisture retention, and mechanical stability, which can delay healing and increase infection risk. Aims: This study aims to develop plant-based synthesized silver nanoparticles (AgNPs) incorporated into 3D-printed scaffolds to combat antibiotic resistance, enhance antibacterial efficacy, accelerate tissue regeneration, and improve chronic wound healing outcomes. Methods: AgNPs will be green-synthesized using Spirostachys africana extract and incorporated into a bilayer collagen-alginate scaffold fabricated by 3D printing. Nanoparticles will be characterized using ICP-MS, TEM, XRD, and FTIR. Antibacterial activity against ESKAPE pathogens will be assessed using broth microdilution assays according to CLSI guidelines. In vivo rat wound models will be used to assess wound closure and collagen deposition. Cytotoxicity, anti-inflammatory activity, and antioxidant properties will be evaluated using the MTT, Griess, and DPPH assays. Expected Outcomes: The scaffold is expected to show potent antibacterial activity, reduce biofilm formation, enhance fibroblast proliferation, and accelerate wound closure compared with conventional dressings. It is also expected to demonstrate low cytotoxicity and strong anti-inflammatory and antioxidant effects. Conclusion: The integration of green-synthesized AgNPs into 3D-printed scaffolds offers a dual-action strategy for infection control and wound healing. This approach may help address critical gaps in chronic wound management and reduce mortality associated with chronic wound infections.

CETTI-P-16: Comparative Analysis of Physicochemical Characteristics of PLGA Nanoparticles and IMB-P1–Conjugated PLGA Nanoparticles for Colorectal Cancer Therapy

Tolulope Owolabi*, *Samson Adeyemi, Lindokhule Ngema, Clement Penny, Yahya Choonara*

*School of Therapeutic Sciences

Background: Poly(lactic-co-glycolic) acid (PLGA) nanoparticles are a promising drug delivery system due to their biodegradability, biocompatibility, and tunable surface properties. IMB-P1 (AFTPGCSKTHLPGFVEQAEAL) is a peptide derived from peroxiredoxin-5. Aims: This study aimed to comparatively evaluate the physicochemical properties of unmodified PLGA nanoparticles and IMB-P1–conjugated PLGA nanoparticles. Methods: PLGA nanoparticles were synthesised using the nanoprecipitation method. Peptide conjugation was achieved through EDC/NHS chemistry. Physicochemical characterisation included particle size, polydispersity index (PDI), and zeta potential (ZP) analysis using DLS. Morphological evaluation was performed using SEM. Chemical and structural analyses were performed using FTIR and NMR spectroscopy. The conjugation efficiency (CE) was assessed using the BCA assay. Results: The PLGA nanoparticles demonstrated a mean particle size of 151.2 ± 1.060nm, a PDI of 0.014 ± 0.010, and a ZP of -27.3 ± 0.610mV. After peptide conjugation, the particle size increased to 167.0 ± 1.464nm with a PDI of 0.025 ± 0.013 and a shift in ZP to -19.1 ± 1.12mV indicating successful conjugation. Morphological analysis confirmed a spherical shape in both formulations, with PLGA nanoparticles showing a smooth surface and PLGA-P1 a rough surface, indicating successful conjugation. The CE was 67.4 ± 2.0%, and 0.449 ± 0.013 mg of peptide was bound per mg of nanoparticles demonstrating effective coupling via EDC/NHS. Spectroscopic analysis using FTIR and NMR revealed characteristic functional groups and well-resolved peaks at the expected positions for PLGA and IMB-P1, confirming successful conjugation. Conclusion: & Implications Overall, IMB-P1 conjugation significantly altered the physicochemical properties of PLGA nanoparticles while preserving their nanoscale features, highlighting their potential for targeted colorectal cancer therapy.

CETTI-P-17: Referral Pathway Delays and Advanced Diabetic Foot Ulceration Among Patients Presenting to Tertiary Hospitals in Gauteng, South Africa

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Background: Diabetic foot ulcers (DFUs) are a leading cause of morbidity, mortality, and lower limb amputation worldwide. While referral delays are recognised contributors to poor diabetic foot outcomes, little is known about the referral pathway barriers associated with advanced ulceration in South African tertiary healthcare settings. Aims: To determine whether referral pathway delays and barriers are associated with advanced diabetic foot ulceration among patients presenting to tertiary hospitals in Gauteng. Methods: A cross-sectional observational study was conducted among 95 patients with confirmed DFUs between January 2024 and December 2025. Data were collected through structured questionnaires, clinical assessments, and medical record reviews. Ulcer severity was classified using the Wagner grading system. Referral pathway data were available for 63 patients. Associations between referral factors and advanced ulceration (Wagner grades 3-4) were assessed using chi-square tests and logistic regression. Results: Advanced ulceration was present in 54.4% of participants. Among patients with referral pathway data available (n=63), 44.4% experienced delays of at least one month and 52.3% attended two or more healthcare facilities before receiving appropriate care. Delayed presentation was significantly associated with advanced ulceration ($p<0.001$) and remained significant in logistic regression analysis ($p=0.003$). Conclusion: Delays in the referral pathway were significantly associated with advanced diabetic foot ulceration at presentation. Strengthening referral systems and facilitating earlier access to specialised diabetic foot services may reduce the burden of advanced disease and improve patient outcomes. Interventions targeting referral delays, including earlier primary-care identification, standardised referral pathways, and improved access to specialised diabetic foot services, may reduce the burden of advanced ulceration.

CETTI-P-18: Near-Peer Learning in Practice: Enhancing Clinical Training and Managing Growing Student Cohorts

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Background: Peer learning within a community of practice fosters a socially constructive environment where students learn collaboratively. Near-peer learning, involving interactions between junior and senior students, enhances clinical education. The Pharmacy and Pharmacology department's Screening and Testing Programme by Pharmacy Students (STEPPS) to develop public health competencies in final-year Bachelor of Pharmacy students. In 2024, a near-peer learning activity was introduced where third-year students shadowed fourth-year students during screening events. Aims: To explore students' experiences of a near-peer teaching and learning initiative and assess its value as an educational approach. Methods: A qualitative, descriptive design was used. Semi-structured interviews captured experiences of mentors and mentees. Data were transcribed, anonymised, and analysed thematically. Results: Mentees reported increased confidence and a smoother transition into clinical activities due to early exposure. The close age gap supported a safe, interactive learning environment, with some students benefiting from shared home languages. Mentors described improved preparation, greater attention to clinical technique, and strengthened professional practice, with several expressing interest in also wanting to pursue academia because of this exposure. The model also help staff distributed teaching responsibilities, which may present as a solution to accommodate larger student cohorts. Conclusion: Near-peer learning enhanced confidence, skills development, and professional growth, supporting sustainable expansion of clinical education. These findings position near-peer learning as a valuable pedagogical approach transferable across Health Sciences. It promotes psychologically safe, inclusive, and contextually responsive learning environments while supporting diverse cohorts and increased student enrolments. Educators are encouraged to incorporate near-peer learning to enhance engagement, ease clinical transitions, and support the growing student numbers.

CETTI-P-19: Title: Evaluating quality of life and apathy among individuals living with a Huntington disease phenotype in South Africa

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Background: Huntington disease (HD) is a rare, progressive neurodegenerative disorder characterised by cognitive, psychiatric, and motor impairments. As the disease progresses, individuals may experience worsening symptoms and psychosocial challenges that negatively affect quality of life (QoL) and contribute to apathy. There is limited research on patient-reported outcomes among individuals living with an HD phenotype in the South African setting. Aims: This study aims to assess QoL and apathy among individuals with an HD phenotype and to examine clinical and psychosocial factors associated with these outcomes. Methods: A descriptive quantitative design will be used. Convenience sampling will be used to recruit approximately 10-15 participants seen through the Division of Human Genetics and private genetic counselling practices in Johannesburg. A capacity-to-consent form will be used to ensure that participants are able to understand the study. Data will be collected using a demographic questionnaire, open-ended questions, the WHOQOL-BREF and the self-report Dimensional Apathy Scale Results: Data collection is ongoing, and preliminary findings are expected by September 2026. Conclusion: This study may improve understanding of QoL and apathy among individuals living with an HD phenotype in South Africa, and may inform patient-centred care and future research in resource-limited settings.

CETTI-P-20: Using Bacteriophages to Treat Drug-Resistant Klebsiella pneumoniae Infections
BHSc alumni

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Background: The escalating public health burden of antimicrobial resistance highlights the need for alternatives to antibiotics. Bacteriophage therapy shows promise due to its bacterial specificity, safety, and the ability of bacteriophages to evolve alongside their hosts. Aims: This study aimed to isolate and characterise lytic bacteriophages active against local strains of extensively drug-resistant (XDR) K. pneumoniae, and to evaluate the single-layer agar method as a simpler, resource-efficient alternative to the standard double-layer method of phage propagation. Methods: Sewage samples were collected from a wastewater treatment plant in Johannesburg. The samples were centrifuged and filtered, before being mixed with XDR K. pneumoniae cultures to isolate bacteriophages. Bacteriophages were propagated using both single- and double-layer plaque assays. Plaque-forming units, plaque morphology, and host range were measured. Results: Three lytic bacteriophages were isolated and showed therapeutically significant activity against their host bacteria. Bacteriophages demonstrated limited efficacy against non-host bacteria. Double-layer plating methods produced clearer plaques than single-layer plating. Double-layer plating also yielded higher PFU counts. Conclusion: Lytic bacteriophages active against XDR K. pneumoniae can be effectively isolated from sewage. While single-layer plating produces fewer plaques, it offers a quicker, resource-saving

method of propagation. The findings of the study support further development of personalised phage therapy as an alternative to antibiotics for treating drug-resistant bacterial infections. They also suggest time and material-saving refinements to methods. Finally, they highlight the necessity for strain-specific phage matching prior to clinical use, informing future treatment protocols.

CETTI-P-21: Whole Genome Sequencing and Molecular Surveillance of Influenza in South African Children

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Background: Influenza causes an estimated 7,000-12,000 deaths annually in South Africa, with children in low- and middle-income settings disproportionately affected. Genomic surveillance is critical for tracking viral evolution and informing vaccine strain selection. Aims: To characterise circulating influenza subtypes and clades among hospitalised South African children over three seasons, and explore associations between clade and severity. Methods: Nasopharyngeal swabs from children under 14 years admitted with lower respiratory tract infections at Chris Hani Baragwanath Academic Hospital, Johannesburg (Jan 2021-Dec 2023), were tested by multiplex RT-PCR. Influenza-reactive specimens with Ct ≤32 underwent whole genome sequencing (Illumina MiSeq). Bioinformatics used INSaFLU; phylogenetic trees were built with MUSCLE/FastTree, annotated in iTOL, with sequences deposited on GISAID. Results: Of 10,612 participants, 428 (4.0%) were influenza-positive, with influenza A predominating (352/428, 82.2%). Of these, 226 were sequenced and 206 clade-assigned (2021: n=19; 2022: n=79; 2023: n=108). Influenza A positivity rose from 2022 to 2023 (2.7% to 4.4%); H3N2 was the exclusive subtype in 2023. Nine clades were identified: H1N1pdm09 (52/206, 25.2%), H3N2 (131/206, 63.6%), and B-Victoria (22/206, 10.7%). Three clades clustered tightly with contemporaneous South African sequences. A neuraminidase H275Y resistance mutation was found in one H1N1pdm09 isolate. Clade 6B.1A.5a.2a.1 (H1N1pdm09, 2021–2022) was associated with supplemental oxygen requirement in 86.5% of cases. B/Yamagata was not detected. Conclusion: Localised phylogenetic clustering in Soweto, possible strain-specific severity differences, and a detected resistance mutation suggest region-specific viral evolution. Site-level genomic surveillance offers resolution beyond national data, supporting vaccine strain guidance and resistance monitoring in paediatric populations.

CETTI-P-22: Longitudinal Evaluation of External Quality Assessment on the Roche Cobas 800 using the Royal College of Pathologists of Australasia Quality Assurance Program (RCPAQAP) at Charlotte Maxeke Johannesburg Academic Hospital (CMJAH) Laboratory: A Nine-Year Audit (2016 - 2024)

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Background: External quality assessment (EQA), a key ISO 15189:2022 requirement, supports patient result validity and laboratory quality assurance. Longitudinal EQA review identifies analytical trends, method-specific vulnerabilities, and potential platform deterioration, while supporting peer comparison and quality improvement. Aims: To evaluate RCPAQAP EQA performance for 10 analytes on the Roche Cobas 800 platform at CMJAH laboratory from 2016-2024. Methods: EQA data were reviewed for 10 serum analytes: albumin, AST, bicarbonate, chloride, creatinine, potassium, sodium, urea, hs-troponin T(hs-TNT) and β-hCG. Performance indicators included failure rate, bias and coefficient of variation (CV). Failure was defined as an Analytical Performance Specification (APS) score >1, representing predefined analytical quality targets. Trends were assessed per semester cycle. Results: During initial implementation in 2016, several high-volume analytes showed high EQA failure rates, reaching 75% for albumin, AST, bicarbonate, chloride and sodium. Performance improved during the platform's mid-life, but recurring analyte-specific problems were identified, with deterioration most evident from 2022–2024. AST showed persistent bias, while electrolytes were most affected overall, with recurrent sodium failures, later potassium deterioration and persistent chloride imprecision. Bicarbonate performance improved over time, although precision remained variable. In contrast, creatinine, urea, hs-TnT and β-hCG showed more stable long-term performance, despite intermittent late-cycle deterioration. Conclusion: Longitudinal EQA review identified persistent bias, imprecision and analyte-specific weaknesses missed by internal QC. EQA failures were managed through established quality processes, with no documented impact on patient results or clinical care. Findings support risk-based maintenance, targeted troubleshooting, timely replacement and re-audit of the new platform to distinguish platform- from method-related effects, strengthening quality management and patient safety.

CETTI-P-23: The effect of IgA1 and IgA2 allelic variation on the function and dimerization of SARS-CoV-2 antibodies ***BHSc alumni***

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Background: Allelic variation within immunoglobulin (Ig) constant regions is known to modulate antibody function. IgA allelic variation, particularly within African populations, remains understudied. IgA plays a critical role in immunity,

particularly against mucosal pathogens. This makes understanding factors that influence its functionality, across both its monomeric and dimeric forms, essential for the design of therapeutics and vaccines. Aims: This study assessed the impact of novel IgA1 and IgA2 allelic variation on antibody function and dimerization. Methods: Seven IgA1 and seven IgA2 monomeric variants and one dimeric variant of two SARS-CoV-2-specific antibodies, 084-7D and EY6A, targeting different spike epitopes were used. Antibody functions assessed included neutralization, phagocytosis, antigen binding, and FcαRI engagement Findings: We demonstrate that IgA allelic variation affects neutralization in an antibody- and epitope-dependent manner, while phagocytosis and FcαRI binding are unaffected. The 084-7D IgA1 F411Y L451M variant showed significantly improved neutralization across multiple SARS-CoV-2 variants. Conversely, IgA2 variants IGHA2*02, IGHA2*03, and IGHA2*05 exhibited marked reductions in neutralization. Functional differences between IgA subclasses were observed, with IgA2 consistently inferior to IgA1 across all functions, possibly attributable to differing hinge lengths and antigen-binding avidity. Dimers demonstrated enhanced neutralization and spike binding relative to monomers, with modest reductions in phagocytosis and FcαRI binding. In contrast to monomers, allelic variation exhibited a subtle impact on the dimeric form. Conclusion: Naturally occurring allelic variation can significantly alter IgA function. This suggests the potential for harnessing natural genetic diversity in therapeutic and vaccine strategies targeting mucosal pathogens.

CETTI-P-24: Determining Minimum Inhibitory Concentration of Drugs Against Mycobacterium tuberculosis Isolates with WHO - Interim Resistance Mutations
BHSc alumni

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Background: The WHO catalogue of mutation is a powerful tool for classifying Mycobacterium tuberculosis drug-resistance. However, Group 2 mutations (associated with resistance-interim), requires further investigation using minimum inhibitory concentration (MIC) data to resolve genotypic and phenotypic discordance. Aims: To determine the MICs of isolates harboring Group 2 mutations for rifampicin (RIF), isoniazid (INH), and fluoroquinolones (FLQ). Methods: 214 isolates with group 2 mutations identified by WGS, comprising of 84 RIF, 63 INH, and 34 for FLQ [Moxifloxacin (MXF)/Levofloxacin (LEV)]. MIC testing was performed using the BACTEC MGIT 960 system. Result: For RIF 61/84 (73%) isolates were resistant (MIC ≥ 0.5µg/mL), while 27% were susceptible. Notably, rpoB mutations identified within the susceptible-range included mutations at the codon 450 (n=5), Met434Ile (n=3), His445Gln (n=2), and Asp435Ala (n=2). For INH, the majority of the isolates 58/63 (92%) were resistant (MIC ≥ 0.1µg/mL). Isolates within the susceptible-range mainly carried inhA mutations. For FLQ, resistance was higher for MXF than LEV, at 26/34 (79%) versus 8/33 (24%). Isolates with gyrB_Glu501Asp mutation were resistant to MXF but remained LEV-susceptible. The gyrB_Ser447Phe mutation maintains susceptibility to both FLQs. Conclusion: The MIC results showed 27% of RIF isolates remained susceptible despite carrying mutations. Over-half of the inhA mutations showed high-level INH resistance. Currently available commercial assays detect only promoter inhA variants, which could have clinical implications, as patients may be incorrectly managed with high-dose INH. Specific gyrB mutations showed distinct resistance profiles: gyrB_Glu501Asp conferred MXF resistance while retaining LEV susceptibility, whereas gyrB_Ser447Phe maintained susceptibility to both drugs.

CETTI-P-25: Laboratory-based evaluation of porphyria investigations: A retrospective audit at National Health Laboratory Services (NHLS) Charlotte Maxeke Johannesburg Academic Hospital (CMJAH) (2019-2025)

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Background: Porphyrias are rare disorders of haem biosynthesis characterised by accumulation of porphyrin precursors and diverse neurovisceral and cutaneous manifestations. South Africa has a high prevalence of Variegate Porphyria to the presence of a founder mutation (R59W). Biochemical investigations remain central to diagnosis due to limited accessibility of genetic testing. Aims: This study aimed to evaluate porphyria investigations performed at the NHLS CMJAH between 2019 and 2025. Methods: A retrospective laboratory-based audit of porphyria investigations was conducted. Data extracted from the NHLS laboratory information system included urine porphobilinogen screening (UPBG) results, urine porphyrin fractionation profiles by high-performance liquid chromatography (HPLC) and available genetic testing results. Descriptive statistics summarised laboratory findings and referral patterns. Agreement between UPBG screening and fractionation results was assessed using Cohen's kappa statistic. Results: Overall, 185 porphyria investigations for 146 patients were identified from 22 referring hospitals, of which 89% were from Gauteng. Median age was 39.0 years (IQR: 27.0–53.0) with a female predominance (55.5%). Urine porphyrin fractionation by HPLC was performed in 89 patients, with 27 (30.3%) demonstrating abnormal profiles. Secondary porphyria was the most frequent biochemical pattern identified (n=10). Genetic testing was low (6.1%), identifying two pathogenic mutations (R59W and HMBS). Agreement between UPBG screening and fractionation testing was poor (κ=0.092; 95% CI: −0.035 to 0.220). Conclusion: and implications Agreement between UPBG screening and urine porphyrin fractionation was slight, highlighting the limitations of screening assays and the importance of confirmatory HPLC testing. These findings support the need for integrated biochemical and molecular diagnostic approaches to improve porphyria diagnosis and management.

CETTI-P-26: An interprofessional model of care for adolescents living with perinatal HIV

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Background: Despite good viral suppression and medical management, perinatally HIV-infected adolescents (PHIVA) can still face significant health challenges in adolescence. Currently, no model of care (MoC) caters for this specific population. Aims: Based on data from a larger mixed-methods study, this study aimed to develop and ratify a MoC for PHIVA. Methods: Drafts of the MoC were ratified through focus groups with stakeholders: PHIVA attending a local clinic; and HIV healthcare professionals from multiple sites. Results: The PHIVA focus group consisted of seven participants, aged 10-16 years. All participants initiated antiretroviral therapy under the age of 4 years and were virally suppressed. The findings highlighted the necessity of including mental health in the model as well as social workers as in PHIVA management. A subsequent MoC draft was proposed to the healthcare workers. The participants were: physiotherapists, medical doctor, nurse, occupational therapist, counsellor and a clinical psychologist. Their mean years of experience with adolescent healthcare was 13 (SD ± 6) years. The themes developed were: relatable attributes; missing components; implementation and suggestions. Changes were made to the drafts of the MoC, leading to the finalisation of a MoC for PHIVA. The MoC focused on the importance of interprofessional health care and addressed the physical sequelae that PHIVA are likely to encounter. Conclusion: and implications: PHIVA have specific needs and, despite good management, they may still face impairments and challenges. A MoC specific to this population helps to address these limitations, impacting on quality of life.

CETTI-P-27: Exploring Provider-Perceived Determinants of Cervical Pre-Cancer Treatment Implementation at Primary Care Level: A Qualitative Study in Johannesburg Health District

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Background: Cervical cancer is a leading cause of cancer-related mortality among South African women. Despite the proven effectiveness of Large Loop Excision of the Transformation Zone (LLETZ) for treating cervical precancerous lesions, services remain largely centralised to tertiary hospitals in Johannesburg Health District, creating access barriers and attrition along the care cascade. Decentralisation is proposed to address this implementation failure; however context-specific evidence on determinants for implementation is lacking. Aims: To explore stakeholder-perceived facilitators and barriers to decentralised LLETZ implementation at primary care level in Johannesburg Health District in 2026, using the Consolidated Framework for Implementation Research (CFIR). Methods: A qualitative exploratory study using semi-structured, CFIR-informed interviews with 32 purposively selected stakeholders across clinic, community health centre (CHC), hospital and administrative levels. Interviews were audio-recorded, transcribed verbatim and analysed using hybrid thematic analysis. Results: Preliminary findings identify determinants across multiple CFIR domains. The intervention was perceived as advantageous- reducing waiting times and compatible with existing CHC workflows, with an embedded cervical screening programme providing an enabling foundation. These are constrained by fragile supply chains, fragmented recall pathways, absent treatment-specific monitoring indicators and human resources shortages. Workforce demoralisation- rooted in resource shortfalls- represents a critical inner setting barrier. Results: will be updated by August 2026. Conclusion: Decentralised LLETZ is perceived as beneficial and structurally feasible within Johannesburg's primary care platform. Sustainable implementation requires dedicated supply chain mechanisms, strategic retention, and establishing monitoring frameworks for pre-cancer treatment. These findings will directly inform implementation strategies for decentralised LLETZ in Johannesburg Health District and contribute evidence to support scale-up of cervical cancer prevention.

CETTI-P-28: The effect of APOL-1 gene variants in kidney transplant recipients in South Africa
BHSc alumni

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Background: Chronic kidney disease (CKD) disproportionately affects individuals of African ancestry and has been strongly associated with APOL-1 risk variants, particularly G1 and G2, which increase susceptibility to CKD and progression to end-stage renal disease. Emerging evidence suggests that the APOL-1 M1 variant (rs73885316) may attenuate the effects of G1 and G2 when co-inherited. Calcineurin inhibitors (CNIs) are widely used as immunosuppressive agents in kidney transplantation, but variation in their metabolism and nephrotoxic effects remain poorly understood. The distribution of APOL-1 variants and their potential influence on CNI pharmacokinetics in kidney transplant recipients (KTRs) in South Africa remain unexplored. Aims: To investigate APOL-1 risk alleles in Black South African KTRs and assess their distribution and effects on CNI pharmacokinetics. Methods: The rs73885316 SNP (M1) was genotyped using a TaqMan™ assay, while rs73885319, rs60910145, and rs71785313 were genotyped using MassARRAY. APOL-1 haplotypes, risk alleles, and associations with CNI pharmacokinetic parameters were evaluated. Results: In univariate analyses, KTRs carrying the M1 variant experienced more tacrolimus dose adjustments and nephrotoxic events than non-carriers. Among individuals with one or two APOL-1 risk alleles, co-inheritance of M1 was associated with lower daily tacrolimus doses and higher dose- and

weight-normalized trough levels (DWNTL). In multivariate analysis, the presence of M1 with one or two risk alleles was associated with a 24.4% increase in tacrolimus DWNTL after adjustment for confounding factors. Conclusion: Co-inheritance of the APOL-1 M1 variant with APOL-1 risk alleles influences tacrolimus pharmacokinetics. These findings suggest a potential role for APOL-1 genotyping in guiding personalized immunosuppressive therapy in KTRs.

CETTI-P-29: Growing Green Vaccines: Using Agricultural Waste to Refine Ionisable Lipids for mRNA-LNP Vaccines
BHSc alumni

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Background: Developing cost-effective and sustainable mRNA-lipid nanoparticle (LNP) vaccine manufacturing is crucial for equitable vaccine access in lower- and middle-income countries. Ionisable lipids, the major constituent in mRNA-LNP, contribute to RNA complexing and delivery, and act as adjuvants in vaccines. Conventional ionisable lipids are synthesised using petroleum-based resources, which are expensive, unsustainable and not environmentally friendly. We identified cashew nutshell liquid (CNSL), a biorenewable, agricultural waste product, as an inexpensive source to synthesise ionisable lipids. Aims: We previously showed that CNSL-mRNA-LNPs stimulated vaccine-based immune responses similar to Moderna's SM-102 lipid. Guided by this data, we iteratively designed second-generation candidates to further improve delivery and vaccine efficacy. Methods: mRNA-LNPS were formulated by microfluidics and screened in mice using a reporter gene to assess delivery efficacy after intramuscular injection. The top candidates were used to formulate mRNA vaccines against SARS-CoV-2 and Mycobacterium tuberculosis. Antigen-specific T-cell immunity in mice was evaluated following a prime–boost regimen using FluoroSpot, intracellular cytokine staining, and secreted cytokine profiling. Humoral responses were characterized through serum antibody binding and neutralization assays. Results: Second-generation CNSL-mRNA-LNPs had particle sizes ranging 63-125 nm, with encapsulation efficiencies >90%. These showed improved mRNA delivery in mice compared to previous iterations. Formulation as mRNA vaccines elicited robust, antigen-specific secreted cytokine responses in mice splenocytes comparable to SM-102-LNPs. Potent binding and neutralising antibodies were also detected in serum samples post-boost. Modification to the other LNP excipients could also alter vaccine immune responses. By transforming biorenewable cashew nutshell waste into sophisticated delivery vehicles, we have paved the way for a more equitable global vaccine pipeline.

CETTI-P-30: An innovative Targeted Block-and-Kill Strategy for Reducing the HIV-1 Latent Reservoir
BHSc alumni

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Background: HIV 1 remains a major challenge in South Africa. Although antiretroviral therapy (ART) suppresses viral replication, viral rebound occurs when treatment stops due to latent reservoirs in memory CD4+ T cells. These reservoirs, sustained by immune checkpoint molecules such as PD 1, are difficult to eliminate, and current strategies have limited success. Innovative "block and kill" approaches are needed. Aims: This study aims to evaluate the efficacy of pembrolizumab functionalized immunoliposomes carrying cytochrome C or Senexin A in reducing the HIV 1 latent reservoir through a targeted "block and kill" strategy. Methods: Liposomes will be synthesized using the ethanol injection method and loaded with either cytochrome C or Senexin A. Conjugation to pembrolizumab will be performed using the N hydroxysuccinimide/1 ethyl 3 (3 dimethylaminopropyl) carbodiimide (NHS EDC) coupling method. Characterization will be conducted using Zetasizer Nano ZS, Transmission Electron Microscopy (TEM), and Scanning Electron Microscopy (SEM). In vitro efficacy will be tested on HIV 1 subtype C and J Lat 10.6 latency models. Cell viability will be measured with Countess, apoptosis with Annexin V assay via flow cytometry, and latency blockade assessed by Green Fluorescent Protein (GFP) expression. Data will be analyzed using t tests and ANOVA. Results: It is expected that pembrolizumab functionalized immunoliposomes will induce apoptosis in latently infected cells while preventing viral reactivation, supporting a "block and kill" outcome compared to untreated controls. Conclusion: Pembrolizumab modified immunoliposomes carrying cytochrome C or Senexin A may provide a novel therapeutic avenue for functional HIV 1 cure strategies. This approach could inform checkpoint-targeted nanomedicine strategies for safer and more effective HIV-1 reservoir eradication.

CETTI-P-31: Assessing the Therapeutic Potential of an Ancestral-Derived AAV Capsids for Gene Therapy Applications
BHSc alumni

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Adeno-associated viruses (AAVs) are widely used as gene delivery vectors and have enabled the development of several approved gene therapies. However, the presence of pre-existing neutralising antibodies (nAbs) against naturally occurring

AAV serotypes, including AAV2 and AAV8, remains a major barrier to successful gene transfer. Ancestral AAV capsids have been proposed as an alternative strategy to circumvent pre-existing immunity. Anc80, an in silico reconstructed ancestral capsid predicted to be the common ancestor of AAV1, AAV2, AAV8, and AAV9, has demonstrated efficient transduction in multiple tissues. However, its ability to enable transgene expression in the presence of pre-existing antibodies (Abs) has not be tested. This study evaluated the ability of Anc80 to mediate transgene expression in the presence of AAV2 and AAV8 specific Abs. An in vitro luciferase based neutralisation assay was performed using mouse- and human-derived Abs, while an in vivo neutralisation study was conducted in mice. In the presence of AAV specific Abs, partial neutralisation of Anc 80 was observed, indicating incomplete evasion of pre-existing humoral immunity. To determine whether partial neutralisation of Anc 80 was sufficient to achieve a therapeutic effect, Anc80 vectors expressing Hepatitis B virus (HBV) targeting artificial primary microRNAs (apri-miRNAs) were evaluated in an AAV-HBV mouse model. Significant reductions in Hepatitis B surface antigen (HBsAg) levels were observed in the presence of AAV-specific antibodies. Despite the significant reduction in HBsAg levels, this effect was not only restricted to vectors expressing anti-HBV apri-miRNAs. These findings demonstrate that while Anc80 exhibits partial resistance to neutralisation by AAV2- and AAV8-specific antibodies, cross reactive humoral responses remain

CETTI-P-32: Agapanthus africanus inhibits Candida albicans virulence: Implications for Antifungal Research
BHSc alumni

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Background: Fungal infections are common among cancer patients due to immunosuppression caused by chemotherapy, radiation, and the disease itself. Rising antifungal resistance, high treatment costs, and drug toxicity highlight the urgent need for alternative therapies. South Africa's rich biodiversity of indigenous medicinal plants represents a promising source of novel antifungal agents for managing Candida albicans infections in vulnerable populations. Aims: This study evaluated the antifungal activity of Agapanthus africanus and explored the anti-virulence properties of its extract against C. albicans. Methods: Plant material was dried, ground into fine powder, and prepared as organic and aqueous extracts. Antifungal activity was determined using minimum inhibitory concentration (MIC) and minimum fungicidal concentration (MFC) assays. The effect of the extract was investigated against C. albicans biofilm and germ tube formation as well as the expression of key virulence genes (ALS3, SAP1, SAP2, PLB1). Data was analysed using a t-test. Results: Agapanthus africanus demonstrated an MIC of 0.16 mg/mL and an MFC of 0.31 mg/mL. It significantly reduced C. albicans biofilm formation at 0.16, 0.08, and 0.04 mg/mL after 24 hours, with reductions of 57%, 53%, and 45%, respectively. Germ tube formation was also inhibited at these concentrations, with reductions of 80%, 56%, and 43%, respectively. Moreover, A. africanus suppressed the expression of the targeted virulence genes in the tested strains. Conclusion: Agapanthus africanus demonstrated therapeutic potential against Candida albicans by targeting virulence factors, thereby potentially preventing infection progression and improving treatment outcomes. These findings suggest that Agapanthus africanus could serve as a promising lead for future antifungal drug development and therapeutic innovation.

CETTI-P-33: Development and Characterisation of an Imiquimod-loaded nanosystem for the treatment of skin cancers

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Background: Skin cancer remains a significant health burden, while the effectiveness of conventional topical therapies is often limited by poor penetration through the skin barrier and inconsistent drug delivery. Although imiquimod is conventionally administered topically for certain skin cancers, its therapeutic performance is restricted by inadequate skin penetration and variable delivery across the skin. Incorporation into biodegradable nanoparticulate systems may improve drug stability, localisation, and sustained release. Aims: To develop and characterise imiquimod-loaded polycaprolactone (PCL) nanoparticles using a design of experiments (DOE) approach for potential application in the treatment of skin cancer. Methods: Imiquimod-loaded PCL nanoparticles will be prepared and optimised using a Box-Behnken design to evaluate the influence of critical formulation and process variables on particle size, polydispersity, zeta potential, encapsulation efficiency, and drug release. The optimised nanoparticles will be characterised using standard physicochemical and morphological techniques. Results: Preliminary formulation development identified nanoparticle composition and stabiliser concentration as key factors influencing colloidal stability and drug incorporation. Initial nanoparticle formulations showed a mean size of 102 nm, zeta potential of -5 mV, and encapsulation efficiency of 40%. DOE optimisation is currently underway to establish a PCL nanoparticle system with improved size distribution, surface charge, encapsulation efficiency, and controlled imiquimod release. Conclusion: PCL-based nanoparticles offer a promising biodegradable platform for imiquimod delivery in skin cancer treatment, with further scope for optimisation toward improved formulation performance. The optimised PCL nanoparticle formulation may provide a stable, biodegradable platform for controlled imiquimod delivery to the skin, addressing limitations associated with conventional topical administration.

CETTI-P-34: Factors influencing bowel and bladder management in people with spinal cord injuries post discharge

from a rehabilitation setting: a two-phase descriptive study.
BHSc alumni

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Background: Neurogenic bladder and bowel have a major impact on quality of life (QoL) and health after spinal cord injury (SCI). An effective bladder and bowel programme is a necessity to prevent secondary complications but is often difficult to adhere to. Limited research has been done to explore the challenges that people in South Africa (SA) with SCIs face in this regard. Aims: To investigate bowel and bladder management in spinal cord injuries post discharge from a rehabilitation setting, and to investigate the factors influencing this management. Methods: A descriptive two-phased study included adults living with SCI at least one-year post-discharge from a rehabilitation centre. Phase one established participant bowel and bladder regime post SCI, using the Bladder and Bowel Treatment Index and Behavioural Adherence Assessment of Bowel and Bladder. Phase two was a qualitative study with semi-structured, open-ended interviews to gather insight of the experiences of participants. Results: 25 participants were included in phase 1 and 7 in phase 2. Phase one data indicated that 56% (n=14) of participants made a change to their bladder programme and 76% (n=19) of participants made a change to their bowel programme. The interviews further explored the changes in method that was made and the factors influencing these changes. Conclusion: and Implications The study provides insight into the prevalence and nature of changes made in bladder and bowel management in people with SCI in SA. Understanding the barriers and facilitators in adherence to bladder and bowel management will contribute better outcomes post-discharge from rehabilitation.

CETTI-P-35: Regulation of PD-L1 Expression by PTEN through PI3K/AKT Signalling in Colorectal Cancer Cells

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Background: Colorectal cancer (CRC) is a leading cause of cancer-related mortality worldwide and is increasingly reported in African populations. CRC tumours evade immune surveillance through mechanisms such as PD-L1 binding to PD-1 on T cells, which suppresses anti-tumour immune responses. Although PI3K/AKT pathway activation has been associated with PD-L1 upregulation in several cancers, evidence in CRC is inconsistent. PTEN negatively regulates PI3K/AKT signalling, and its loss may enhance PD-L1 expression. Thus, we hypothesise that dysregulation of the PTEN/PI3K/AKT axis promotes PD-L1-mediated immune evasion in CRC. Defining this relationship may support the development of biomarker-driven, personalised immunotherapy strategies. Aims: To determine whether PTEN inhibition alters PD-L1 expression and cellular localisation through activation of PI3K/AKT signalling in CRC cells using both 2D and 3D tumour models. Methods: PTEN activity will be inhibited using VO-OHpic in cultured CRC cell lines. PD-L1 expression and localisation will be assessed using Laser Scanning Confocal microscopy and quantitative image analysis in 2D monolayer cultures and 3D spheroid models. Assessment of PI3K/AKT pathway activation will be incorporated where feasible to support mechanistic interpretation. Results: Data collection is currently underway. PTEN inhibition is hypothesised to increase PI3K/AKT signalling activity and PD-L1 expression in CRC cells. Conclusion: Elucidating the relationship between PTEN activity and PD-L1 expression may improve understanding of immune evasion mechanisms in CRC and identify potential therapeutic opportunities. If PTEN-mediated regulation of PD-L1 is confirmed, the findings may support future biomarker-guided immunotherapy and contribute to improved CRC patient outcomes.

CETTI-P-36: Development of a liquid chromatography-tandem mass spectrometry (LC-MS/MS) method for the measurement of meropenem in human plasma
BHSc alumni

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Background: Meropenem is a broad-spectrum carbapenem antibiotic widely used in critically ill patients, who show marked pharmacokinetic variability. Therapeutic drug monitoring (TDM) is essential to individualize dosing and avoid subtherapeutic exposure. The use of LC-MS/MS enables selective and accurate meropenem quantification. Aims: To develop and validate a LC-MS/MS method for measuring meropenem in human plasma for TDM. Methods: Methods: development was performed on a Waters™ Acquity UPLC-tandem mass spectrometer. A meropenem trihydrate stock solution (877mg/L) was prepared in 50% methanol-water, with standards prepared by serial dilution, covering an analytical range of 0.5–80.0mg/L. Electrospray ionization (positive mode) was optimized by direct infusion. Chromatographic separation was achieved on a Kinetex 2.6µm PFP column using 0.1% formic acid in water (mobile phase A) and acetonitrile (mobile phase B). Samples were prepared by protein precipitation with cold acetonitrile and the supernatant diluted with mobile phase A. Results: Infusion optimization identified MRM transitions at m/z 384.2→141.1 (quantifier) and m/z 384.2→114.0 (qualifier), showing adequate selectivity. The acetonitrile-water mobile phase with 0.1% formic acid gave good peak shape and resolution within an appropriate run time of 4.5 minutes. The method was linear over 0.5–80.0mg/L, with a lower-limit-of-quantitation of 0.5mg/L. Validation showed acceptable accuracy and precision per internationally recognized criteria. Conclusion: The method is suitable for high-

throughput TDM application. Deuterated internal standard incorporation will improve the method`s precision in a future planned multiplex antibiotic assay. This method supports routine clinical implementation to guide meropenem dosing in critically ill patients, particularly in settings with high antimicrobial resistance.

CETTI-P-37: Interpreting serum oestradiol concentrations in transgender women receiving feminising gender-affirming hormone therapy: a retrospective audit from a South African quaternary hospital

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Background: Serum oestradiol (E2) is routinely monitored in transgender women receiving feminising gender-affirming hormone therapy (FGAHT). However, interpretation is complicated by differences in hormone formulation, administration route, timing of blood sampling and inter-assay variability, with no South African data available. Aims: To characterise serum E2 concentrations in transgender women receiving FGAHT and to assess the real-world applicability of current guideline-recommended E2 target ranges. Methods: A retrospective audit of clinical and laboratory records of transgender women attending the transgender clinic at Charlotte Maxeke Johannesburg Academic Hospital (CMJAH) from August 2025 to February 2026 was performed. Demographic, treatment and biochemical data were analysed descriptively. E2 concentrations were evaluated against the recommended target range (367–734 pmol/L). Results: Serum E2 measurements were available for 40 of the 93 transgender women receiving FGAHT. Among these 40, 37 were receiving oral E2 and 3 were receiving injectable E2. Of these, 22 (55.0%) had at least one E2 concentration exceeding the target range. The median E2 concentration among patients with elevated results was 2513 pmol/L (interquartile range: 1271–4257 pmol/L). All three patients receiving injectable E2 exceeded the target range. Conclusion: Elevated serum E2 concentrations were frequently observed in transgender women receiving guideline-concordant E2 dosing, highlighting limitations of current monitoring thresholds in clinical practice. Clinical interpretation of serum E2 concentrations should account for hormone formulation, timing of specimen collection and assay differences. Further studies are needed to refine E2 monitoring recommendations, including evaluation of route-specific target ranges, testosterone suppression and clinical response.

CETTI-P-38: Building health together: Memory box workshops as a pathway to family and community empowerment in Soweto, South Africa

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Background: Child loss is deeply traumatic, yet many bereaved families receive limited structured support. In Soweto, the Child Health and Mortality Prevention Surveillance (CHAMPS) programme recognises the need for a holistic response that integrates psychosocial care with health empowerment. As child deaths often reflect broader household vulnerabilities, targeted interventions are needed to support healing and prevent future losses. Aims: Through Memory Box Workshops (MBWs), bereaved families receive counselling and tailored health education that empower them to become community health champions. Methods: Families who have recently experienced stillbirth or loss of a child under 5 years are approached for CHAMPS consent. Regardless of study participation, families are invited to attend MBWs where they create personalised memory boxes, write to their deceased child, and participate in facilitated discussions. Sessions are conducted in a supportive, non-judgmental environment, with participants grouped by shared experiences to foster peer support and targeted health education. Health education focuses on antenatal care, child mortality causes, early illness recognition, and prevention strategies. Referrals are provided where needed. Results: Although qualitative work is still ongoing, early participant reports show that MBWs improved emotional expression, reduced isolation, and fostered peer support networks. Families reported increased awareness of health risks, improved coping strategies, and reduced stigma around child loss. Conclusion: MBWs are a scalable, community-based model that can strengthen family resilience, contribute to health education and reduce preventable child deaths. MBW represent a feasible, low-cost strategy for integrating bereavement care with public health education. By centring lived experiences and collective healing, the intervention strengthens family resilience and promotes community empowerment.

CETTI-P-39: Microbial Contamination of Nebulisers in Medical Intensive Care Units at a Tertiary Hospital in Johannesburg
BHSc alumni

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Background: Hospital-associated infections are a major concern in intensive care units (ICUs), contributing to increased morbidity, prolonged hospitalisation, and higher healthcare costs. Nebulisers, routinely used to deliver aerosolised medications, may act as reservoirs for pathogenic bacteria when inadequately cleaned, posing a risk of cross- contamination

between patients and healthcare staff. Aims: This study evaluated microbial contamination of nebulisers within two Medical ICUs at a Tertiary Hospital in Johannesburg, South Africa. Methods: A cross-sectional observational study was conducted involving ten ICU patients receiving nebulised therapy. Samples were collected from nebuliser surfaces, internal medication chambers, and hand imprints of 2–3 healthcare workers (HCW) over five consecutive days. Cultures were grown on standard media, and microbial growth was quantified as colony forming units (CFU) per swab, microbial identification and antibiogram were performed using established laboratory protocols. Results: Microbial contamination was detected on all nebulisers. Internal surfaces consistently showed higher bacterial loads, with counts ranging from 4 CFU to >300 CFU/swab. External surfaces ranged from 0–64 CFU/swab. The predominant isolates in nebulisers included coagulase-negative staphylococci (CNS), Proteus mirabilis, Enterobacter cloacae, and Corynebacterium spp. Whereas HCW hand imprints yielded Staphylococcus aureus and CNS. Proteus mirabilis and Enterobacter cloacae exhibited antibiotic resistance to multiple antibiotic classes, including β-lactams, aminoglycosides, and polymyxins. No significant differences were observed between internal vs external surfaces (p=0.11) or morning vs afternoon sampling (p=0.9). Conclusion: The findings highlight the presence of clinically important bacterial contamination on nebulisers and suggest a risk of cross-contamination in ICU settings. Strengthening cleaning protocols and infection prevention control training may reduce device- associated infections.

CETTI-P-40: Advancing Thiol-Based Hydrogel Crosslinking: Validation of Cysteine-Enriched Bioinks for 3D Scaffold Fabrication.
BHSc alumni

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Background: Biomaterials can be cross-linked chemically or can be functionalized with amino acids to overcome inherent biocompatibility and stability limitations. Despite significant progress, poor remodelling limitations persist, hence the need for cross-linkers with dynamic adaptability, native tissue mimicry and controllable degradation. Cysteine-mediated crosslinking has emerged as a promising strategy in this regard due to its thiol functionality, enabling dynamic covalent interactions, and improved network stability. Aims: To evaluate the use of cysteine cross-linking strategies, particularly cysteine-rich peptides, to enhance the stability, bioactivity, and mechanical properties of soft tissue engineering 3D scaffolds intended for the fabrication of robust bioinks. The objectives were to: (i) confirm GelNB functionalization, (ii) evaluate crosslinking changes in thermal and mechanical behaviour, (iii) investigate extrusion-based 3D printability and (iv) assess scaffold degradation behaviour. Methods: Functionalized gelatine-norbornene (GelNB) hydrogel scaffolds were crosslinked using a cysteine-rich peptide strategy. GelNB functionalization was confirmed by proton nuclear magnetic resonance (^1H-NMR) and ninhydrin assay. Thermal characterization was conducted using differential scanning calorimetry (DSC) and thermogravimetric analysis (TGA). Mechanical and textural properties were assessed using texture profile analysis to evaluate hardness, adhesiveness and structural resilience. Scaffold fabrication was performed via extrusion-based 3D printing, followed by printability. Results: Preliminary findings demonstrated that thiol-mediated modification consistent with cysteine incorporation. Thermal analysis showed altered degradation profiles and improved thermal stability in crosslinked scaffolds compared to controls. Texture analysis revealed enhanced mechanical integrity and resistance to deformation following cysteine-rich crosslinking. Conclusion: The incorporation of cysteine-rich crosslinking strategies into GelNB hydrogels significantly improved thermal stability, mechanical robustness and printability, while maintaining controlled degradation behaviour.

CETTI-P-41: PrEP use within multi-method PrEP services in primary care settings in South Africa

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Background: Understanding PrEP use and persistence in the context of multi-product PrEP is essential to informing HIV prevention programming. We assessed time to first PrEP interruption among individuals offered a choice of daily oral PrEP, dapivirine vaginal ring (DVR) or long-acting injectable cabotegravir (CAB-LA). Methods: Data from HIV-negative men and women, ≥15years enrolled in a cohort offering CAB-LA, DVR and oral PrEP in six facilities and three mobiles in South Africa (April 2024 - October 2024) and followed for 12months were collected. PrEP interruption was defined as missing a follow-up visit by ≥30days. Kaplan–Meier methods were used to estimate cumulative probability of interruption until 360days, and curves compared using the log-rank test. Cox proportional hazards regression estimated the relative hazard of interruption by PrEP method. Results: Of 3780 participants, 65.8% chose CAB-LA, 25.0% oral PrEP, 7.5% no PrEP and 1.7% DVR. Among 3495 participants who used PrEP at enrolment, 87.1% were women, median age 22years. Use patterns differed by PrEP method. Over 12months, cumulative interruption rose to approximately 80% among oral PrEP users, 68% among CAB-LA users and 88% among DVR users. Risk of interruption was significantly higher among oral and DVR users compared with CAB-LA. Kaplan–Meier curves showed significantly different time-to-interruption distributions between groups. Conclusion: CAB-LA users demonstrated greater PrEP persistence, with lower risk of interruption and higher retention; highlighting the potential of injectable PrEP to improve HIV prevention coverage. Scaling access to long-acting PrEP, alongside differentiated support strategies for oral PrEP users, may strengthen prevention outcomes.

CETTI-P-42: The transcription profile of a cuticle protein: Establishes an unexplored Link to the maturation pathway of a dominant malaria vector, Anopheles funestus
BHSc alumni

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Background: Malaria is the deadliest mosquito-borne parasitic disease known. Anopheles funestus is widely recognised as one of the primary malaria vectors in Africa; however, it remains understudied. Aims: This study aims to characterise one of the cuticle protein transcripts, specifically the cuticle protein transcript with a Rebers-Riddiford consensus sequence type one (called CPRR-1 in this study), associated with maturation and development in An. funestus. Methods: Functional gene and protein elements of CPRR-1 were predicted in silico using bioinformatics. Transcript abundance of CPRR-1 was evaluated via reverse transcription quantitative real-time polymerase chain reaction (RT-qPCR) in three head-associated tissues- head and eyes, proboscis and palps, and antennae- as well as across different developmental stages using TRIZOL RNA extraction, QuantiTect reverse transcription, and SYBR green-qPCR. Transcript localisation was evaluated using RNA-FISH. A simple double-stranded RNA (dsRNA) soaking method was developed specifically to trigger RNA interference (RNAi) in An. funestus and examine the CPRR-1 function using MEGAscript RNAi. Results: and Discussion The CPRR-1 protein transcript was predicted to have a structural role in the mosquito's cuticle, enabling flexible movement. Our results revealed a role for CPRR-1 in the early maturation of An. funestus. The dsRNA soaking method is efficient and highly reproducible for targeting larval and pupal stages of An. funestus, addressing limitations of more common methods with limited field application, such as microinjection. Conclusion: This research aims to deepen our understanding of the role of CPRR-1 in the maturation and development of the key African malaria vector, An. funestus, offering valuable insights into its behaviour and biology.

CETTI-P-43: Comparison of HbA1c analysis using two different methodologies: immunoassays and high-performance liquid chromatography
BHSc alumni

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Background: Glycated haemoglobin (HbA1c) is central to diagnosing diabetes and monitoring glycaemic control. HbA1c can be measured by high-performance liquid chromatography (HPLC), the analytical gold standard, or immunoassays, which offer faster analysis, lower cost and easier integration into routine chemistry. Studies show good agreement, but small biases may influence clinical decisions. Aims: To compare the accuracy, precision and clinical agreement of the Roche Cobas Pro immunoassay against the Bio-Rad VARIANT II HPLC; to determine whether differences alter result interpretation. Methods: Forty remnant patient samples were analysed on both platforms following CLSI EP9 guidelines. Precision was assessed using matrix-matched quality controls. Agreement and bias were evaluated using Bland–Altman analysis, with association assessed by Spearman correlation. Categorical agreement at the 6.5% and 7.0% thresholds was assessed using Cohen's kappa statistic. Results: Median HbA1c was 6.32% (IQR 5.89–8.90) by immunoassay and 6.85% (IQR 6.40–8.78) by HPLC, with strong correlation ($\rho = 0.962$). Within-day precision was better for the immunoassay (CV 0.85%) than HPLC (CV 1.47%). Mean bias was –0.38% (Limits of Agreement –1.15 to +0.39), the immunoassay reading lower. At the 6.5% threshold, there was only moderate agreement between the methods ($\kappa = 0.52$) whilst at the 7.0% threshold substantial agreement was observed ($\kappa = 0.79$). Conclusion: and Implications: The methods correlated strongly but were not fully interchangeable. Platform switching may support glycaemic-control monitoring, but diagnostic use may require method-specific reference intervals given the significant reclassification observed at the diagnostic threshold.

CETTI-P-44: Recurrent Systemic Inflammation Drives Early Myocardial Fibrotic Remodelling in The Rat Heart

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Background: Cardiovascular diseases (CVDs) frequently coexist with metabolic comorbidities and are characterised by chronic, low-grade inflammation that promotes myocardial remodelling and adverse clinical outcomes. Myocardial fibrosis is a common endpoint of this remodelling; however, it remains unclear how repeated inflammatory insults drive the early structural changes that precede overt fibrotic development. Aims: This study investigated whether recurrent inflammatory exposure drives early structural and molecular changes associated with myocardial fibrotic remodelling. Methods: Sprague-Dawley rats (n=29) were assigned to control or lipopolysaccharide (LPS)-treated groups and received weekly injections of saline or LPS for four weeks to model recurrent chronic inflammation. Echocardiographic, histological, and molecular analyses were performed to assess structural and fibrotic changes following recurrent inflammatory exposure. Results: Recurrent inflammatory exposure altered left ventricular internal dimensions and relative wall thickness, indicating early structural remodelling. These changes were accompanied by modulation of local inflammatory and fibrosis-related gene

expression, together with histological evidence of adverse myocardial remodelling consistent with the early stages of fibrotic development. Collectively, these findings support a role for recurrent inflammatory exposure in driving early structural and molecular changes associated with myocardial fibrotic remodelling. Conclusion: These findings provide preliminary evidence that recurrent inflammatory stimulation contributes to early structural and molecular changes associated with myocardial fibrotic remodelling.

CETTI-P-45: Using South African propolis for oral infections

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Background: Oral infections, including dental caries and periodontal diseases, are widespread in South Africa. These infections are often treated with antibiotics. Such treatments are increasingly losing efficacy due to rising antimicrobial resistance. As a result, finding alternative therapeutic options is vital. Propolis, a resinous substance produced by bees, has demonstrated antimicrobial properties globally. South African propolis, however, was yet to be investigated against oral pathogens. Aims: This study aimed to evaluate the antimicrobial activity of locally sourced propolis in inhibiting the growth of oral pathogens. Methods: A total of 90 propolis samples were collected from around South Africa and comparatively analyzed with three Brazilian samples. Ethanolic extracts of all samples were investigated against seven oral pathogens (Enterococcus faecalis, Lactobacillus acidophilus, Lactobacillus casei, Lactobacillus rhamnosus, Staphylococcus saprophyticus and Streptococcus mutans) using the Minimum inhibitory concentration (MIC) and Minimum bactericidal concentration (MBC) broth microdilution assays. Results: Of the samples tested, 77% displayed noteworthy inhibitory activity against at least one pathogen. The strongest activity was observed against E. faecalis, L. rhamnosus, and S. saprophyticus. Several samples from Gauteng exhibited strong activity against a range of pathogens, with MIC values ranging from 0.04 to 0.78 mg/ml, and MBC values ranging from 0.10 to 3.13 mg/ml, demonstrating broad-spectrum potential. Conclusion: and implications: These results demonstrate the therapeutic potential of South African propolis in oral health. Local propolis could be developed as a natural adjunctive agent in caries prevention, endodontic treatment, and periodontal support, following future investigation into standardization and clinical validation.

CETTI-P-46: Impact of type 2 diabetes mellitus on the morphological characteristics of maxillary bones in a Sprague-Dawley rat model
BHSc alumni

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Background: Type 2 diabetes (T2D) is the most prevalent form of diabetes worldwide. It is characterised by hyperglycaemia, hypoinsulinaemia and a mild dysfunction of pancreatic β-cells. While T2D is well known for its systemic complications, its impact on craniofacial bones such as the maxilla, remains under-investigated. This study, investigated the morphological impact of T2D on the maxillary bone of experimental Sprague Dawley rats. Methodology T2D was induced in Sprague Dawley rats using a high fructose diet and streptozotocin administration (40mg/kg b.w). Palatal tissue samples were harvested from rats at 14 and 28 days, followed by analysis using histological staining including Haematoxylin and Eosin (H&E), Mallory's One step Trichrome, and Picrosirius red. Immunolabelling using Ki-67, a marker for cell proliferation was used to examine changes in maxilla bone histoarchitecture Results Healthy control samples transitioned from active woven bone with erythrocytes and transitioning osteoblasts (H&E) at day 14 to a dense lamellar matrix displaying mature dark blue/purple gradients (Mallory's) and parallel orange-red Type I collagen bands (Picrosirius red) by day 28. At 14 days, diabetic samples demonstrated a mineralization lag characterized by a low-contrast, light blue cortical matrix, microvascular luminal instability, and early osteocyte apoptosis. By day 28, chronic hyperglycaemia triggered osteopathy with the cortical bone matrix disorganized and soft tissue degradation with loose, fragmented collagen fibres. Diabetes demonstrably alters maxillary bone morphology through the systemic disruption of the cellular lifecycle, microvascular integrity, and the structural quality of the collagen scaffolding. This suggests that Diabetes decelerates palatal development and maturation

CETTI-P-47: In Silico Design and Computational Evaluation of Hydroxybenzoic Acid Derivatives as Potential Antimicrobial Agents

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Background: The continuous rise of antimicrobial resistance (AMR) necessitates the discovery and development of novel antimicrobial agents with improved efficacy, safety, and pharmacological properties. Computational drug design has become an indispensable approach in modern drug discovery, enabling the rapid identification and optimization of promising lead compounds while minimizing the time, cost, and resources associated with conventional experimental screening methods. Aims: This study aimed to evaluate hydroxybenzoic acid derivatives as potential antimicrobial agents using an in-silico drug

design approach. Methods: This study employed an in-silico drug design approach to evaluate hydroxybenzoic acid derivatives as potential antimicrobial candidates. A series of derivatives were designed through structural modification of the hydroxybenzoic acid scaffold. The designed compounds were computationally analysed using predictive tools such as SwissADME to assess physicochemical characteristics. SwissTargetPrediction was used to identify potential biological targets and predict the probable mechanism of action. Way2Drug was employed to predict the extent of biological activity, while OSIRIS Property Explorer was used to evaluate toxicity risks and overall drug scores. Results: These analyses revealed that several derivatives exhibited favourable drug-like properties, acceptable pharmacokinetic profiles, and low predicted toxicity risks. Furthermore, biological activity predictions indicated promising antimicrobial potential for the derivatives. Conclusion: The in-silico evaluation identified hydroxybenzoic acid derivatives with favourable pharmacological characteristics and predicted their potential antimicrobial activity. These findings indicate how computational tools accelerate antimicrobial drug design. Keywords: Antimicrobial resistance; Hydroxybenzoic acid derivatives; In silico drug design; SwissADME; Computational drug discovery.

CETTI-P-48: The Same Tool, Different Stories: Screwdriver Trauma in Macerated versus Decomposed Bone
BHSc alumni

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Background: Sharp force trauma is frequently encountered in forensic casework in South Africa. Characteristics of trauma are often affected by postmortem processes, including maceration and decomposition, which could result in the loss or alteration of existing trauma. When assessing trauma, researchers have also recommended supplementing macroscopic analysis, with microscopic methods, such as stereomicroscopy and micro-computed tomography (micro-CT) to improve trauma analysis. Aims: This study thus aimed to characterise the macroscopic and microscopic features of screwdriver-induced punctures in macerated and decomposed bones, as well as between different observation modalities. Methods: Four porcine (Sus scrofa domesticus) carcasses were used, with sharp force trauma inflicted using a four-pointed (cross-tipped) screwdriver. Two carcasses were subsequently macerated to remove all soft tissue, and two were allowed to decompose naturally until skeletonisation. Trauma was assessed using macroscopic analysis, stereomicroscopy, and micro-CT. Eighteen bones were inflicted with trauma, resulting in 54 impacts. Features examined included wastage, protrusions, inclusions, bone debris, fractures, puncture impressions, and puncture penetrations. Results: The decomposed samples showed more protrusions and patterned impressions. In contrast, macerated samples showed more scrapes along the bone edge. Additionally, wastage, bone debris, and fractures were more readily identified using macroscopic and stereomicroscopic methods than with micro-CT. Conclusion: These findings highlight characteristic patterns associated with screwdriver-inflicted trauma in macerated and decomposed bone. It was observed that maceration affected or obscured certain traits, such as protrusions and bone debris. Micro-CT provided limited additional diagnostic value; instead, a combined macroscopic and stereomicroscopic approach is most effective for analysing puncture trauma.

CETTI-P-49: STI prevalence among South African women in a 4CMenB vaccine trial for Neisseria gonorrhoeae prevention

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Background: A vaccine against Neisseria gonorrhoea (NG) could reduce burden and mitigate antimicrobial resistance. Aims: We assessed baseline characteristics and prevalence of NG in women screened in an NG vaccine trial. Methods: BIYELA is a phase 3 randomized controlled trial of the efficacy of the 4CMenB vaccine for NG prevention, which enrolled women aged 18-45 years with or without HIV and at risk of NG in South Africa (SA). At screening, demographic and sexual behaviour data were collected and pharyngeal, cervical and anorectal swabs were tested onsite for NG and Chalmydia trachomatis (CT) using GeneXpert. Participants with NG were only enrolled after treatment and a negative test of cure. Results: From 14 August 2024 to 20 March 2025, 1429 women were screened, and 1306 (91%) tested for NG/CT including 280 (21%) with HIV. Of these, the median age was 28 (IQR: 23-33) years, 88% were married or in a relationship, and 25% lived with their partner. In the past year, 41% reported 3+ partners, 51% had a previous STI, and 19% used PrEP. Of the 1306 with NG/CT results, 7% had anogenital NG (2% in women with HIV and 6% in women without HIV). By anatomical site, NG prevalence was 6% cervical, 5% anorectal and 2% pharyngeal. Anogenital CT prevalence was 21% -- 19% cervical, 15% anorectal and 1% pharyngeal CT. Conclusion: NG and CT prevalence was high in women screened for a NG vaccine trial, irrespective of HIV status. Implication: These findings highlight the need for novel vaccines, therapeutics and diagnostics to prevent and control bacterial STIs in SA.

CETTI-P-50: Histopathological Features and MicroRNA Expression Profiles in Squamous Cell Carcinoma of the Oral, Skin, and Lip
BHSc alumni

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Background: Squamous cell carcinoma (SCC) affects various anatomical sites, including oral (OSCC), skin (SSCC), and lip (LSCC). Although these conditions arise from a common epithelial tissue type, their pathogenesis, biological behaviour, and molecular characteristics may vary. Notably, dysregulated microRNA (miRNA) expression has emerged as a key regulatory mechanism contributing to site-specific differences in tumour development and progression. Aims: This study aimed to evaluate histopathological and miRNA expression patterns and differences in OSCC, SSCC, and LSCC Methods: A total of 60 SCC cases were collected, comprising 20 OSCC, 20 SSCC, and 20 LSCC. Demographic and histopathological data were analysed using descriptive statistical tests. Comparisons across the SCC group were conducted using one-way ANOVA and non-parametric tests. Quantitative RT-PCR was performed to measure Let-7a, Let-7d, and Let-7f. Results: Participants with SSCC had the highest mean age (65.53 ± 15.24 years), followed by those with OSCC (57.85 ± 12.07 years) and LSCC (54.20 ± 11.40 years). Individuals with SSCC were significantly older than those with LSCC (p= 0,026). Significant differences were observed in margin involvement (p = 0.039) and perineural invasion (p < 0.001) across the three SCC groups. Let-7f showed the highest mean expression (4.19 ± 4.76), followed by Let-7a (3.611± 4.437) and Let-7d (2.684 ± 4.561). However, there were no significant differences in the expression of miRNAs across the three groups. Conclusion: These findings suggest that histopathological features, rather than Let-7 expression, may better reflect SCC heterogeneity and prognosis, providing a foundation for future translational research.

CETTI-P-51: The role of glucose-6-phosphate dehydrogenase gene variants in the development of type 2 diabetes in a black South African population

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Background: Oxidative stress contributes to the development of type 2 diabetes (T2D). Nicotinamide adenine dinucleotide phosphate maintains cellular defence against oxidative damage and is generated by glucose-6-phosphate dehydrogenase (G6PD) and individuals with T2D have lower G6PD activity than controls. G6PD missense variants (MVs), rs1050828 (C>T; MV1) and rs1050829 (T>C; MV2) reduce G6PD activity, however, their association with T2D remains unclear. Aims: To determine the association of two G6PD polymorphisms with T2D in the black South African population. Methods: Black South Africans living with T2D (n=100) and controls (n=101) were genotyped for the G6PD polymorphisms using Taqman assays. G6PD is an X-linked gene therefore gene associations with T2D and HbA1c levels were determined using random X-inactivation (XCI) and escape from X-inactivation (eXCI) models. Results: In both models, increasing age and female sex were associated with increased risk of T2D (p<0.005). The presence of the MV2 CT (p=0.010) and TT (p=0.045) genotypes decreased T2D odds by 77% and 60%, respectively. Increasing age (p<0.001), female sex (p=0.022), MV1 CC genotype (p=0.018) and MV2 CT genotype (p=0.008) were associated with increased HbA1c levels in the XCI model, whereas in the eXCI model, only the association with age remained (p<0.001). Conclusion: and implications: The MV1 T-allele is known to result in lower HbA1c levels through non-glycaemic mechanisms. Thus, in T-allele carriers, HbA1c levels may not be a reliable marker of glycaemia. It is not known whether the MV2 T-allele association with lower T2D odds is mediated via changes in G6PD activity. Mechanistic studies are required.

CETTI-P-52: Automated Vs. Manual Oxygen Titration in Emergency Care: A Systematic Review and Meta-Analysis

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Background: Supplemental oxygen is a cornerstone of emergency care, yet manual titration often fails to maintain optimal saturation targets due to human and system limitations. Automated closed-loop oxygen titration systems offer a potential solution by continuously adjusting oxygen delivery. This systematic review and meta-analysis evaluates the effectiveness of automated versus manual titration in adult emergency care. Methods: Following PRISMA guidelines and PROSPERO registration, we conducted a comprehensive search across PubMed, Scopus, Web of Science, the Cochrane Library, and Google Scholar to identify relevant adult emergency care studies. Results: Of 22 identified records, four met inclusion criteria: three randomized controlled trials (n = 286) and one prospective observational study. Meta-analysis showed that automated titration significantly increased time within oxygen saturation target ranges compared to manual care (mean difference 22.9%; 95% CI 9.6–36.2). High initial heterogeneity (I^2 = 85.7%) was resolved through sensitivity analysis (excluding one cohort), which confirmed a robust effect (mean difference 29.6%; 95% CI 23.7–35.6). Current evidence is limited to surrogate physiological endpoints; data regarding patient-centered clinical outcomes remain absent. Conclusion: Automated closed-loop titration provides superior physiological precision in maintaining oxygen saturation targets compared to manual care. While it effectively minimizes risks associated with hypoxaemia and hyperoxia, large-scale trials are needed to determine if these physiological improvements translate into definitive clinical benefits for patients.

CETTI-P-53: Cardiovascular Outcomes and Safety of Chlorthalidone versus Hydrochlorothiazide: A Systematic Review and Meta-Analysis

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Background: For decades, chlorthalidone (CTD) has been favored over hydrochlorothiazide (HCTZ) based on its longer half-life and historical efficacy data. However, recent high-powered pragmatic trials and large-scale observational cohorts have challenged this preference. We aimed to synthesize contemporary evidence comparing cardiovascular efficacy and metabolic safety of these two thiazide-type diuretics in patients with hypertension. Methods: We conducted a systematic review and meta-analysis of contemporary evidence. A comprehensive literature search was performed across PubMed, Scopus, and the Cochrane Central Register of Controlled Trials from inception through March 2026, supplemented by manual reference mining. Data were pooled using a random-effects model to account for heterogeneity. For the primary outcome of major adverse cardiovascular events (MACE), we synthesized data from a large randomized controlled trial and two international observational cohorts. Secondary safety and renal outcomes were pooled from four studies. Heterogeneity was assessed using the I^2 statistic. Results: Seven studies (>700,000 patients) were included. There was no significant difference in MACE between CTD and HCTZ (RR 1.01; 95% CI: 0.83–1.24; moderate certainty). Renal outcomes were also similar. However, CTD was associated with a higher risk of hypokalemia (RR 1.55; 95% CI: 0.90–2.66; low certainty). Conclusion: CTD does not provide superior cardiovascular or renal protection compared to HCTZ. Given the higher risk of hypokalemia and monitoring burden, HCTZ remains a pragmatic first-line option in hypertension.

CETTI-P-54: Efficacy of Equiosmolar Hypertonic Saline Versus Mannitol for Intracranial Hypertension in Traumatic Brain Injury: A Systematic Review and Meta-Analysis

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Background: The optimal choice of hyperosmolar therapy for managing intracranial hypertension in traumatic brain injury (TBI) remains a subject of clinical debate. This systematic review and meta-analysis evaluated the comparative efficacy of hypertonic saline (HTS) versus mannitol strictly utilizing equiosmolar dosing protocols. Methods: Electronic databases (PubMed, Scopus, Web of Science, and Cochrane CENTRAL) alongside ClinicalTrials.gov were searched from inception to June 2026 for randomized controlled trials (RCTs) comparing equiosmolar administrations of HTS and mannitol in patients with acute TBI. The primary outcome analyzed from our updated data pool was the Mean Difference (MD) in intracranial pressure (ICP). Quantitative synthesis was performed using a random-effects model. Results: Three RCTs encompassing 975 patients (HTS: n=437; Mannitol: n=538) were analyzed. The pooled analysis demonstrated a statistically significant difference favoring mannitol for a lower mean ICP, though the absolute difference was small (MD = 0.84 mmHg; 95% CI: 0.35 to 1.33). Moderate, non-significant statistical heterogeneity was identified across the included trials ($I2=43.4\%$; $\tau2<0.0001$; $p=0.1708$). Individual study estimates ranged from an MD of -1.46 (Kumar) to 1.20 (Jagannatha), with the overall effect heavily driven by the Huang trial (86.5% weight). Conclusion: Results: indicate that while equiosmolar doses of hypertonic saline and mannitol yield close profiles, mannitol demonstrated a statistically superior, marginal reduction in mean ICP. The relatively low heterogeneity supports the consistency of these findings across the included equiosmolar clinical protocols, though clinical significance requires further exploration.

CETTI-P-55: Medium-Term Outcomes of Gradual Deformity Correction for Neglected and Recurrent Blount's Disease in Skeletally Mature Patients

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Background: Neglected and recurrent Blount's disease in skeletally mature patients is associated with severe multiplanar deformity, pain, functional limitation and abnormal knee loading. While gradual deformity correction using circular external fixation is well described in paediatric populations, there is limited evidence regarding its use in skeletally mature patients. Aims: The aim of this study was to review the medium-term outcomes of gradual deformity correction for neglected and recurrent tibial deformity in skeletally mature patients. Methods: A retrospective review was performed of skeletally mature patients with neglected or recurrent Blount's disease treated using a hexapod circular external fixator. Demographic, radiographic and patient-reported outcome data were collected. Radiographic assessment included mechanical axis deviation (MAD), mechanical lateral distal femoral angle, medial proximal tibial angle (mMPTA), valgus angle and procurvatum. Pain and quality of life were assessed using the Visual Analogue Scale (VAS) and 12-Item Short Form Survey (SF-12). Pre- and postoperative outcomes were compared. Results: Seventeen patients (25 limbs) were included. The median age was 19 years (IQR 18–23), with a median time in frame of 210 days (IQR 162–274). Significant improvements were seen in MAD (74.0 to 19.9 mm), mMPTA (68.6° to 88.6°), valgus angle (29.2° to 6.4°), procurvatum (27.0° to 12.5°), VAS pain scores (100 to 10), and SF-12 physical and mental component scores (all $p < 0.05$). No significant association was found between radiographic correction and patient-reported outcomes. Conclusion: Gradual deformity correction using a hexapod circular external fixator achieved substantial improvement in lower limb alignment, pain and quality of life in skeletally mature patients with neglected or recurrent Blount's disease. These findings support its

CETTI-P-56: DNMT2 expression in HIV-TB infected and unifected tissues.
BHSc alumni

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2905645@students.wits.ac.zaTopic: Determination of DNA methyltransferase (DNMT2) expression levels in HIV-TB infected and uninfected tissues. Rosina Tloubata1; Musa Marimani1 1Anatomical Pathology, School of Pathology, University of the Witwatersrand, Johannesburg, South Africa. 2905645@students.wits.ac.za Background: Human immunodeficiency virus (HIV) remains a major public health challenge in South Africa, where HIV-TB co-infection contributes substantially to morbidity and mortality. Despite the use of antiretroviral and anti-tuberculosis therapies, treatment challenges such as drug interactions, toxicity, and drug resistance persist. Epigenetic mechanisms, particularly DNA methylation, have emerged as important regulators of host immune responses and may contribute to the pathogenesis of HIV-TB co-infection. Aims: This study aimed to determine the expression levels of DNA methyltransferase 2 (DNMT2) in formalin-fixed paraffin-embedded (FFPE) tissues from HIV-TB infected and uninfected individuals. Methods: Total RNA was extracted from FFPE tissues and reverse transcribed into complementary DNA (cDNA). Conventional polymerase chain reaction (PCR) was performed to confirm DNMT2 amplification, followed by real-time PCR to quantify gene expression levels. Results: Conventional PCR generated the expected DNMT2 amplicon of approximately 150 bp. Real-time PCR demonstrated a significant upregulation of DNMT2 expression in HIV-TB tissues, with approximately 12-fold higher expression than in uninfected controls ($p < 0.05$; Mann-Whitney U test). Conclusion: These findings suggest that DNMT2 may play a role in the epigenetic regulation associated with HIV-TB co-infection and highlight its potential relevance in understanding host-pathogen interactions during infectious disease. Keywords: TB; HIV; Epigenetics; DNMT2

CETTI-P-57: Beyond Bronchodilation: A Systematic Review of the Pathophysiological and Clinical Effects of Nebulized Ketamine in Airway Hyper-responsiveness

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Background: Airway hyper-responsiveness is a defining feature of obstructive airway diseases such as asthma. Although systemic ketamine has established bronchodilatory effects, nebulized delivery may provide targeted airway therapy while limiting systemic adverse effects. Aims: To systematically evaluate the mechanisms, efficacy, and safety of nebulized ketamine for airway hyper-responsiveness using clinical and preclinical evidence. Methods: A systematic review was conducted according to PRISMA guidelines. PubMed, Scopus, Web of Science, CENTRAL, and CINAHL were searched from inception to April 2026. Eligible studies included human and animal investigations evaluating nebulized or inhaled ketamine for bronchoconstriction. Risk of bias was assessed using the Cochrane RoB 2 tool for clinical studies and the SYRCLE tool for animal studies. Results: Four studies met the inclusion criteria, comprising two clinical trials and two animal studies. Nebulized ketamine was well tolerated in human subjects and improved peak expiratory flow by 29.4% in corticosteroid-resistant asthma, with efficacy comparable to intravenous magnesium sulphate. Animal studies demonstrated dose-dependent suppression of airway hyper-responsiveness, reduced airway inflammation through decreased interleukin-4 and nitric oxide levels, and attenuation of fibrosis and airway remodelling via inhibition of epithelial-mesenchymal transition. Conclusion: Nebulized ketamine demonstrates bronchodilatory, anti-inflammatory, and anti-remodelling effects, supporting its potential as an adjunctive therapy for severe corticosteroid-refractory asthma. Current evidence is promising but limited. Larger multicentre randomized controlled trials are required to establish optimal dosing, long-term safety, and clinical effectiveness before routine implementation.

CETTI-P-58: Implementing the Guide for Monitoring Child Development (GMCD) Tool in a Tertiary Care Institution: Healthcare Workers' Experiences

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Background: In South Africa, 38% of young children are at risk of developmental delay. Developmental monitoring is essential for early identification and timely intervention, yet it is often inadequately performed during routine child health visits. This study evaluated the acceptability of the international Guide for Monitoring Child Development (GMCD) tool among healthcare workers (HCWs) within paediatric outpatient clinic settings at a tertiary care institution. Methods: A prospective quantitative cross-sectional descriptive study was conducted at Steve Biko Academic Hospital (SBAH) in Tshwane, Gauteng. GMCD trained HCWs, were recruited to a three month period of implementing the GMCD tool in their respective paediatric outpatient clinic settings. HCWs administered the GMCD tool to children aged 1–36 months, accompanied by their primary caregivers (aged ≥18 years). Acceptability was assessed during and post implementation using the Theoretical framework acceptability (TFA) questionnaire. Results: Thirteen HCWs enrolled in the study, with a mean age of 34 (SD = 8.5). Most of the HCWs (92%) were from allied profession. The majority (69%) had no prior experience with

standardised developmental tools. Three participants withdrew during the implementation phase. Among 60 GMCD interviews conducted, 24 children were age-appropriate, 25 delayed, and 11 significantly delayed. The acceptability post implementation was 40% acceptable and during the implementation, 31%. However, the difference in proportion, was not statistically significant (p=0.645). Conclusion: The GMCD tool was acceptable to HCWs working in a paediatric outpatient clinic setting of a tertiary care institute. Results: highlight the role of HCWs and contextual factors influencing implementation, warranting further research to inform policy and scale-up in South African public healthcare.

CETTI-P-59: Clinical characteristics and outcomes of invasive antimicrobial-resistant infections in infants <90 days of age

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Background: Neonatal deaths account for 45% of under-5 deaths globally with over 1 million neonatal deaths attributed to severe infections annually. Antimicrobial resistance is a growing global concern, with pathogens such as Klebsiella pneumoniae, Acinetobacter baumannii, Escherichia coli and Staphylococcus aureus classified among the World Health Organization's critical priority pathogens due to their high resistance profiles and clinical impact. This study aimed to determine the burden of invasive K. pneumoniae, A. baumannii, E. coli and S aureus in infants <90 days of age. Aims: To describe the clinical epidemiology and outcomes of culture-confirmed K. pneumoniae, A. baumannii, E. coli and S. aureus sepsis in infants less than 90 days of age in South Africa. Methods: Prospective surveillance was conducted among hospitalized infants <90 days of age with culture-confirmed K. pneumoniae, A. baumannii, E. coli and S. aureus across four hospitals in three provinces in South Africa, from January 2024 to December 2025. Result: Of 1052 infants, 491 (47%) had K. pneumoniae, 349 (33%) had A. baumannii, 115 (11%) had S. aureus, and 97 (9%) had E. coli. Of the 1082 episodes recorded, 106 (9.8%) were polymicrobial, and 62% (n=66) of these were due to A. baumannii and K. pneumoniae co-infection. The majority of cases were in low-birth-weight infants of <2500g, (815, 77%). The case fatality rate was highest for A. baumannii (59.4%), followed by K. pneumoniae (45.2%), E. coli (34%), and S. aureus (31.3%). Conclusion: Antimicrobial- resistant infections remain a major cause

CETTI-P-60: Development of preclinical mRNA vaccine candidates against Rift Valley Fever virus

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Background: Rift Valley fever virus (RVFV) is a mosquito-borne zoonotic pathogen that causes significant disease in humans and livestock across Africa and the Middle East. Despite its important public health and economic impact, currently there is no licensed human vaccine available. While existing vaccine candidates including live-attenuated and inactivated formulations are promising, they have been shown to have face safety concerns, scalability challenges, and restricted use in pregnant animals. Messenger RNA (mRNA) vaccines offer a promising platform for rapid vaccine development against emerging and re-emerging viral pathogens. Aims: This project focuses on the design and development of a novel RVFV mRNA vaccine candidate. The vaccine construct encodes the RVFV glycoproteins Gn and Gc, the main targets of neutralising antibodies and essential mediators of viral entry. Methods: Codon optimisation was performed to enhance translational efficiency in mammalian cells, while incorporation of enhancer and tag sequences was carried out to improve expression and facilitate downstream purification. Sequence engineering further included minimisation of stable secondary structures to enhance expression. Results: The RVFV mRNA vaccine construct was successfully designed and synthesized, with in silico analyses predicting favourable immunogenic potential. Conclusion: Future work will involve in vitro transcription (IVT) of RVFV vaccines. To enhance protein expression and reduce innate immune stimulation, modified nucleotides and TriLink CleanCap AG will be incorporated during IVT. The mRNA will then be encapsulated into lipid nanoparticles and antigen expression, immunogenicity, and protective efficacy will be evaluated in preclinical mouse models. The approach represents a promising strategy to overcome limitations of existing RVFV vaccines.

CETTI-P-61: Characterisation of a multivalent mRNA construct for the development of a vaccine strategy against the monkeypox virus (MPXV)
BHSc alumni

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Background: Monkeypox virus (MPXV) is the causative agent of monkeypox disease (Mpox). In Africa alone, nearly 1,600 deaths were recorded between 2022 and 2024. Currently, there are no Mpox-specific vaccines available. The success of mRNA vaccine platforms during the COVID-19 pandemic demonstrated notable protection against infection. mRNA platforms boast

ease of production, dosage control and efficient packaging into lipid nanoparticles (LNPs). Immunogenic MPXV antigens-encoding B6, A35, H3, M1, and A29 have been selected to produce a multivalent mRNA sequence for this study. Aims: This project aims to develop a vaccine against the MPXV using mRNA technology. To achieve this, DNA templates were used to produce MPXV antigen-encoding mRNA via in vitro transcription. Methods: MPXV-encoding sequences were designed and cloned into an mRNA expression cassette comprising a T7 promoter sequence and additional elements necessary for translation. Additionally, the MPXV-encoding sequence was engineered to include a FLAG tag at the 3' end. The cassette was linearised and T7 RNA polymerase was used to bind to the T7 promoter sequence to initiate transcription. The addition of a cap analogue yielded transcripts mimicking endogenous mRNA. Huh7 cells were transfected with the resulting MPXV-encoding mRNA and expression was assessed by immunocytochemistry. Results: Immunofluorescence staining demonstrated robust expression of FLAG-tagged protein in Huh 7 cells. Conclusion: Preliminary data strongly suggest proper folding of the MPXV polyprotein sequence. A dose-dependent study using LNP-encapsulated MPXV-encoded mRNA is underway in mice. We anticipate that the vaccine will elicit strong humoral and cellular immune responses, offering a promising approach for Mpox prevention.

CETTI-P-62: Refining Perioperative Blood Loss Estimation: An Evaluation of Gravimetric and Absorptive Capacities of Various Surgical Textiles at Chris Hani Baragwanath Academic Hospital

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Background: Haemorrhage remains the leading cause of mortality in the operating room and accurate blood loss estimation is a fundamental principle in patient blood management. Despite recognised limitations and poor inter-observer accuracy, visual blood loss estimation remains the predominantly used method worldwide. Surgical textiles are one of the major factors that are observed as they absorb a substantial proportion of intraoperative blood; however, limited data exist regarding their gravimetric and maximum absorptive capacities, particularly within the South African setting. Aims: To determine the gravimetric values and maximum absorptive capacities of surgical textiles commonly used at Chris Hani Baragwanath Academic Hospital and develop a comprehensive Blood Loss Estimation Diagram (BLED) Wheel/Table that can be used in all operating theatres. Methods: This laboratory-based experimental study evaluated twelve categories of surgical textiles used in minor and major surgical procedures. Physical characteristics like Textile dimensions, material composition, gravimetric and volumetric capacities using water and blood were assessed. Comparative analyses between textile types and manufacturers were performed. Results: Preliminary findings from ongoing data analysis demonstrate substantial variability in absorptive capacities and gravimetric characteristics between textile types. Larger surgical textiles appear to retain considerably greater blood volumes than smaller materials, suggesting that surgical textiles cannot be considered equivalent with respect to blood absorption. Conclusion: Commonly used surgical textiles exhibit significant heterogeneity in their blood-holding capacities and gravimetric characteristics. This study generates objective reference dataset for the development of the BLED, a novel, low-cost innovation designed to improve perioperative blood loss estimation and support patient blood management, particularly in resource-constrained settings.

CETTI-P-63: The antifungal activity of essential oils in treating onychomycosis- a biochemometric approach

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Background: Onychomycosis remains a persistent public health challenge, accounting for nearly 50% of nail disorders. Conventional antifungal therapies are limited by low cure rates, high recurrence, poor nail penetration, prolonged treatment duration, and emerging microbial resistance. Essential oils offer promising alternatives with broad-spectrum antimicrobial properties, minimal side effects, and good nail penetration. Aims: This study aimed to evaluate the antifungal activity of 32 essential oils and their combinations against clinically relevant pathogens of onychomycosis, assessed toxicity, examined phytochemical profiles, and identified bio-active compounds using chemometric techniques. Methods: Essential oils and combinations were screened using the broth microdilution assay. Toxicity was evaluated using the brine shrimp lethality assay. Chemical characterization was undertaken using Gas Chromatography-Mass Spectrometry (GC-MS) and chemometric techniques were used to correlate phytochemical profiles with antifungal activity. Results: Cympogogon martini (palmarosa) and Cinnamomum zeylanicum (cinnamon) exhibited noteworthy activity against eight of the nine pathogens studied with MIC values ranging from 0.28–1.00 mg/ml and 0.31-1.00 mg/ml, respectively. The combination of Pelargonium graveolens (rose geranium) with Santalum austrocaledonicum (sandalwood) was notably active against four pathogens. Most single oils and combinations were toxic at effective concentrations except the combination of Melaleuca alternifolia (tea tree) with Eucalyptus globulus (eucalyptus) which showed additive interactions across six pathogens and remained non-toxic at 1.00 mg/mL. The GC-MS and chemometric models identified eugenol and geraniol as putative biomarkers of antifungal activity. Conclusion: and Implications: This research highlights the value of essential oils and their combinations as potential antifungal candidates. It could lead to the development of effective therapies that manage chronic fungal infections

CETTI-P-64: Establishing ABI Values of Healthy South Africans

BHSc alumni

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Background: The ABI is a non-invasive and accessible method of screening for PAD. The studies that first proposed its < 0.90 threshold had significant age, sex and ethnic limitations. Aims: We established the ABI values of healthy South Africans to determine their mean ABI and any sex and ethnic-related differences in ABI. Methods: Anthropometric measurements (weight, height, waist circumference), seated brachial blood pressure and ABI readings of healthy (no PAD) participants aged 18 years and above were taken. Average ABI was calculated by adding the left and right ABI readings and dividing the sum by two. Unpaired t-tests and Mann-Whiteny tests were used to compare variables between the two sexes and between the two ethnic groups. A Two-way ANOVA was used to determine sex-specific ethnic-related differences. Results: The mean average ABI of healthy South Africans (1.07 ± 0.06) is higher than the threshold of <0.90. No sex-related differences in left ($p = 0.6653$), right ($p = 0.5160$) and average ABI ($p = 0.8490$) were observed. African ethnicity had a significantly lower right ($p = 0.0255$) and average ABI ($p = 0.0033$) than white ethnicity. African women had a significantly lower right ($p = 0.0295$) and average ABI ($p = 0.0007$) than white women. Conclusion: African ethnicity was related to having a low ABI regardless of the distribution of traditional risk factors. These results suggest that the international standards for diagnosing PAD using the ABI might not be as accurate when applied to young and healthy African individuals.

CETTI-P-65: Early Implementation Outcomes of Long-Acting Depot Buprenorphine Integrated with Infectious Disease Care Among People Who Inject Drugs in South Africa
BHSc alumni

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Background: People who inject drugs (PWIDs) are at risk of infectious, blood borne diseases (IDs), with limited access to opioid agonist therapy (OAT). Long-acting depot buprenorphine (LADB) reduces dosing frequency and may improve management of IDs and opioid dependence. We report on early outcomes of LADB integrated with IDs care among PWIDs in Johannesburg. Aims: To evaluate LADB uptake, early effectiveness, and IDs outcomes. Methods: This implementation study, conducted in Yeoville, screened participants for HIV and hepatitis C virus (HCV) at baseline. Participants received sublingual buprenorphine (≥ 7 days), weekly LADB injections (x 4) and then monthly LADB injections. IDs management was integrated into care. Data from clinical logs, questionnaires, and laboratory results (October 2025 to June 2026) were analysed descriptively. Results: Of 228 PWIDs engaged, 107 (47%) showed interest and were screened. Eighty (75%) participants were enrolled (74 males, 6 females; mean age 39 years). Following induction, 41 (51%) received at least one LADB injection. Among these, 31 (76%) reported no opioid use for over seven days at their last visit. Most participants reporting ongoing opioid use had missed scheduled LADB doses and twenty-one (26%) were lost to follow-up. Overall, 34 (43%) tested HIV-positive and all were initiated on antiretroviral treatment, 37 (46%) had confirmed chronic HCV infection, 25 (68%) initiated on directly acting antivirals. Conclusion: Early findings suggest LADB is feasible and associated with reduced opioid use. HCV and HIV burden among PWIDs in Johannesburg is high. Integrating OAT with ID diagnostics and care may improve access to comprehensive treatment. Strategies to improve OAT retention are needed.

CETTI-P-66: "Sputum is King": Understanding Trust in Tuberculosis Diagnosis

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Background: Tongue swabs have emerged as a promising non-invasive alternative to sputum for tuberculosis (TB) diagnosis, but successful implementation depends on acceptance by patients and healthcare workers (HCWs). This study explored patient and HCWs perceptions of TB specimen collection methods and the factors influencing acceptance of tongue swabs in South Africa. Methods: A qualitative approach was employed, conducting six focus group discussions with HCWs and 24 in-depth interviews with patients across KwaZulu-Natal, Limpopo, and the Western Cape. Data were analysed thematically using ATLAS.ti to explore preferences and experiences regarding various specimen collection modalities. Results: Participants praised tongue swabs for being quick, discreet, and comfortable. However, concerns regarding reliability persisted, with some questioning how TB could be detected from the "tip of the tongue". Despite being viewed as uncomfortable and stigmatising, sputum was repeatedly described as the specimen participants trusted most because it was viewed as the established method for TB diagnosis. Patients expressed preferences for blood tests and chest X-rays, believing they enable clinicians to "check everything". While HCWs viewed urine collection as simple, patients associated it with pregnancy and stigma. Confidence in testing was also influenced by the performance and identity of the HCW during collection. Conclusion: and Implications: TB testing acceptability is shaped by trust, convenience, dignity, and perceived value rather than diagnostic performance alone. Successful implementation of tongue swabs requires targeted communication to build scientific trust in accuracy and address the longstanding trust in sputum-based testing. Implementation strategies must prioritise patient dignity and consider integrating TB screening into broader health assessments to enhance overall uptake.

CETTI-P-67: Comparing Tools to Capture Patient Preference in Sample Type for Tuberculosis Testing
BHSc alumni

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Background: Understanding diagnostic methods aligned with patient needs is critical for expanding access to early diagnosis. Dedicated preference assessment research is essential for uncovering the concerns, experiences, and values of people affected by tuberculosis (TB). Aims: We compared three tools used to assess patient preferences; Likert scales (LS), Discrete Choice Experiments (DCEs), and Quadratic Voting (QV). Methodology A mixed methods study using quantitative surveys and qualitative interviews was conducted in 10 primary healthcare facilities across Western Cape, Kwa-Zulu Natal, and Limpopo. Patients who experienced tongue swab and sputum TB collection methods were sampled, and consented to participate. Preference data were collected using a structured REDCap questionnaire with three quantitative assessments, followed by in-depth interviews that were transcribed and thematically analysed using Atlas.ti. Results: Participants and field staff reported that the LS was the easiest to administer and understand. Contrastingly, the DCE was more time-consuming and cognitively demanding, while the QV tool was the most challenging due to its credit-based voting system. However, once participants understood the QV approach, it encouraged deeper reflection and more considered responses. Participants also felt that the wording or structure of questions limited their choices particularly in the DCE. All three methods identified that testing for multiple conditions not just TB, in a single specimen type was preferred. Conclusion: Simpler tools such as LS are easier to administer but provide less comprehensive insights and more complex tools such as QV and DCE provide richer data however are more difficult to understand. This emphasises the need to balance analytical power with feasibility, especially in large-scale preference assessments.

CETTI-P-68: In silico Identification of Repuposed Drugs Targeting Key Pathways in Black African Patients with Pancreatic Ductal Adenocarcinoma
BHSc alumni

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Background: Pancreatic ductal adenocarcinoma (PDAC) is the most common aggressive type of cancer marked by malignancy of the exocrine pancreas. In South Africa, PDAC ranks as the seventh leading cause of cancer-related deaths, with most patients diagnosed at advanced stages. Prognosis remains poor, with a five-year survival rate of approximately 13%. Current therapeutic strategies are limited, and global genomic databases underrepresent African-specific variants, leaving critical gaps in understanding PDAC's molecular drivers. Key gene mutations in KRAS, TP53, and SMAD4 converge on disrupted signaling pathways, highlighting opportunities for targeted therapeutic. Given the urgency of this disease and the lengthy nature of conventional drug discovery, drug repurposing offers a cost-efficient strategy by redirecting existing compounds toward PDAC-relevant pathways. Aims: This study employs an in silico pathway-based approach to identify and prioritise clinically relevant repurposed drugs that target biological pathways disrupted by high-confidence variants in Black African PDAC patients. Methods: Whole exome sequencing (WES) was conducted on 28 FFPE samples obtained from 14 patients (one tumour and one normal per patient) will be filtered to identify key genes associated with these variants. Pathway enrichment analyses will be conducted to identify disrupted biological pathways. These pathways and genes will be mapped to established drug targets, and clinically relevant FDA-approved drugs acting on these targets will be curated. Results: Preliminary results indicate recurrent variant-associated genes converging on oncogenic pathways, with several candidate compounds demonstrating prior clinical evidence of therapeutic relevance. These findings highlight the potential of pathway-guided drug repurposing to deliver actionable strategies for African PDAC patients while reinforcing African genomic representation in cancer research.

CETTI-P-69: Client and provider perspectives on aetiological testing and treatment for sexually transmitted infections in primary healthcare: insights from a pilot trial in Johannesburg, South Africa

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Background: Laboratory-based testing for sexually transmitted infections (STIs) is not routinely available in South African primary health care (PHC). We explored client and provider perspectives on the acceptability and feasibility of integrating laboratory testing and treatment for chlamydia (CT) and gonorrhoea (NG) into PHC services. Methods: Between August 2023 and February 2024, we enrolled 350 sexually active adolescents and young adults (AYA) at elevated STI risk in Johannesburg. Participants were randomized to same-day CT/NG testing and treatment using GeneXpert® on urine samples or standard testing with results and treatment after 24–48 hours. We purposively sampled eight clients and four key informants (healthcare providers/laboratory personnel) for in-depth interviews. Transcripts were analysed using deductive and inductive content

analysis. Results: Among clients, 75% were female (median age 22 years); all key informants were female. Participants unanimously supported STI testing integration, citing improved diagnostic accuracy, particularly for asymptomatic infections. Same-day clients (n=6) valued rapid results and treatment despite longer clinic waits, while standard-testing clients (n=2) appreciated flexible follow-up, although treatment uptake varied. Urine testing was preferred for its comfort and non-invasive nature. Counselling was valued for its empathy, clear education, and risk-reduction support. Client-initiated partner notification was generally acceptable but should consider relationship safety. Key informants considered GeneXpert® testing feasible, noting that nurses could be trained easily and recommending government support for scale-up. Conclusion: Integrating aetiologic STI testing into PHC was highly acceptable to clients and feasible for providers. Same-day results were preferred, while both service models offered benefits. Skilled, non-judgemental counselling supported treatment completion, partner notification, and STI knowledge, supporting wider implementation of STI testing

CETTI-P-70: Evaluating the Quality of Life and Burnout Among Caregivers of Individuals with a Huntington Disease in South Africa
BHSc alumni

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Caregiving for Huntington disease (HD) can place considerable physical, emotional, social, and financial strain on caregivers, yet little is known about these experiences in the South African context. The study aims to assess caregiver quality of life and burnout and to identify factors associated with these outcomes. A quantitative cross-sectional design is being used, and caregivers aged 18 years and older are being recruited through the Division of Human Genetics at the National Health Laboratory Service and private genetic counselling practices using convenience sampling. An anticipated sample size of 10–15 caregivers will complete a demographic and caregiving questionnaire, the WHOQOL-BREF, the Maslach Burnout Inventory, and open-ended questions. Quantitative data will be analysed in SPSS using descriptive and inferential statistics, while open-ended responses will be summarised into themes. Data collection is ongoing, and preliminary findings are expected by September 2026. This study is expected to provide important insight into caregiver quality of life and burnout and to contribute to improved understanding of the challenges faced by caregivers of individuals with a Huntington disease phenotype in South Africa. The findings may inform targeted support interventions and strengthen future research in this area.

CETTI-P-71: Parental Coping in the ICU: A Narrative Analysis of Experiences Following Paediatric Cardiothoracic Surgery
BHSc alumni

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Background: A child's illness requiring cardiothoracic surgery in the ICU is a life event that profoundly disrupts parents. The narrative approach enables us to examine how meaning is constructed and coping is enacted in parents' ongoing stories. Aims: The purpose was to explore parents' stories and sense-making of coping when their child is admitted to the ICU following cardiothoracic surgery. The study was conducted in a highly specialised children's hospital in Johannesburg, South Africa. Methods: We conducted a qualitative narrative study with ten parents through semi-structured interviews. Data were narratively analysed, focusing on how parents constructed their experiences over time and the meanings they ascribed to events and relational contexts that shaped their coping. Interpretive analysis was conducted in a manner consistent with the thematic approaches described by Braun and Clarke. Results: Six themes and twelve subthemes emerged, including parental emotional distress, support systems, information needs, coping strategies, challenges within the healthcare system and recommendations for support. Parents described coping as a dynamic process characterised by fear, helplessness, uncertainty and emotional overwhelm in the unfamiliar ICU environment. Communication, emotional reassurance from nurses, family support, spirituality, and shared experiences with other parents fortified coping. However, communication gaps and isolation exacerbated distress. Conclusion: These findings highlight the importance of family-centred intervention strategies to improve parental coping in ICU settings by promoting emotional support, effective communication, psychological preparation, and peer support. Implication: Strengthening family-centred ICU care through consistent communication, psychological preparation, emotional support, and peer support may enhance parental coping and improve families' experience following paediatric cardiothoracic surgery.

CETTI-P-72: CD44 Knockout in Breast Cancer: Optimisation Clone Isolation and Analysis
BHSc alumni

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Background: Breast cancer is driven by differences in tissue structure, gene expression, and genetic mutations. Cancer stem

cells, often marked by CD44, play a key role in tumour progression, metastasis, and therapy resistance through self-renewal and interactions with the tumour microenvironment. CRISPR technology is an important tool in breast cancer research, enabling identification of genes involved in tumour development, assessment of drug responses, and development of more accurate models for targeted therapies. A key focus is optimising single-cell validation to distinguish true CRISPR-induced changes from background variability in CD44 edited subclones generated at DUTH (Greece). This is achieved by isolating individual cells, forming colonies, and analysing clones for purity and protein expression using Western blotting. Aims: This study aims to optimise single-cell population generation by comparing limiting dilution and manual colony selection in CD44 CRISPR knockout MCF-7 and MDA-MB-231 breast cancer cell lines. Methods: In limiting dilution, cells are seeded at low density in 96-well plates, serially diluted, and monitored to identify wells containing single colonies. In manual picking, cells are cultured in Petri dishes, and isolated colonies are identified, scraped under a microscope, and transferred into 96-well plates. Clones are expanded into larger vessels, monitored, and viable clones selected. Results: Manual picking produces more precise single-cell colonies but has a higher contamination risk, while limiting dilution is faster and lower risk but less reliable for single-cell origin. However, manually picked clones show higher viability and are more suitable for Western blot validation. Conclusion: and Implications Optimising these methods enhances CRISPR by improving target identification and supporting more personalised breast cancer therapies.

CETTI-P-73: Comparison of oral glucose tolerance test plasma glucose concentrations in sodium fluoride and citrate buffer tubes: Does citrate preservation make a difference?

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Background: The diagnosis of gestational diabetes mellitus (GDM) requires accurate plasma glucose measurement obtained from an oral glucose tolerance test (OGTT). Aims: To compare plasma glucose concentration in sodium fluoride (NaF) and citrate buffer tubes obtained from OGTTs in pregnant women. Methods: Blood was collected into NaF and citrate buffer tubes from pregnant women during an OGTT. Paired NaF and citrate tubes were batched according to routine practice (cohort 1; n=58) or centrifuged immediately according to WHO guidelines (cohort 2; n=51). Plasma glucose was measured using the hexokinase method. Passing Bablok regression and Bland-Altman analysis were performed using MedCalc® software. Cohen kappa was used to assess agreement between the two tubes for GDM classification. Results: Plasma glucose was lower in NaF than citrate in both cohorts ($p<0.001$). Mean percentage differences (MPD) for cohort 1 were -8.1%, -4.9%, and -4.5% at fasting, 1-hour post-OGTT, and 2-hours post-OGTT respectively and -2.9% (fasting), and -2.5% (both 1-hour and 2-hour) in cohort 2. All MPDs exceeded the allowable bias specification of 2.3%. GDM classification was lower when NaF tubes were used: 24.1% versus 34.5% [k= 0.75, CI 0.57-0.93] for cohort 1 and 21.6% vs 25.5.% [k=0.89, CI 0.74-1.0)] for cohort 2. Conclusion: The ineffectiveness of NaF as a glycolytic inhibitor was more evident with delayed sample processing, resulting in lower plasma glucose concentrations in NaF than citrate tubes. These results support the recommendation by international guidelines to use citrate tubes. The use of NaF rather than citrate tubes for plasma glucose collection may lead to misclassification of GDM cases.

CETTI-P-74: Production, characterisation, and immunogenicity testing of novel SARS-CoV-2 BA.2.86-based mRNA vaccines
BHSc alumni

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Background: The self-amplifying RNA (saRNA) platform was developed to overcome the need for multiple doses of conventional mRNA vaccines, making it a cost-effective vaccine strategy. This study compared immunogenicity of SARS-CoV-2 BA.2.86-based conventional and saRNA vaccines. Methods: Conventional mRNA and saRNA transcripts were synthesised through in vitro transcription and encapsulated in lipid nanoparticles. Vaccines were administered in BALB/c mice and blood samples were collected at 21 and 35 days post-immunization. Immunogenicity was tested by a multiplex Luminex-based assay and pseudovirus-based neutralization assay. Results: When administered at 1 µg dose, the conventional mRNA vaccine elicited a 33-fold stronger response than the saRNA against the vaccine-matched variant and a later variant, KP.3.1.1. Both vaccines failed to elicit a response at a lower dose of 0.1 µg. The BA.2.86-based conventional mRNA vaccine elicited similar binding and neutralization patterns as other SARS-CoV-2 vaccines. In vitro characterisation of the saRNA transcript showed high protein expression but no amplification over time. Conclusion: Results: from this study offer promise that using a highly divergent immunogen, like BA.2.86, may protect against infection by newly emerging variants; thus, aiding in pandemic preparedness. The saRNA, with further optimisation, might be an effective and cheaper option for low-and-middle income class countries seeking a more cost-effective vaccine strategy. As new variants continue to emerge, there is a necessity for continued development of next-generation vaccines that will offer protection against both earlier and later variants.

CETTI-P-75: Serotonergic Dysfunction in Autism Spectrum Disorder (ASD): Construct Validity of the Prenatal

Valproic Acid Rat Model
BHSc alumni

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Background: Autism spectrum disorder (ASD) is a common neurodevelopmental disorder with an incompletely understood pathophysiology. Increasing evidence implicates serotonergic dysregulation in ASD; however, its contribution remains unclear. Prenatal exposure to valproic acid (VPA) produces a widely used rodent model of ASD, but further molecular characterisation is required to strengthen its construct validity. Aims: The current study aims to evaluate the serotonergic construct validity of the prenatal VPA rat model of ASD by examining central serotonergic markers. Methods: Archived brain tissue from prenatally VPA-exposed and saline-treated male Sprague Dawley rats will be analysed. Quantitative real-time PCR will quantify mRNA expression of SLC6A4, HTR1A, and HTR2A, while enzyme-linked immunosorbent assays (ELISA) will determine brain serotonin (5-HT) concentrations. Results: Molecular analyses are currently underway. Quantitative gene expression and serotonin concentration data will be available for presentation on Research Day. Conclusion: and Implications: This study will provide molecular evidence regarding serotonergic alterations in the prenatal VPA model of ASD. The findings are expected to strengthen the models construct validity and translational relevance, supporting its use in future mechanistic studies and the development of targeted therapeutic strategies for ASD.

CETTI-P-76: Participant choice of tuberculosis testing method (Near point-of-care vs Laboratory based), and diagnostic yield during community-based tongue swab screening

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Background: Tuberculosis (TB) elimination depends on innovative, patient-centred approaches that improve access to timely diagnosis in community settings. Near-point-of-care (NPOC) testing has the potential to fast-track diagnosis and treatment initiation, but little is known about how individuals choose between NPOC and lab-based TB testing methods when offered both options. Aims: Evaluate participant preference for TB testing modality and its association with TB positivity rate. Methods: The ACT-TB study evaluated self-collected tongue swabs for TB screening in community settings. Participants randomised to arm 3 could choose between NPOC (Pluslife MiniDock MTB) and laboratory-based testing (Xpert Ultra). Participants completed TB symptom screening via mHealth-supported surveys and were classified as symptomatic if they reported ≥1 TB symptom. Preferred testing method was compared by symptom status. TB positivity rate was compared between the two testing methods. Results: Of the 4,873 participants enrolled, 1,576 participants were randomised to arm 3. 34.3%(540/1,576) chose NPOC, and 65.7%(1,011/1,576) chose lab-based testing. There was higher NPOC uptake among younger participants (OR 0.99, p=0.026) and those enrolled via WhatsApp (OR 3.39, p<0.001). 26/4,873[JC2.1] participants were diagnosed with microbiologically confirmed TB. Symptomatic participants had approximately twice the odds (OR 2.05, p=0.095) of testing TB positive compared with asymptomatic participants. TB positivity rate was higher among NPOC (3.6%[JC3.1](19/535)) versus lab-based participants (0.2%(2/1,011)). Conclusion: When offered a choice for testing modality, younger participants preferred NPOC. Participants choosing NPOC demonstrated higher diagnostic yield than those opting for laboratory-based testing. Incorporating participant choice into community-based TB screening programmes may improve case-finding by aligning diagnostic pathways with individual risk perception and healthcare-seeking behaviour.

CETTI-P-77: Identification and classification of Cornelia de Lange syndrome genetic variants in a cohort of 7 South African individuals.

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Background: Cornelia de Lange syndrome (CdLs) is a rare multisystem developmental disorder caused by pathogenic variants in genes involved in cohesin function such as NIPBL, SMC1A, SMC3, BRD4, HDAC8 and RAD21. CdLs shares phenotypic features with several genetic disorders, highlighting the importance of accurate genetic testing. Aims: This study aimed to identify pathogenic variants in a cohort of seven South African patients with clinical features suggestive of CdLs. Methods: VCF files generated, using a targeted NGS Inherited Diseases Gene Panel, were annotated using Ensembl VEP. Variants within NIPBL were then prioritised based on minor allele frequency, biological impact, in silico pathogenicity scores and ClinVar classification before being classified according to the ACMG-AMP guidelines. Variant quality, sequencing coverage and zygosity were assessed using IGV. Results: Three of the seven samples contained pathogenic NIPBL variants. Sample 1 contained the c.5465A>G (p.Asp1822Gly) missense variant, sample 2 contained the novel c.6977T>A (p.Met2326Lys) missense variant while sample 5 contained the c.2479_2480del (p.Arg827GlyfsTer2) frameshift variant. Lastly, variant visualisation revealed that all three variants were heterozygous, consistent with autosomal dominant inheritance of NIPBL-associated CdLs. Conclusion: These findings demonstrate the usefulness of targeted NGS for the accurate molecular diagnosis of CdLs. Accurate variant identification will subsequently facilitate recurrence risk assessment and family planning as

different variants result in varying levels of disease severity (missense variants cause milder phenotypes than frameshift variants). Furthermore, identification of a novel variant contributes to the mutational spectrum of CdLs, while the absence of NIPBL variants in four patients suggests that investigation of other CdLs-associated genes should be considered.

CETTI-P-78: Formulation of a Nano-enabled Transdermal Microneedle Array Patch for Paediatric HIV treatment

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Background: In South Africa, 160,000 children live with HIV, with 60% receiving antiretroviral therapy (ART). Despite strides in developing child-friendly antiretrovirals (ARVs), regimen-related challenges, such as complex dose preparation, frequent clinical visits, and socioeconomic barriers in low-income settings, continue to drive poor adherence, drug resistance, and treatment failure. Therefore, simpler, long-acting paediatric formulations are required. Aims: To develop a dissolving microneedle (MN) patch for sustained delivery of dolutegravir sodium (DTG-Na) loaded within polymeric nanoparticles (NPs) for paediatric ART. Methods: DTG-Na-loaded NPs, formulated via nanoprecipitation using non-toxic synthetic polymers (Eudragit, PCL, PVA), were characterised for size, morphology, and stability using DLS and SEM. FTIR, DSC, and TGA were utilised for chemical and thermal characterisation. Following in vitro release studies, the NPs were incorporated into dissolving MN patches fabricated from biodegradable polymers. Results: Spherical NPs (110 - 200 nm, optimal for skin residence) exhibited high uniformity (PDI: 0.093 - 0.246) and colloidal stability (zeta potential: -23 to -40 mV). FTIR and entrapment studies confirmed successful encapsulation (38.8% efficiency). In vitro studies demonstrated sustained drug release, with 40% release over 48 hours. These NPs were successfully incorporated into a 10x10 MN patch that dissolved within 15 minutes releasing the NPs. Conclusion: The successful development of a DTG-Na-loaded MN patch highlights the potential of this formulation as a simple, long-acting, and child-friendly ARV formulation for paediatric HIV treatment. This proof-of-concept offers simple administration and an easily scalable design for weight-related dose adjustments. It promises to improve ART adherence in low-income settings, with broader applications for delivering paediatric antibiotics, vaccines, and analgesics.

CETTI-P-79: Analysis of sequence variants in South African patients presenting with Osteogenesis Imperfecta. Viwe Soci, Nkateko Mayevu, Odirile Tabane, Lindie Lamola, Thandiswa Ngcungcu, Dylan McCarthy, Vimbai Siziba, Katryn Fourie, Robyn Kerr, Amanda Krause and Maria Mabyalwa Mudau1.

Viwe Mpho Soci*, *Nkateko Mayevu, Odirile Tabane, Lindie Lamola, Thandiswa Ngcungcu, Dylan McCarthy, Vimbai Siziba, Katryn Fourie, Robyn Kerr, Amanda Krause, Maria Mabyalwa Mudau*

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Background: Osteogenesis Imperfecta (OI) is a rare hereditary skeletal dysplasia predominantly caused by pathogenic variants in the COL1A1 and COL1A2 genes, which encode type I collagen. Although the genetic basis and clinical presentations of OI have been extensively described in literature, the relationship between specific disease-causing variants and variable clinical presentations in the South African population remains poorly described. Aims: this study sought to identify and characterize putative disease-causing variants associated with OI in a South African cohort of seven patients. Methods: previously generated sequencing data from the Ion Torrent platform, using the Ion AmpliSeq™ IDP, was analyzed. VCF files were annotated using the Ensembl VEP and manually prioritized based on population allele frequency, predicated functional impact, variant type and clinical significance. Clinically relevant variants were visualized using IGV and classified according to the American College of Medical Genetics and Genomics and Association for Molecular Pathology (ACMG-AMP) guidelines. Results: three clinically significant variants in patient 4 [COL1A1 (NM_000088.4):c.3505G>A (p.Gly1169Ser)], 5 [COL1A1 (NM_000088.4):c.2110G>A (p.Gly704Ser)] and 6 [COL1A2 (NM_000089.4):c.1100G>A (p.Gly367Glu)] were classified as likely pathogenic according to the ACMG-AMP guidelines. Conclusion: this study demonstrates the potential of the targeted gene panel to identify clinically significant SNVs contributing to the genetic characterization of OI in an underrepresented South African population. CNVs were not analyzed in this study. identified clinically significant variants will inform risk counselling, cascade testing and management planning for affected families. Genotype-phenotype correlation can inform decisions around bisphosphonate therapy and orthopaedic intervention. This study addresses critical gaps in variant databases and supports improved diagnostic strategies in resource-constrained settings.

CETTI-P-80: Investigating the Role of TNALP Activity in Colorectal Cancer Cell Migration and Tumour Architecture
BHSc alumni

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Background: Colon cancer (CRC) remains a leading cause of cancer-related mortality globally, with tumour invasion and metastasis responsible for poor clinical outcomes. Phosphorylation-dependent signalling networks regulate these processes. Membrane-associated phosphatase, Tissue non-specific alkaline phosphatase (TNALP), involved in protein

dephosphorylation, has been implicated in cancer biology, but its contribution to tumour architecture, cell migration and signalling in CRC remains poorly understood. Aims: To investigate the effects of TNALP inhibition on tumour architecture, cytoskeletal organisation, β-catenin localisation, and migratory behaviour in DLD-1 CRC cells. Methods: A preliminary IC50 value of a TNALP inhibitor, levamisole chloride, was determined using a live-cell/dead-cell viability assay. DLD-1 Tumour spheroids are being analysed for alterations in three-dimensional architecture, and cell migration will be quantified using an in vitro scratch assay to evaluate whether inhibition of ALP activity reduces migratory capacity. In addition, confocal microscopy will be used to evaluate nuclear morphology, cytoskeletal organisation and β-catenin localisation following treatment. Results: Preliminary IC_{50} analysis of levamisole chloride estimated an IC_{50} of approximately 10 mM. Cell viability decreased from 66% in untreated controls to 61% at 1mM, 47% at 5mM and 35% at 10mM levamisole. Additional biological replicates are underway to refine IC_{50} before functional analyses are completed. Conclusion: TNALP inhibition is expected to alter spheroid architecture and reduce the migratory capacity of DLD-1 cells. These findings will provide insight into the role of ALPs in colorectal cancer cell behaviour and inform future studies evaluating alkaline phosphatase activity as a potential therapeutic target in colorectal cancer.

CETTI-P-81: One Clinic, Integrated Care: A Cost Analysis of Trans-Inclusive Gender-Affirming and HIV Service Delivery in Johannesburg, South Africa.

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Background: Integrated gender-affirming and HIV services for transgender people (TGP) remain limited in South Africa. A transgender-specific differentiated service delivery (TG-DSD) model, integrating gender-affirming hormone therapy (GAHT) with HIV services, was designed and delivered through fixed and mobile clinics. Aims: We estimated the provider costs of delivering integrated TGP services in Johannesburg, South Africa, to inform government budgeting for these services. Methods: We analysed resource use from the provider perspective, using an ingredients-based costing approach assuming complete retention in care. Variable costs included client-facing staff, laboratory tests, drugs and consumables, estimated using standard operating procedures and public-sector guidelines. Fixed costs, derived from expenditure reports, included start-up costs, overheads, support personnel, oversight visits, demand creation, community mobilisation, and mobile clinic operations. We report average costs per client-year for stand-alone and integrated services in 2024 South African Rands. Preliminary Findings Year one average costs varied by service package and year of provision: PrEP-only: R3,484/client, ART-only: R4,888/client and GAHT-only: R11,052/transgender woman (TGW) and R7,909/transgender man (TGM). Integrated packages cost R11,830/TGW and R8,868/TGM for GAHT+PrEP, and R13,343/TGW and R8,539/TGM for GAHT+ART, rendering integrated services between 16% and 33% cheaper than the combined cost of separate services. Average costs decreased substantially (43-63%) from year two onwards due to fewer clinic visits. Among variable costs, drugs (29-47%) and client-facing staff (9-35%) were the main cost drivers, with site-level personnel driving fixed costs (60-64%). Conclusion: Integrating GAHT and HIV services for TGP reduced costs/person. Results: support government budgeting and policy for maintaining threatened gender-affirming and HIV services in South Africa.

CETTI-P-82: Interpretation of variants in patients presenting with xeroderma pigmentosum

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Background: Xeroderma pigmentosum (XP) is a rare autosomal recessive DNA repair disorder associated with ultraviolet sensitivity, ocular involvement and increased skin-cancer risk. Genetic heterogeneity and overlap with related nucleotide excision repair disorders complicate molecular diagnosis and variant interpretation. Aims: This study aimed to prioritise and classify variants in suspected XP using existing targeted NGS data from seven anonymised cases and to validate one selected candidate variant using Sanger sequencing. Methods: A retrospective descriptive design was used. Literature-based XP and differential-diagnosis gene lists guided variant filtering. VCF files were annotated using Ensembl VEP on GRCh37/hg19. Variants were prioritised according to gene relevance, consequence, predicted impact, population allele frequency and clinical significance. Shortlisted variants were classified using ACMG/AMP guidelines and assessed using IGV. Primers will be designed for XPC (NM_004628.5).2251G>C (p.Val751Leu) for downstream PCR and Sanger sequencing. Results: Seven prioritised variants were identified across four samples in XPA, ERCC2, and XPC. Three variants were classified as pathogenic, three as likely pathogenic and one as a variant of uncertain significance. The recurrent XPC c.2251-1G>C splice-site variant was identified in three samples. XPC c.2251G>C (p.Val751Leu), a heterozygous likely pathogenic variant, was selected for primer design and downstream validation. Conclusion: The study identified clinically relevant variants in genes associated with XP and related DNA repair disorders. These findings support structured, indication-guided variant interpretation and may contribute to improved molecular investigation of suspected XP in the South African diagnostic context.

CETTI-P-83: Towards the Development of an Affordable sub-Saharan Africa-Focussed Trivalent HPV Vaccine Using the C1 Expression Platform

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Background: Cervical cancer (CCa) is projected to increase substantially in sub-Saharan Africa (SSA), with approximately 95% of cases attributable to human papillomavirus (HPV). Current licensed HPV vaccines (e.g. Cervarix) primarily target HPV16 and HPV18, however, HPV35, which is disproportionately prevalent among CCa cases in SSA, is not covered. Importantly, unaffordable costs and supply-chain constraints limits vaccine access. HPV vaccines are based on the L1 capsid protein, which self-assembles into highly immunogenic virus-like-particles (VLPs). Aims: To develop a safe and regional-specific trivalent HPV vaccine that protects against subtypes 16, 18 and 35, using C1, a high yield, low-cost, fungal-based recombinant protein production system. Methods: L1 gene cassettes and recombinant plasmid constructs were designed for integration of L1-HPV16, 18 and 35 into the C1 genome. C1 protoplasts were transformed and cell lines selected using the pyr4 system. These were verified through VLP expression and immunoblot analysis using anti-HPV antibodies. VLPs will be purified using size exclusion and ion-exchange chromatography, and characterised for size using PAGE, structure using TEM, and consistency using dynamic light scattering. Safety, immunogenicity and efficacy in pseudoviral challenge studies will be evaluated following formulation with AS04 (Cervarix) and novel adjuvants. Results: Novel C1 lines expressing L1-HPV16, 18 and 35 were created. Each L1 was confirmed using SDS-PAGE and immunoblotting. L1-HPV35 was expressed intracellularly. Improved expression and characterisation of VLPs are ongoing. Conclusion: Novel C1 cell lines that express vaccine antigens for a regional-specific trivalent HPV vaccine have been achieved. The local development and production of a next generation HPV vaccine which can be used to address regional needs.

CETTI-P-84: Multivalent Self-amplifying RNA Vaccines against Hepatitis B Virus Elicits Improved Immune Responses
BHSc alumni

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Background: Vaccination against Hepatitis B virus (HBV) remains the most effective means of preventing infection. However, approximately 10 % of vaccinees do not mount protective immune responses to currently available subunit vaccines targeting the small surface antigen (SHBs) leaving them vulnerable to infection. In addition, subunit vaccines cannot elicit interferon immune responses required for eradication of intracellular pathogens. The large surface antigen (LHBs) contains the SHBs-domain as well as the receptor-binding PreS-domain making it a more immunogenic protein. Aims: The aim of this project was to develop improved vaccines against HBV by targeting LHBs and using the self-amplifying RNA (saRNA) vaccine platform to elicit both cellular and humoral immune responses. Methods: SaRNAs encoding SHBs or LHBs were synthesized by in vitro transcription and formulated with ionizable lipids. BALB/c mice were immunized with 5 micrograms of individual antigen-encoding saRNAs, a combination of saRNAs encoding SHBs and LHBs in a 1:1 or 4:1 ratio, or a subunit comparator vaccine. Vaccines were administered intramuscularly as a 4-week prime-boost regimen. Humoral immune responses were quantified by ELISAs and HBV neutralization assays. Cellular immune responses were assessed by Fluorospot and intracellular cytokine staining of peptide-stimulated splenocytes. Results: saRNAs encoding secretable LHBs induced antibodies targeting the PreS domain. Combining saRNAs encoding SHBs and LHBs induced neutralizing antibodies against both domains. Immunization with saRNAs also induced polyfunctional Th1-cytokine secreting cells which were not observed in mice that received subunit vaccines. Conclusion: Multivalent saRNA vaccines may induce better immune responses and confer protection to vaccine non-responders.

CETTI-P-85: Development of a Multimeric L1-Based Subunit Vaccine Against HPV 16, 18 & 35

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Background: Human Papillomavirus (HPV) contributes to almost all cervical cancer (CCa) cases, a disease which disproportionately affects sub-Saharan African (SSA) women. Current HPV vaccines are effective but remain costly for resource-constrained settings. Moreover, there is no coverage for HPV-35, an emerging subtype prevalent in SSA. There is a need for cost-effective, novel vaccines with increased coverage. Aims: To develop a subunit-based trivalent vaccine targeting HPV16, 18, and 35, containing monomers of the HPV L1 capsid protein linked to a ferritin nanoparticle scaffold, all produced using Thermothelomyces heterothallica (C1), a low-cost, high-yield fungal expression system. Methods: In silico analysis was used to design L1 monomers that retain key structural elements. Monomers included an N-terminal Spy-tag. Modified L1 genes were synthesized and cloned into C1 vectors containing flanking promoter and terminator regions for integration into C1 loci, and a split marker system. Recombinant plasmids were verified using restriction enzyme analysis. C1 protoplasts were transformed with gene cassettes and cell lines verified using PCR and immunoblotting with anti-HPV antibodies. The next steps are to optimise expression, purify L1 monomers using size exclusion and ion-exchange chromatography, conjugate to Spy-Catcher-Ferritin to form monomeric- and trivalent-nanoparticle vaccines and characterise particles using TEM and dynamic light scattering. Results: Novel L1-HPV16, 18 and 35 C1 cell lines were created. Recombinant protein expression and purification is ongoing. Conclusion: A milestone of creating cell lines in this proof-of-concept study on assembly of

immunogenic, multivalent HPV nanoparticles, has been achieved. Advancing African vaccine sovereignty by using an economical platform technology to address the HPV-35 protection gap on the continent.

CETTI-P-86: Factors Influencing Uptake of Clinical Decision Support Tools by Primary Care Providers in Sub-Saharan Africa: A Rapid Review

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Background: Clinical decision support tools (CDSTs) have the potential to strengthen primary healthcare delivery in sub-Saharan Africa. However, their successful implementation depends on their integration clinical practice. Aims: To synthesise evidence on factors influencing the uptake and sustained use of CDSTs by primary healthcare providers in sub-Saharan Africa. Methods: PubMed and CINAHL were searched for studies published up to 31 December 2023 describing the implementation of CDSTs in primary healthcare settings in sub-Saharan Africa (SSA). Eligible studies underwent independent duplicate screening, and data were extracted on study characteristics and reported barriers and facilitators to uptake. Results: were synthesised using the Normalization Process Theory (NPT) framework. Results: Twenty-four studies evaluating CDSTs across maternal and neonatal care, child health, HIV medicine, mental health, and other primary healthcare services were included. Uptake was greatest when clinicians understood the purpose of the CDSTs (24/24, 100%), perceived them as useful and clinically relevant (19/24, 79%), and were willing to engage with them (21/24, 88%). Reported benefits included improved clinical decision-making (18/24, 75%), quality of care (15/24, 63%), and adherence to clinical guidelines (10/24, 42%). Integration into routine clinical practice varied, with good workflow integration reported in only 8/24 studies (33%) and partial or mixed integration in 13/24 (54%). Principal barriers included limited human resources and inadequate digital infrastructure. Key facilitators were perceived relevance, compatibility with existing clinical workflows, user training, and ongoing implementation support. Conclusion: Successful uptake and integration of CDSTs in primary healthcare settings in SSA depend on perceived usefulness, compatibility with routine practice, adequacy of user training and sustained organisational and technical support.

CETTI-P-87: Analysis of putative disease-causing variants in South African patients suspected of having Sotos syndrome

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Background: Sotos syndrome is an autosomal dominant, fully penetrant overgrowth disorder marked by childhood overgrowth, characteristic facial features, and developmental delay that is underrepresented in African populations. Cases arise from heterozygous NSD1 variants, encompassing SNVs, indels, exon-level CNVs, and splice/intronic changes. Aims: To identify putative disease-causing variants in NSD1 and differential genes linked to Sotos syndrome, and correlate results with clinical data and in relation to overgrowth disorders. Methods: NGS data from seven patients presenting with Sotos syndrome generated from a multi-disease targeted gene panel containing 500 genes associated with monogenic disorders (Sotos being one), was analysed. Genes associated with Sotos where prioritised and analysed. Candidate variants were analysed using various databases and in-silico protein function prediction tools. IGV was used to visualise and confirm presence of the prioritised variants. Putative disease-causing variants were interpreted and classified using American College of Medical Genetics (ACMG/AMP) guidelines. Results: Three patients were identified with putative variants in NSD1. These were classified as pathogenic (Sample 4: NSD1 (NM_022455.5): c.4823dup (p.Pro1609ThrfsTer9) - Homozygous), variant of uncertain significance (Sample 6: NSD1 (NM_022455.4): c.5033G>A (p.Gly1678Glu) - Heterozygous), and likely pathogenic (Sample 7: NSD1 (NM_022455.5): c.5138G>T (p.Cys1713Phe) - Heterozygous). Sample 4 was selected for Sanger sequencing validation. Conclusion: Putative disease-causing variants were identified and classified in an African cohort in 43% of the patients, supporting their diagnostic relevance to Sotos syndrome. This also shows potential diagnostic utility of the targeted gene panel. These findings strengthen African genomic representation while provide supportive care for patients and appropriate counselling on recurrence risks and reproductive planning for family members.

CETTI-P-88: Bridging Epidemiology and Bone Biology in HIV-Associated Osteonecrosis of the femoral head

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Background: The surge in prevalence of osteonecrosis of the femoral head (ONFH) among PLWHIV and the recent detection of HIV RNA within femoral head tissue from virally suppressed patients undergoing total hip replacement (THR) suggests a potential role for HIV in ONFH pathogenesis. Aims: To evaluate the global burden of ONFH requiring THR among PLWHIV and investigate HIV-associated femoral head microstructural changes and their relationship with pain. Methods: Ethical approval was obtained from the Wits Human Research Ethics Committee (M240311). A systematic review and meta-analysis

were conducted according to PRISMA guidelines (PROSPERO: CRD42024585313). Patients undergoing THR for ONFH were prospectively recruited. Resected femoral heads underwent micro-computed tomography, and reconstructed scans were analysed using VGStudio 20.5 to quantify trabecular morphometric parameters. Harris Hip Score (pain component) was correlated with bone morphometry. Statistical analyses were performed in STATA 19.5. Results: PLWHIV had significantly greater odds of undergoing THR for ONFH than HIV-negative individuals (OR 19.93; 95% CI 9.02–37.05; p<0.001). In the prospective cohort (n=44), HIV-positive patients (n=19) underwent THR at a younger age than HIV-negative patients (46.6±9.3 vs 53.6±13.4 years). Femoral heads from PLWHIV demonstrated greater trabecular sclerosis in the proximal junctional weight-bearing regions (BV/TV 80.4% vs 61.4%; p<0.001). Whereas robust junctional zones correlated with less pain in HIV-negative patients, the opposite relationship was observed in PLWHIV (TbSp: rho=-0.546 vs +0.471). Conclusion: PLWHIV are at substantially increased risk of disabling ONFH requiring THR and exhibit distinct HIV-mediated damage that may contribute to pain and functional impairment, supporting further investigation of disease mechanisms and targeted therapies.

CETTI-P-89: Evaluating the Holistic Value of Family-Centered Care in Paediatric Intensive Care Units: A Mixed-Methods Study
BHSc alumni

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Background: Family-centered care (FCC) is increasingly recognised as an essential approach to improving paediatric intensive care, particularly in resource-constrained settings. However, evidence on its perceived holistic value in Ghanaian paediatric intensive care units (PICUs) is limited. Aims: To explore the perceived holistic value of FCC in Ghanaian PICUs from the perspectives of nurses, doctors, and families. Methods: A four-phase mixed-methods study comprising a literature review, qualitative interviews, instrument development, and a quantitative survey was conducted. Twelve purposively selected participants (three nurses, three doctors, three mothers, and three fathers) from two Ghanaian PICUs were interviewed. Qualitative data were analysed thematically and informed the development of a questionnaire completed by 100 participants. Survey data were analysed using exploratory factor analysis and principal component analysis. Results: Participants perceived FCC as promoting family-child bonding, reducing anxiety and staff workload, supporting recovery, improving communication, and enhancing family education. Most respondents (95%) agreed with these benefits. The questionnaire demonstrated good internal consistency (Cronbach's $\alpha > 0.82$). Family education emerged as the strongest contextual value (Eigenvalue = 3.20), explaining 53.3% of the variance. Conclusion: FCC was perceived to empower families, improve parenting confidence, reduce anxiety, strengthen bonding, shorten hospital stays, and lessen staff workload in Ghanaian PICUs. Integrating FCC into PICUs may improve outcomes for critically ill children and their families. Additional staff training and environmental modifications may support effective FCC implementation in resource-constrained settings.

CETTI-P-90: Clinical Evaluation of Glycerol-Preserved Amniotic Membrane versus Acticoat® in Partial-Thickness Burns: A Within-Patient Controlled Trial.

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Silver-based dressings such as Acticoat® are widely used in burn care due to their antimicrobial properties but are often associated with pain during dressing changes and delayed epithelialization. Human amniotic membrane (hAM) has shown regenerative and anti-inflammatory properties, though comparative clinical data against advanced silver dressings remain limited. To evaluate the clinical performance of glycerol-preserved hAM compared with Acticoat® in the treatment of partial thickness burns. A prospective, randomized within patient controlled trial was conducted in 57 patients with paired partial thickness burn sites. Each patient received hAM on one site and Acticoat® on the other. The primary outcome was time to first signs of re-epithelialization. Secondary outcomes included number of dressing changes, pain scores, and incidence of infection. Paired statistical analyses were performed using StataNow/SE 19.5. hAM achieved faster re-epithelialization than Acticoat® (median 6 days, IQR 5–7 vs 7 days, IQR 6–10; p<0.001, Wilcoxon signed-rank test). hAM required no dressing changes following initial application, compared with a mean of 5.1 ± 1.6 changes for Acticoat®. Patient reported pain scores were lower in the hAM group (Day 0: p=0.038; Days 3–14: p<0.001). Infection rates were low and comparable between groups (hAM 12.3% vs Acticoat® 14.0%; p=0.317). Patient feedback indicated a preference for hAM in terms of comfort and reduced wound disturbance. Glycerol-preserved hAM is a safe and effective alternative to Acticoat® for partial-thickness burns, promoting earlier onset of re-epithelialization. It also provides a reduced dressing burden and improved patient comfort without compromising infection control. These findings support further evaluation in larger studies with extended follow up to assess long-term outcomes.

CETTI-P-91: Community-informed implementation of low dead-space needle and syringe distribution among people who inject drugs in Johannesburg, South Africa

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Background: Low dead-space needles and syringes (LDSS/N) are recommended to reduce transmission of blood-borne diseases among people who inject drugs (PWID), but LMIC implementation evidence remains limited. Aims: To explore how PWID preferences, experiences and stakeholder reflection informed LDSS/N implementation in Johannesburg, South Africa. Methods: This qualitative arm of the LDSS/N study within the Unitaid-funded Hepatitis C Combination Prevention in People Who Inject Drugs and Prisons (HepC3P) Project comprised two phases. Phase 1 included three FGDs with PWID accessing needle and syringe services in Ivory Park (n=25) and a reflection workshop. Phase 2 followed a six-week pilot distribution of five LDSS/N options among 30 participants and included three FGDs (n=24) and a second reflection workshop. Transcripts and workshop notes were analysed thematically. Results: Participants assessed LDSS/N products through practical knowledge, including sharpness, pain, blockage, wastage, re-use, visibility and compatibility with everyday injecting practices. Injecting was sometimes relational, with partners, friends and informal "doctors" influencing trust in equipment. Product testing linked participant voice to procurement through workshop validation and Phase 3 recommendations. Inadequate quantities shifted risk back to participants through reuse, sharing, resale and continued use of less-preferred products. Public visibility, policing and stigma affected whether equipment could be carried, accessed and used safely. Women faced barriers to direct access, including stigma, safety concerns, partner control and male-dominated outreach spaces. Conclusion: LDSS/N implementation required more than product substitution; uptake depended on product fit, sufficient supply, discretion, gender-responsive access and community feedback. Scale-up should include product testing, accountable procurement, risk-based quantities, privacy-sensitive distribution, gender-responsive outreach and reflection with PWID and implementers.

CETTI-P-92: High-grade (AAST Grade IV–V) liver injuries in a predominantly penetrating trauma population: management and outcomes

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Background: High-grade liver injuries remain associated with substantial morbidity and mortality despite advances in trauma care. Contemporary data describing outcomes of high-grade liver injuries in predominantly penetrating trauma populations are limited. This study aimed to describe the epidemiology, management, complications, and outcomes of patients with high-grade liver injuries at a South African Level I trauma centre and to compare outcomes according to injury grade. Methods: A retrospective cohort study was conducted of adult patients (≥18 years) with American Association for the Surgery of Trauma (AAST) Grade IV or V liver injuries presenting to a South African Level I trauma centre between 1 January 2017 and 31 December 2023. Demographic, injury, management, and outcome data were extracted from a prospectively maintained trauma registry. Comparisons between Grade IV and Grade V injuries were performed using Fisher's exact test, Chi-square test, or Mann–Whitney U test, as appropriate. Results: A total of 89 patients were included, comprising 79 Grade IV and 10 Grade V liver injuries. The cohort was predominantly male (91.0%), and penetrating trauma accounted for 71.9% of injuries, with gunshot wounds representing the most common mechanism (67.4%). Patients with Grade V injuries were younger and presented with significantly lower systolic blood pressure, lower mean arterial pressure, higher lactate concentrations, and higher New Injury Severity Scores than patients with Grade IV injuries. Operative management was required in 61.8% of patients overall and was more common in Grade V injuries (80.0% vs 59.5%). Liver-related complications occurred in 18.0% of patients, while non-liver complications occurred in 46.1%. Overall 28-day mortality was 12.4%.

CETTI-P-93: Respiratory system toxicosis in co-administration of combination antiretroviral (cART) drug and alcohol in T2D male rats: a histopathology study
BHSc alumni

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Background: The preventative and therapeutic use cART is reported with diabetogenic capacity and disrupted metabolism of drugs especially with alcohol use. These factors independently impact respiratory structure and functionality, contributing to global burden of disease, especially in developing countries. Aims: To investigate respiratory system histopathology of cART and alcohol in T2D male rats Methods This study evaluated the histopathology of cART with/or alcohol use in diabetes on the respiratory system. Forty adult HIV-naive diabetic Sprague-Dawley rats were treated with cART and/or alcohol for three months. Serum was analysed for oxidative stress using GPx1 and MDA ELISA. Histomorphology of the trachea, bronchiole and lung parenchyma were evaluated for histopathology and CRP immunohistochemistry. Results: Results show independent cART mitigating fibrosis and bronchial wall atrophy, when combined with alcohol depletes trachea and bronchiole histomorphometry parameters. Moreover, cART with diabetes induced tracheal and bronchial thinning, elevated parenchymal collagen and reduced elastic and reticular fibres with elevated CRP inflammation in the bronchiole and parenchyma. But cART, alcohol and diabetes interaction exacerbates oxidative stress and elevates CRP inflammation throughout the respiratory tract. Conclusion: The study indicates adverse histological alterations on the respiratory system and provides crucial knowledge for clinical management of pulmonary health in diabetic individuals on cART therapy and regular alcohol intake.

The study findings underscore increased risk of lung function perturbations in diabetic patients receiving cART and alcohol regularly, invaluable clinically in the management of this triple-morbidity in the community and calls for clinical regular respiratory assessments to prevent and alleviate pulmonary toxicity.

CETTI-P-94: Suprapatellar versus Infrapatellar Intramedullary Tibial Nailing: A Survey of South African Orthopaedic Surgeons

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Background: Tibial shaft fractures are commonly treated with intramedullary nailing. Although the infrapatellar (IP) approach remains traditional, the suprapatellar (SP) approach may improve reduction, imaging and anterior knee pain outcomes, while concerns about patellofemoral injury and knee sepsis persist. Aims: To determine South African orthopaedic surgeons' preferred approach for tibial shaft intramedullary nailing and identify factors influencing selection between SP and IP techniques. Methods: A national cross-sectional online survey was distributed to registered South African specialist orthopaedic surgeons. The questionnaire assessed demographics, operative volume, training exposure, technique preference, perceived outcomes, barriers and comparative perceptions using categorical responses and 5-point Likert scales. Data were analysed using descriptive statistics and appropriate inferential tests. Results: Of 101 responses, 100 were included. Most respondents managed ≤25 tibial shaft fractures annually (68%) and had formal training in both techniques (68%, $p<0.001$). Routine practice was divided, with 55% primarily using IP and 45% SP. Fracture location was the dominant determinant of technique selection (89%, $p<0.001$). Respondents perceived SP nailing as technically easier and quicker, more reliable for proximal-third fracture reduction, and associated with less anterior knee pain. IP nailing was perceived to cause less patellofemoral damage. Higher-volume surgeons demonstrated significantly greater preference for SP nailing. Conclusion: South African practice remains divided, but surgeon perceptions increasingly favour SP nailing, especially among higher-volume surgeons. Results: support targeted training, improved access to SP instrumentation, and prospective South African outcome studies comparing safety, efficiency and patient-centred outcomes.

CETTI-P-95: Molecular epidemiology and antimicrobial resistance profiles of Enterococcus species isolated from poultry production in Gauteng province, South Africa
BHSc alumni

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Background: Enterococcus species are opportunistic pathogens and key reservoirs of antimicrobial resistance genes, with potential zoonotic transmission through the food chain. In South Africa, intensive poultry production often relies on antibiotics for growth promotion and disease prevention, driving the emergence of multidrug-resistant strains. This study investigated the prevalence, AMR profiles, resistance genes, and virulence factors of Enterococcus species from poultry farms. Methods: Samples from broiler chickens, water samples, and farm workers were collected from three poultry farms in Gauteng. Enterococcus species were isolated using Rapid Enterococci ChromoSelect agar and identified by MALDI-TOF mass spectrometry. Antimicrobial susceptibility testing was performed using the MicroScan WalkAway 96 system. Resistance and virulence genes were detected using polymerase chain reaction and whole-genome sequencing (WGS). Preliminary results: Of the 1375 Enterococcus species isolated, 100 isolates were selected for further characterization. Of these, 34% were identified as E. faecium, 30.6% as E. faecalis, 24% as E. gallinarum, and 11.5% as other species. High resistance rates were observed to tetracycline (92%), ciprofloxacin (56%), and erythromycin (89%). Lower resistance rates were recorded for penicillin (36%), teicoplanin (23), ampicillin (9%), and vancomycin (32%). Antimicrobial resistance and virulence genes are currently being analysed by WGS and will be presented at the Research day. Conclusion: The moderate to high rates of resistance to tetracycline, erythromycin, ciprofloxacin, and vancomycin in Enterococcus species isolated during this study indicate a multidrug resistance profile that would limit treatment options for serious infections. These findings highlight the need for ongoing surveillance and antimicrobial stewardship in the South African poultry farms.

CETTI-P-96: Normotensive versus hypertensive backgrounds shape bone microarchitectural decline in Adenine-induced CKD

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Background: CKD affects over 10% of the world's population and approximately 8.7% of the South African population. Definitive diagnosis is usually reached in later disease stages. Advanced stages are accompanied by renal osteodystrophy and increased fracture risk. As renal replacement therapy is rare in developing countries such as South Africa, early detection and preventative measures are essential. Aims: To evaluate the effects of CKD on bone microarchitecture and to the earliest stage at which structural changes can be detected. Methods: Forty-eight 2-month-old male rats (24 Wistar Kyoto and 24

Spontaneously Hypertensive strains) were used for this study. Twelve rats from each strain were fed a 0.25% w/w adenine diet for 8 weeks to induce CKD, making two CKD (treatment) groups. Trabecular and cortical parameters were recorded using 3D micro-computed tomography whilst three-point bending tests were performed to assess the biomechanical properties. Statistical analyses were performed using t-tests or Mann Whitney-U tests. Results: In WKY rats, trabecular thickness was significantly reduced in proximal and distal epiphyses of both femora (Proximal right p=0.032; distal right p=0.032; proximal left p=0.003; distal left p=0.0016). Bone-volume to total-volume ratio decreased in the distal epiphyses of the left femur (p=0.016). Cortical bone areas increased (p=0.006) and biomechanical strength decreased in the treatment group (p=0.006). In SHR rats, bone-volume to total-volume ratio (p=0.001), trabecular thickness (p=0.018), trabecular number (p=0.008), trabecular spacing (p=0.029) and cortical thickness (p=0.041) were reduced in the treatment group. Conclusion: Region-specific microarchitectural changes occurred in both strains within 8 weeks. Alterations differed between strains. Hypertension may additionally influence skeletal changes in CKD.

CETTI-P-97: Differential effects of burn-induced hyperinterleukin-6-nemia in patients living with and without HIV

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Background: Interleukin-6 (IL-6) is one of the commonest pro-inflammatory cytokines. Hyper-interleukin-6-nemia is the rapid, dysregulated, overwhelming host response to hyperstimulation and overproduction of IL-6 due to burns which can lead to life-threatening conditions (MODS). Burn is a form of traumatic injury with severity determined by total body surface area, depth of skin injury and special tissue location. HIV is a retrovirus that attacks the body immune system and if left untreated can lead to acquired immunodeficiency syndrome. Aims: To determine clinical/biochemical factors associated with burn-induced hyperinterleukin-6-nemia in PLWH and without HIV by assessing IL-6 and other septic markers. Methods: Prospective study at adult burns unit of CHBAH. Ethics approval obtained. Included ≥20% TBSA in HIV positive and HIV negative. Excluded inhalational burns. Blood drawn on days 1, 3, 5 and 7 for the study. Results: /Finding: IL-6 demonstrated superior sensitivity in predicting acute inflammatory response compared to WCC, CRP and PCT, with markedly higher levels observed in HIV-positive individuals. Notably, IL-6 levels in HIV-positive patients showed a sustained and elevated response, peaking by Day 7, suggesting an exaggerated or prolonged inflammatory state relative to HIV-negative counterparts. Conclusion: Persistent, elevated IL-6 in HIV-positive patients indicates a dysregulated immune response due to on-going chronic inflammation. This heightened pro-inflammatory state may predispose these patients to increased risk of SIRS, delayed wound healing, sepsis, and multi-organ dysfunction. HIV-positive burn patients may require closer monitoring, more aggressive anti-inflammatory management, and tailored supportive care to mitigate adverse outcomes.

CETTI-P-98: Expanding the PrEP market: Early insights offering oral, ring and CAB PrEP in Sub-Saharan Africa
BHSc alumni

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Background: Adapting PrEP service delivery to a multi-method market requires real world data on uptake and use patterns. We evaluated method uptake, patterns of use and associated factors among women offered oral PrEP, PrEP ring, or CAB PrEP in the CATALYST study. Methods: The CATALYST implementation science study offered women a choice of three PrEP methods in sites across Lesotho, South Africa, Uganda, and Zimbabwe. We describe PrEP uptake and month-1 continuation among participants enrolled between April and September 2024. Logistic regression assessed factors associated with CAB PrEP uptake. Results: Of 1574 participants enrolled, 1,326 were eligible for all three methods. Twenty-two percent were 18-24 years; 33% sex workers. Among participants offered only oral PrEP or PrEP ring prior to April 2024 (n=808), 62% switched to CAB PrEP; among new enrollees (n=518), 86% chose CAB PrEP. Overall, the majority chose CAB PrEP (71%), followed by oral PrEP (20%), PrEP ring (7%), and 2% choosing no method. Those reporting prior PrEP ring or oral PrEP use had lower odds of choosing CAB PrEP than PrEP naive participants [aOR=0.51, 95% CI: 0.32-0.80, p=0.003; aOR=0.45, 95% CI: 0.31-0.67, p<0.001]. CAB PrEP was popular among both AGYW and sex workers; however not statistically associated with CAB PrEP uptake. Month-1 continuation was 83% for CAB PrEP (n=467), 42% for oral PrEP (n=24), and 31% for PrEP ring (n=13). Conclusion: There is high demand for CAB PrEP, however dedicated PrEP ring and oral PrEP users, even in the context of an injectable method. There remains broad appeal among priority populations. Initial rates for refill/reinjection are promising.

CETTI-P-99: Benchmarking Acute Stroke Care at Two South African Tertiary Hospitals: Early Findings from a Prospective Stroke Registry

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Background: Stroke is a leading cause of death and disability in South Africa. Although effective acute stroke interventions are available, their impact depends on timely and consistent delivery. Evaluating stroke systems of care is essential to identify implementation gaps and inform quality improvement. Aims: To evaluate evidence-based acute stroke care at two Johannesburg tertiary hospitals and identify opportunities to strengthen stroke systems of care. Methods: A prospective hospital-based stroke registry was established at Chris Hani Baragwanath Academic Hospital (CHBAH) and Charlotte Maxeke Johannesburg Academic Hospital (CMJAH) using the Registry of Stroke Care Quality (RES-Q). Consecutive stroke admissions between April and December 2025 were analysed. Measures included access to care, workflow performance, reperfusion utilisation, rehabilitation services and in-hospital outcomes. Results: Among 561 stroke admissions, 379 (67.6%) were ischaemic strokes. Median onset-to-door times were 11.7 hours at CHBAH and 6.6 hours at CMJAH, with only 22.1% and 35.6% of patients arriving within 4.5 hours, respectively. Median door-to-imaging times exceeded recommended targets at both hospitals (6.3 vs 3.4 hours). Intravenous thrombolysis was administered to 1.5% and 6.7% of patients at CHBAH and CMJAH, respectively, while mechanical thrombectomy was performed in 1.6% and 2.5%, respectively. Rehabilitation involvement exceeded 60% across disciplines. In-hospital mortality among patients with ischaemic stroke was 17.4% and 15.0% at CHBAH and CMJAH, respectively. Conclusion: Despite the availability of evidence-based stroke interventions, delays in presentation and in-hospital processes limited access to reperfusion therapy. Strengthening stroke systems requires more than introducing evidence-based interventions; improving timely access and in-hospital workflow performance is essential to maximise the benefits of acute stroke care.

CETTI-P-100: Myocardial inflammatory activation is associated with subclinical systolic dysfunction in L-NAME-induced hypertension

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Background: Hypertension increases left ventricular afterload and induces cardiac remodelling. Inflammatory activation, macrophage infiltration, and myocardial fibrosis are recognised features of hypertensive remodelling and may contribute to the development of subclinical systolic dysfunction detected by speckle-tracking echocardiography (STE). However, the relationship between myocardial inflammatory activation and the structural and functional cardiac phenotype in the L-NAME-induced hypertension model remains incompletely characterised. Aims: To characterise the inflammatory, structural, and functional cardiac phenotype of male and female rats with L-NAME-induced hypertension and investigate the association between myocardial inflammatory remodelling and subclinical dysfunction. Methods: Male and female Sprague-Dawley rats were assigned to four groups (n=18/group) that received L-NAME (40 mg/kg/day) to induce hypertension or drinking water for four weeks. Cardiac structure, function, and myocardial deformation were assessed using conventional echocardiography and STE. Myocardial fibrosis, macrophage infiltration, and inflammatory, NF-kB pathway, and profibrotic genes were assessed by histology and quantitative PCR. Two-way ANOVA assessed the effects of sex and L-NAME treatment, and principal component analysis (PCA) integrated inflammatory and histological components. Results: L-NAME increased systolic blood pressure ($P<0.001$) and relative wall thickness ($P=0.019$). Despite preserved ejection fraction ($P=0.731$), STE detected reduced global longitudinal ($P=0.019$), circumferential ($P=0.003$), and radial strain ($P=0.001$). L-NAME increased perivascular collagen ($P=0.003$), macrophage infiltration ($P=0.006$), TGF-beta ($P=0.0295$), IL-1beta ($P=0.021$), and RUNX1 expression ($P=0.048$). PCA identified a transcriptional inflammatory component (PC1) independently associated with impaired global longitudinal strain ($\beta=0.792\pm0.348$, $P=0.029$). Conclusion: In L-NAME-induced hypertension without overt systolic dysfunction, transcriptional myocardial inflammatory activation was associated with subclinical systolic dysfunction, suggesting that inflammation may be an early feature of hypertensive cardiac remodelling and dysfunction.

CETTI-P-101: Integrating HIV self-testing into community-based tuberculosis screening: uptake and impact on acceptability in the ACT-TB study
BHSc alumni

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Background: Community-based tuberculosis (TB) screening offers a platform to integrate HIV services. Evidence on HIV self-test (HIVST) uptake in this setting, and whether it affects acceptability of TB screening tools, is limited. Aims: To assess HIVST uptake among participants offered it within community TB screening, and its association with acceptability of self-collected tongue-swab testing and a WhatsApp-based mHealth platform. Methods: The ACT-TB study screened adults for TB with self-collected tongue swabs in community settings, using WhatsApp-based mHealth or manual data capture. Participants randomised to arm 2 were offered a HIVST alongside the tongue swab. HIV-status knowledge, and self-reported HIVST completion and results, were recorded. Tongue-swab acceptability and mHealth usability were compared between HIVST completers and non-completers. Results: Preliminary results of 4584 participants across all cohorts,76.3% (3497/4584) knew their HIV status, HIV status knowledge was higher among WhatsApp users 87%3027/3497 compared with those enrolled manually 13% 470/349775.1%; among those aware, 15.5% (527/3405) were living with HIV, and 92.7% (486/524) were on antiretroviral therapy. Among 1576 Arm-2 participants, 5.1% (80/1576) self-reported completing HIVST; 10.0% (8/80) self-reported positive results. HIVST completion was not associated with tongue-swab acceptability (mean acceptability score 4.07 vs 4.04, p=0.613) or mHealth usability (SUS 65.5 vs 63.9, p=0.369); though completers rated HIV screening as more

effective (4.09 vs 3.88, p=0.043). Conclusion: HIVST uptake within community TB screening was low and offering it did not influence acceptability of tongue-swab screening or the mHealth platform. Low uptake likely reflects survey timing and preference for home-based testing rather than unacceptability; optimising delivery timing could strengthen integrated HIV–TB community screening.

CETTI-P-102: Peri-operative nutrition in femoral neck fracture arthroplasty: a pragmatic framework to mitigate dual-hit catabolism and improve outcomes

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Background: Patients undergoing arthroplasty for femoral neck fractures (FNFs) are among the most metabolically vulnerable in orthopaedic surgery. Malnutrition, sarcopenia and frailty are highly prevalent and contribute to increased mortality, postoperative complications, delayed mobilisation and prolonged hospitalisation. Despite this, peri-operative nutritional optimisation remains inconsistently implemented. Aims: To review current evidence on peri-operative nutrition in FNF arthroplasty and propose a pragmatic, phase-specific nutritional framework to improve surgical and functional outcomes. Methods: A structured narrative review of the literature was conducted using PubMed, Scopus and Google Scholar. Recent systematic reviews, meta-analyses, randomised controlled trials, cohort studies and international guidelines addressing malnutrition, frailty, sarcopenia and peri-operative nutritional strategies in FNF arthroplasty were synthesised. Results: Evidence consistently demonstrates that malnutrition is associated with increased mortality, infection, delayed rehabilitation and longer hospital stay. A three-phase framework is proposed, comprising early nutritional screening and risk stratification on admission, intra-operative metabolic protection through minimising physiological stress, and early postoperative nutritional support with adequate protein intake and multidisciplinary dietetic involvement. Conclusion: Peri-operative nutrition is a modifiable determinant of outcomes in FNF arthroplasty and should be integrated into routine orthopaedic care. Implementing a structured peri-operative nutritional pathway may improve recovery, reduce complications and enhance functional outcomes, particularly in resource-constrained healthcare settings.

CETTI-P-103: In Vitro and In Silico Assessment of Phenylhydrazone Quinoline Hybrids for Malaria Vector Control and Antiparasitic Activity
BHSc alumni

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Background: /Information Malaria remains a health challenge with 282 million cases in 2024. The growing resistance of Plasmodium parasites and Anopheles vectors to existing antimalarial drugs and insecticides underscores the need for novel compounds with selective activity. Quinoline scaffolds have historically provided valuable pharmacological agents. Aims: Therefore, fifteen phenylhydrazone quinoline hybrids (PHYD) were designed, synthesized, and evaluated for biological activity, focusing on inhibiting Anopheles acetylcholinesterase (AChE), alongside in silico pharmacokinetic and toxicological profiling. Methods: In vitro assays evaluated antimalarial activity against Plasmodium falciparum (NF54), larvicidal activity against Anopheles larvae (KWAG), and enzyme inhibition against AChE. Molecular docking simulations analyzed binding affinities, while in silico models predicted blood-brain barrier permeability, lipophilicity, LD50 values, and environmental toxicity. Results: The PHYD compounds exhibited antimalarial activity (Parasite viability: 20.92% to 79.44% at 50 µM), poor inhibitory activity against Anopheles larvae (1.6% to 10.0%) and low AChE inhibition (20.88% to 31.34%). Derivative PHYD-10 exhibited the highest AChE inhibition (31.34%), though it was less potent than control propoxur (77.32%). Molecular docking revealed binding affinities surpassing propoxur, involving hydrogen bonding and π–π stacking within the AChE catalytic groove. Conclusion: Pharmacokinetic predictions indicated that all PHYD compounds cross the blood–brain barrier, a trait desirable for central nervous system drugs but problematic for insecticidal repurposing due to non-target organism neurotoxicity. Lipophilicity values were higher than propoxur, raising bioaccumulation concerns. Predicted LD50 values suggested reduced acute human toxicity compared to propoxur. The PHYD compound's hepatotoxicity, neurotoxicity, and aquatic toxicity remained concerns, with PHYD-10 showing greater toxicity to fish and daphnids than propoxur, highlighting the need for structural optimization.

CETTI-P-104: Development of patient-derived liver organoids to model chronic HBV infections
BHSc alumni

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Background: HBV infections, particularly in infants and young children, tend to progress to a chronic condition associated with cirrhosis and hepatocellular carcinoma. This is due to the persistence of episomal covalently closed circular HBV DNA

(cccDNA) and the integration of viral DNA into the host genome. Accurate modelling of chronic HBV infections remain a significant challenge, as this human-specific infection is difficult to simulate in mice and other animal models. Furthermore, conventional 2D cell culture models of HBV infections are unable to fully recapitulate the disease cycle and thus are not accurate representations of HBV infections. Aims: This study aims to use HBV-infected liver organoids to model a chronic HBV infection, in which gene therapy-based approaches can be explored to target the persistent cccDNA and fully cure the disease. Methods: Organoids were developed from patient liver samples and cultured into mature liver organoids. These will then be characterised through RT-qPCR analysis of extracted RNA, immunofluorescent staining, and next generation sequencing. Using these characterised organoids, the liver model will be infected with HBV produced in HepG2.2.15 cells, and the characteristic biomarkers of HBV infection will be assessed, including measurements of HBV surface antigen (HBsAg), HBV DNA levels, and immunofluorescent staining of HBV-specific antigens. Conclusion: This organoid model of HBV infection is expected to facilitate the assessment of anti-HBV activity of both established and novel anti-HBV therapies for chronic infections, such as HBV-targeting CRISPR/Cas9 sequences or other gene therapies, in the development of a complete cure of the disease.

CETTI-P-105: Metabolomic Profiling and Antimicrobial Evaluation of Warburgia salutaris for the potential treatment of oral infections
BHSc alumni

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Background: Oral diseases are a major health concern, particularly in immunocompromised patients who are highly susceptible to opportunistic microbial infections. Warburgia salutaris is used traditionally in South Africa to treat cancer and contains antimicrobial properties relevant to oral health. However, its activity against oral pathogens remains poorly understood. Aims: and objectives: This study aimed to determine the antimicrobial potential of W. salutaris against oral infections and to isolate its active compounds using analytical techniques. Methods: Warburgia salutaris was extracted using dichloromethane (DCM), hexane, ethyl acetate, and methanol. The resulting crude extracts were evaluated for antimicrobial activity against Porphyromonas gingivalis, Streptococcus mutans, Staphylococcus aureus, and Candida albicans. The most active DCM extract was fractionated using column chromatography (CC) and Prep TLC. Phytochemical constituents from the most active S4 fraction were further analysed using Prep HPLC, UPLC MS, NMR, FTIR, and HR-MS. Results: The DCM extract showed potent activity against S. aureus and C. albicans (MIC 0.16 mg/ml), moderate activity against S. mutans (0.63 mg/ml), and weak activity against P. gingivalis (1.25 mg/ml). Fraction S4 demonstrated enhanced activity, with MIC values of 0.04 mg/ml (S. mutans, C. albicans) and 0.08 mg/ml (S. aureus). Three identified compounds, bemadienolide, waburganal, and polygodial, demonstrated notable antimicrobial activity with MIC values ranging from 0.63 to 0.04 mg/ml across all the tested pathogens. Conclusion: Warburgia salutaris, with its bioactive constituents, possesses broad-spectrum antimicrobial activity against key oral pathogens and can be used to develop novel antimicrobial agents or incorporated into oral products. Warburgia salutaris is a promising candidate for translation into clinical or preclinical studies.

CETTI-P-106: Title: From Postgraduate Research to Clinical Impact: Leveraging NHLS Resources for Translational Science.

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Background: Translational research plays a critical role in converting scientific discoveries into interventions that improve patient outcomes, inform clinical practice, and strengthen healthcare systems. Postgraduate research forms an important component of this translational pathway. However, opportunities to leverage existing research infrastructure and resources to maximize clinical impact are often underutilized. The National Health Laboratory Service (NHLS) provides a unique environment that integrates diagnostic services, laboratory infrastructure, clinical expertise, biological specimen repositories, and research support mechanisms. Thus creating opportunities for impactful translational research. Aims: To highlight how postgraduate research can be aligned with translational science through strategic utilization of NHLS resources, infrastructure, and research support platforms. Conclusion: The NHLS offers postgraduate researchers access to extensive laboratory networks, advanced diagnostic technologies, electronic laboratory databases, and archival and prospective biological specimens. These resources support translational research across the continuum from scientific discovery to clinical application, enabling investigations in biomarker discovery, disease diagnostics, prognostic indicators, and health systems research. Furthermore, internal funding opportunities, research training initiatives, and collaborations with academic institutions, including the University of the Witwatersrand, facilitate capacity development and multidisciplinary research. Access to large-scale laboratory datasets and well-characterized patient samples enables researchers to address locally relevant health challenges while generating evidence that can inform diagnosis, disease surveillance, clinical decision-making, and healthcare policy. Conclusion: The NHLS provides a robust platform for translating postgraduate research into clinically relevant and impactful outcomes. By leveraging funding opportunities, laboratory infrastructure, diagnostic databases, biospecimen repositories, and collaborative research networks, postgraduate researchers can accelerate the generation of evidence that advances patient care, strengthens healthcare delivery, and contributes to innovation within South Africa's health sector.

CETTI-P-107: Simplifying TB diagnosis - Performance of the swab-based Pluslife MTB assay in a high HIV-burden population

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Background: The Pluslife MTB assay (Pluslife Biotech, Guangzhou, China) is a novel molecular test designed for swab-based detection of Mycobacterium tuberculosis complex (MTBC). Aims: We evaluated diagnostic accuracy and operational performance of the assay using sputum swabs (SS) and tongue swabs (TS). Methods: This study enrolled adults (≥18 years) undergoing TB assessment between 7-29 July 2025 at two healthcare facilities in Johannesburg and Matlosana, South Africa. Two sputum and two TS were collected per participant. Pluslife MTB results on SS and TS was compared with liquid culture as the reference standard and Xpert MTB/RIF Ultra (Ultra; Cepheid, Sunnyvale, CA, USA) as comparator, both conducted on sputum. Ease-of-use and operational characteristics were assessed. Results: Performance analysis included 217/256 enrolled participants with valid results across all assays. The mean participant age was 38 years; 52% were male, 36% were HIV-positive, and 84% were symptomatic. When compared to culture, on SS, Pluslife MTB demonstrated a sensitivity of 85.4% (95% CI: 70.8–94.4) and specificity of 97.2% (95% CI: 93.5–99.1). On TS, Pluslife MTB sensitivity was 63.4% (95% CI: 46.9–77.9), with a specificity of 98.9% (95% CI: 96.0–99.0). Overall concordance between Pluslife and Ultra increased with bacterial load. High ease-of-use scores (>93%) reflect minimal training, short hands-on time, simple workflows, and clear result interpretation. Conclusion: The Pluslife MTB assay demonstrated diagnostic performance on SS comparable to Xpert Ultra, with excellent ease-of-use and favorable operational characteristics. Although performance on TS was lower, the assay shows promise as a rapid, user-friendly molecular TB diagnostic suitable for near point-of-care implementation.

CETTI-P-108: Cardiac Magnetic Resonance Imaging Findings of Post-Hospitalization COVID-19 Cohort of African descent in Johannesburg, South Africa

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Background: Coronavirus disease 2019 (COVID-19) was associated with high cardiovascular mortality, especially in individuals with co-morbidities. Emerging evidence suggests a complex interplay between chronic systemic inflammation, metabolic dysfunction, and virus-induced myocardial injury. There is limited data on cardiovascular impact of COVID-19 in an African population. This study aims to evaluate post COVID-19 cardiovascular sequalae using standard Cardiac Magnetic Resonance Imaging (CMRI) in an African cohort. Methods: We conducted a secondary analysis of CMRI from a larger perspective cohort post COVID-19 cohort study, “Lung outcomes and related risk factors in patients after SARS-CoV-2 infection: a hospitalised single-centre cohort from Johannesburg, South Africa”. This study was conducted at Chris Hani Baragwanath Academic Hospital (CHBAH), a tertiary facility single centre in Johannesburg, South Africa. All participants had been previously hospitalisation for COVID-19 were followed prospectively with scheduled visit at 1, 6 and 12 months after discharge. CMRI was performed at six- and twelve-months follow-up visits, from September 2021 to November 2022. Results: The study comprised 25 individuals predominantly African females (64%) (n=16) with mean age 52 years (SD 14.6). Common comorbidities included diabetes mellitus (36%), obesity (52%) and hypertension (20%). The mean left ventricle ejection fraction was 61% (SD 8.04). Baseline CMRI at 6 months post-discharge showed pericardial effusion in 80% of patients. Of these, 36% had features consistent with myopericarditis, while 40% had isolated pericardial effusion without myocardial involvement, and 24% had normal CMRI findings. Additionally, 40% showed delayed post-contrast abnormalities suggestive of myocardial scarring and fibrosis in non-coronary artery distribution suggestive of healed myocarditis. CMR parameters of LV and RV function remained

CETTI-P-109: Drug Repurposing Identifies Novel Acetylcholinesterase Inhibitors for Malaria Vector Control

Jabu Mahlangu*, *Taylya Reinecke, Priyanka Agarwal, Robyn van Zyl*

*School of Therapeutic Sciences

Background: Insecticides targeting acetylcholinesterase (AChE) remain central to malaria vector control; however, the emergence of insecticide resistance necessitates the discovery of novel chemical scaffolds. Drug repurposing offers a cost-effective strategy for accelerating insecticide development. Aims: To identify therapeutically used compounds with inhibitory activity against Anopheles AChE using integrated in vitro and in silico approaches. Methods: A library of 62 therapeutically used compounds from the Wits Pharmacology Division Compound Library was screened at 5 µM using Ellman's colorimetric assay. Molecular docking was performed with Schrödinger Maestro (2023-2) to characterise ligand-enzyme interactions, while in silico analyses evaluated physicochemical properties, mammalian toxicity, and predicted environmental safety. Results: Propoxur, the positive control, produced 77.12 ± 1.86% AChE inhibition but exhibited high predicted human toxicity. Several

repurposed compounds demonstrated moderate inhibition with improved safety profiles. Butylated hydroxyanisole emerged as the most promising hit, inhibiting AChE by 45.00 ± 0.52%, with predicted selectivity for Anopheles AChE and favourable mammalian safety. Pyrazinecarboxamide (37.26 ± 2.83%) and camptothecin (37.11 ± 2.13%) also demonstrated moderate inhibition, although camptothecin showed greater predicted mammalian toxicity. Quinine exhibited lower inhibitory activity (27.05 ± 4.64%). Molecular docking identified Tyr282, Tyr493, Tyr494, His600, and Ser360 as key residues mediating ligand binding. Conclusion: Drug repurposing identified several promising AChE inhibitor scaffolds with improved predicted safety compared with propoxur. Pyrazines, pyrans, indolizines, benzimidazoles, and quinolines represent attractive scaffolds for lead optimisation and the development of safer next-generation insecticides to support sustainable malaria vector control.

ORAL PRESENTATIONS (18)

GHHS-O-01: 'Like an infant … trying to run a marathon': A longitudinal audio-diary study exploring the transition from medical school to internship

Stuart Pattinson*, *Anique Atherley, Hans Savelberg*

***[Affiliation pending]**

Background: The transition from student to doctor represents a challenging shift in identity and responsibility that many graduates find difficult to manage. Aims: This study aimed to explore how medical students negotiate legitimate participation and professional identity formation (PIF) through time as they transitioned to internship. Methods: We conducted longitudinal qualitative research using audio-diaries and semi-structured interviews to collect data over 7 months as students transitioned from medical school to internship. 22 students took part in entrance interviews, 20 collected audio-diaries and 17 took part in exit interviews. Data were analysed using a narrative analysis approach. Results: We identified four dominant narrative plotlines in our data. PIF faltered in medical school when students were excluded from hierarchical clinical teams, on graduation when they began to doubt their preparedness and in internship when participants were unable to demonstrate the competencies valued within the demanding South African health care system. Professional identity was built when participants perceived themselves as being valued through their meaningful contributions to the clinical team. Conclusion: We call for a change in our framing of preparedness from 'preparedness for practice' to 'preparedness for transition', shifting our conceptualisation of preparedness towards equipping students with the resources they need for a complex, contextual, ongoing process rather than a moment in time. Clinical learning environments need to legitimise student participation. Learning should be orientated towards gaining experience, cultivating professional identity and supporting individuals in developing the confidence, adaptability and resilience needed to negotiate the challenging transition from student to doctor.

GHHS-O-02: Heat Stress in Rural South Africa: A Pilot Analysis of Population Exposure in rural Bushbuckridge, from 2023-2026

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Wits Donald Gordon Medical Research Institute (WDGMRI)

Background: Climate change is increasing the frequency and intensity of extreme heat events across the globe. However, population-level heat exposure remains poorly characterised in African populations. Aims: To quantify heat stress exposure in rural Bushbuckridge, Mpumalanga, South Africa. Methods: Hourly meteorological data were obtained from the weather station established in 2023 by the South African Environmental Observation Network (SAEON) at the MRC/Wits Agincourt Research Unit. Wet Bulb Globe Temperature (WBGT) was calculated from the available data points using the heatmetrics R package. Exposure outcomes were defined as (i) exceedances above the South African regulatory action level (≥27°C), (ii) occupational exposure limit (≥30°C), (iii) heatwaves defined as ≥3 consecutive days with a daily maximum WBGT ≥28°C. Results: 22,220 monitoring hours over 934 days from May 2023 to May 2026 were included in the analysis. Overall, 46.7% (n=436 days) exceeded the regulatory action level, 22.4% (n=209 days) exceeded the occupational exposure limit, and 42 heatwaves were identified (n=293 days). During the summer seasons, 78.6% of days exceeded the action level and 47.2% exceeded the occupational exposure limit. Conclusion: This is the first available pilot data confirming that heat stress exposure in rural Bushbuckridge is substantial with frequent exceedance of occupational heat stress thresholds posing a significant risk of heat-related illness among outdoor workers. These findings support the need for heat-health surveillance and climate adaptation planning in rural South African communities. It highlights the need for ongoing climate research to quantify heat-related health risks and inform targeted public and occupational health interventions to improve community resilience.

GHHS-O-03: An Analysis of Market-Dominant Herbal Active Ingredients for Contemporary Pharmacognosy Curriculum Design

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School of Therapeutic Sciences

Background: Undergraduate pharmacognosy education in South Africa has traditionally emphasised classical medicinal plants and phytochemical theory, with limited alignment to herbal products encountered in modern community pharmacy practice. The increasing availability and patient use of complementary medicines in large retail pharmacies necessitate a curriculum that reflects real-world exposure to herbal active pharmaceutical ingredients (APIs). Aims: To identify and rank the most frequently listed herbal APIs on major South African pharmacy platforms (Clicks and Dis-Chem) and use these findings to inform the design of a practice-relevant pharmacognosy curriculum. Methods: A descriptive, cross-sectional study using structured content analysis of publicly accessible online pharmacy catalogues was conducted. Herbal products were screened, and each botanical ingredient recorded as an individual data point. Data were standardised, normalised, and analysed to

determine frequency of occurrence, enabling ranking of commonly marketed botanicals. Results: A total of 394 products yielded 742 herbal ingredient entries, with 60.4% containing at least one herbal component. Both single-herb (30.7%) and polyherbal (29.7%) formulations were prominent. Frequently occurring APIs included Withania somnifera, Curcuma longa, Zingiber officinale, and Echinacea purpurea. Functional clustering demonstrated strong representation of immune, central nervous system, and gastrointestinal indications, reflecting market demand and patient use patterns. Conclusion: The herbal product landscape in South African pharmacies reflects a dual paradigm of reductionist single-herb products and traditional multi-herb formulations, with a clear emphasis on key therapeutic categories. Results: provide an evidence-based framework for curriculum development, supporting integration of high-frequency herbal APIs, regulatory considerations, and patient-centred counselling into pharmacognosy education to better prepare future pharmacists for contemporary practice.

GHHS-O-04: Food Insecurity and Body Composition Differences in Young Black South African Males and Females

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Background: Food insecurity is a growing public health concern in South Africa. However, the relationship between food insecurity and body composition among young black South African adults remains poorly understood. This study investigated the prevalence of food insecurity and body composition profiles among young food-secure and food-insecure black South African adults. Methods: In this cross-sectional study, 119 participants aged 18–35 years were recruited in Johannesburg. Food insecurity was assessed using the Food Insecurity Experience Scale. Anthropometric measurements, including Body mass index (BMI), and waist circumference, were also obtained. Advanced body composition analysis was assessed using dual-energy X-ray absorptiometry. Results: Only 34.5% of participants were food secure. Food insecurity was more prevalent among males than females (75.9% vs. 56.9%, p=0.0299). Males were taller than females in both food-secure and food-insecure groups ($p<0.0001$), while no sex differences were observed for body weight or waist circumference. Among food-insecure participants, females had a higher BMI (p=0.0060) but lower bone mineral density (p=0.0079) than males. Regardless of food security status, males had greater appendicular skeletal muscle mass, skeletal muscle mass index (both $p<0.0001$), android fat mass, and bone mineral content (both $p<0.030$), compared with females. In contrast, females had greater arm, leg, and gynoid fat mass, as well as a higher percentage body fat, than males in irrespective of food security status (all $p<0.0030$). Conclusion: Food insecurity was highly prevalent in this population and was associated with distinct sex-specific differences in body composition profiles. These findings highlight the importance of considering sex when evaluating the effects of food insecurity on body composition in young adults.

GHHS-O-05: Title: Belonging in Health Sciences: Undergraduate Perceptions of LGBTQ+ Campus Climate

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Background: Limited research explores the perceptions of the campus climate for LGBTQ+ within undergraduate health sciences. Despite policy promoting inclusion, a disconnect persists between this and students lived experiences. This gap is critical, as campus climate shapes future healthcare professionals' attitudes toward vulnerable populations. Aims: To evaluate perceptions of campus climate among undergraduate health sciences students at Wits university and to compare the experiences of LGBTQ+ students with their heterosexual peers. Methods: A cross-sectional, quantitative study was conducted using a validated 6-item LGBTQ+ Campus Climate scale. This was sent as an online survey, to all undergraduate Health Sciences students at Wits University. 4248 students were invited, but only 184 responses were received. Data were analysed using descriptive statistics, t-tests, and ANOVA in R Studio. Results: Respondents were primarily female (64%), heterosexual (59%), and enrolled in the MBBCh programme (83%). Overall perceptions of campus climate were positive (M=2.26, SD=1.08). However, LGBTQ+ students reported a significantly more negative environment compared to their heterosexual peers ($p<0.001$). Conclusion: Despite an overall positive climate, LGBTQ+ students reported less favourable experiences, highlighting an equity gap within health sciences education. These findings indicate the need for health sciences faculties to take social accountability and move beyond policy towards inclusive, equity-driven education. The hidden curriculum shapes how future healthcare professionals understand diversity, professionalism and patient-centred care. The fact that the heterosexual students did not perceive the gap that the LGBTQ+ students experienced, has consequences for how these students will treat LGBTQ+ patients and other vulnerable populations in future.

GHHS-O-06: Can low concentrations of heavy metals aid the adaptation of the major malaria vector Anopheles arabiensis to urban habitats?
BHSc alumni

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Background: Anthropogenic change is a major challenge to malaria vector control interventions. One of these is the adaptation of malaria vectors to breeding in polluted water rather than clean water. This has the potential to increase the range of these mosquitoes, including expansion into urban areas. A hallmark of breeding water in urban areas is that it has lower heavy metal pollution than rural areas. Therefore, it is worth examining the effect of sublethal heavy metal exposure on Anopheles arabiensis, the dominant vector species present in South Africa. Aims: The aim of this study was to characterise the effect low dosages of heavy metals, specifically zinc and cobalt, on the major malaria vector An. arabiensis. Methods: First instar larvae of the insecticide-susceptible SENN strain and insecticide-resistant SENN-DDT strain were exposed to 100 mg/L zinc acetate and 1000 pm cobalt nitrate solution. The effect on larval development, pupation success, and the adult longevity and gut microbiota was assessed. Results: Life history analyses showed that the metals had differential effects depending on insecticide resistant phenotype. Similarly, gut microbial composition and diversity were also affected in a strain-dependent and treatment-dependent manner. Cobalt treatment's effect on gut microbiota suggests that this metal could potentially serve as a larval micronutrient. Conclusion: Exposure of An. arabiensis larvae to low doses of zinc and cobalt has advantages for both larvae and adults rather than showing toxicity or life history costs. These findings suggest that water pollution conditions in urban areas may have advantages for this species, suggesting the potential for the urban expansion of An. Arabiensis.

GHHS-O-07: The quality of primary care received by foreign migrants in South Africa. A standardised patient audit

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Background: Researchers report that foreign migrants experience negative attitudes and sub-standard care when attending South African (SA) public health facilities, but few studies have rigorously compared the experiences of migrants and citizens. Methods: We exploit a natural experiment and use a standardised patient (SP) audit survey to directly compare the quality of acute care provided to foreign and SA patients by different primary health care (PHC) providers in one urban township. The audit included most PHC providers in the area and used five different clinical cases. We trained three SA SPs and one foreign SP for each case, randomising visits so that each provider received at least one foreign SP. 793 consultations were completed: 589 by SA SPs, 204 by foreign SPs. Afterwards we interviewed providers, including questions about attitudes to foreigners. Hierarchical regression models were used to compare the care received by migrants and citizens from different PHC providers. Results: Public PHC providers expressed more negative attitudes towards migrants in the survey. In the audit, foreign SPs at public facilities were more likely to receive comments about their citizenship status. Foreign SPs had significantly shorter consultations than SA SPs from both public and private providers. The technical quality of care received by SPs was sub-optimal, but did not differ significantly between foreigners and citizens. Conclusion: and Implications Despite perceived discrimination, this more rigorous comparison indicates that the technical management of foreign patients is equivalent to their SA counterparts, in both the public and private sectors.

GHHS-O-08: The time-dependent cardiac inflammatory responses triggered by Group B Streptococcus in neonatal Sprague- Dawley rats

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Background: Group B Streptococcus (GBS) is a leading cause of neonatal sepsis with high morbidity and mortality. Although cardiovascular dysfunction is a recognised complication, the link between GBS-induced cardiac inflammation and neonatal heart function remains unclear. Aims: To investigate acute, time-dependent changes in cardiac inflammatory and injury biomarkers in a neonatal rat model of GBS-induced sepsis. Methods: Male and female postnatal day 9–10 Sprague-Dawley rat pups received intraperitoneal injections of serotype III GBS (1×10^6 CFU/g; n = 70) or saline (n = 69). Blood and heart tissue were collected at 2 and 8 hours post-infection. Bacterial load was quantified via agar plating, and gene expression of cytokines, apoptosis mediators, and cardiac injury markers was assessed using RT-PCR. Results: GBS colonised blood (2 h: 6×10^6 CFU/ml; 8 h: 3×10^6 CFU/ml) and cardiac tissue (2 h: 1×10^6 CFU/g; 8 h: 2×10^7 CFU/g). Cardiac IL-6 ($p < 0.0005$) and TNF-α ($p < 0.0001$) were significantly upregulated. In contrast, IL-18 ($p = 0.0087$), TGF-β ($p = 0.0004$), and apoptosis-inducing factor were reduced, indicating suppressed inflammasome activity, fibrosis, and apoptosis. Cardiac troponin I and T (both $p < 0.0001$) were decreased, suggesting impaired contractility. Conversely, NPPA ($p < 0.0001$) and NPPB ($p = 0.0107$) were elevated, reflecting increased myocardial stress and compensatory responses. Conclusion: Acute neonatal GBS sepsis induces cardiac inflammation, reduced contractile gene expression, and increased natriuretic peptide signalling. Elevated NPPA/NPPB alongside reduced troponins suggests an adaptive response that preserves cardiac function while limiting apoptosis and fibrosis during early sepsis.

GHHS-O-09: A Decade of Surveillance on the Burden of Respiratory Syncytial Virus-associated Acute Lower Respiratory Tract Infections in Hospitalised Infants in South Africa: Implications for Prophylactic Strategies

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Background: Respiratory syncytial virus (RSV) remains a common cause of lower respiratory tract infections (LRTIs). Immunological prophylactic therapies to prevent RSV disease remain largely unavailable for most LMICs. Aims: We describe the epidemiology of RSV-associated LRTI in infants over 10 years in a low-resource and HIV burdened setting. Methods: We undertook surveillance for physician-diagnosed acute RSV-associated LRTIs in infants <12 months of age hospitalised at a secondary-tertiary level care hospital in Soweto, South Africa, from 1 January 2015 to 31 December 2024. Clinical characteristics of RSV-positive infants by polymerase chain reaction (PCR) on nasopharyngeal swabs were compared to RSV-negative infants, stratified by age group and RSV subtype. Results: Over the study period, 37,491 infants were hospitalised, with 17,824 (47.5%) meeting the surveillance definition, and 11,548 (64,8%) with an LRTI discharge diagnosis. The overall RSV PCR positivity was 28.1% (3,242/11,548), of which 76.2% (n=2,472) were infants <6 months of age. The annual incidence rate of RSV-associated LRTI hospitalisations per 100,000 infants was 842 (95% confidence interval [CI], 814-872). RSV-A was the predominant subtype, accounting for 56.2% (1,823/3,242) of RSV cases, with no significant differences in disease presentation or severity across RSV subtypes. The overall in-hospital case fatality ratio for RSV-associated LRTI was 0,7% (n=24), with 71% (n=17) of these deaths occurring in infants <6 months of age. Conclusion: We report a high burden of RSV-associated LRTI hospitalisation, particularly in infants <6 months of age. Targeted prevention strategies are urgently warranted to reduce the burden in this setting; immunoprophylactic strategies would be most beneficial for infants <6 months of age.

GHHS-O-10: A Health Systems Approach to Integrated HIV Prevention and Emergency Contraceptive Services: Barriers and Facilitators Influencing Willingness to Access Pharmacy-Based Service in South Africa

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Background: Women in South Africa face overlapping vulnerabilities of HIV acquisition and unintended pregnancy. Pharmacies are potential access points for HIV prevention and reproductive health services; however, integrated services that address both needs remain scarce. Integrating HIV post-exposure prophylaxis (PEP) with emergency contraceptive pills (ECPs) in pharmacies represents a health systems innovation that may improve access to dual protection (similar to condom usage). Study Aim: We explored factors influencing willingness to use integrated PEP and ECP services among emergency contraceptive users in private pharmacies in South Africa. Methods: We conducted a mixed-methods study in Gauteng and the Western Cape (June 2025-March 2026). Three focus group discussions (FGDs) were conducted with women aged 18-49 with prior pharmacy-accessed ECPs and explored barriers and facilitators influencing uptake. Thematic analysis of data informed the development of a telephonic survey administered to women aged 18-49 recruited from private pharmacies. Survey data were analysed using descriptive statistics and multivariable logistic regression. Results: Participants cited perceived high integrated service costs and stigma tied to accessing HIV prevention or contraceptive services in pharmacies as barriers, while private consultation rooms and discreet service labelling were identified as facilitators. Among 194 women surveyed, 151 (77.8%) reported willingness to use integrated services. This was positively associated with higher perceived pregnancy risk (aOR=4.44, 95%CI:1.12-17.66, p=0.033). Conclusion: Integrated pharmacy-based delivery of PEP and ECPs is a potentially scalable strategy to expand access to dual protection. Addressing cost, stigma, and privacy barriers is critical to promote uptake and strengthen person-centred integrated HIV and reproductive health care.

GHHS-O-11: Descriptive analysis of the incidence of mumps in Gauteng, South Africa in 2024
BHSc alumni

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Background: Mumps is an acute viral infection primarily affecting children between the ages of 5 and 9, and with morbidity rates higher in males than in females. A vaccine is available in private healthcare in South Africa. However, there has been a global resurgence of mumps. In South Africa, infections peak in winter and spring. Aims: To determine mumps IgM incidence in Gauteng. Methods: Mumps IgM data was extracted from the Surveillance Database Warehouse at the National Institute for Communicable Diseases. Demographic data was analysed using excel packages to describe mumps prevalence across districts in Gauteng, sex and age groups. Results: Of 267 patients tested for IgM across Gauteng, 52.1% (139) were female. The incidence rate of mumps in Gauteng was 1 per 100 000. Females had a positivity rate of 37.4% (52/139) and males 31.8% (40/126). City of Johannesburg Metro had the highest number (20.2%; 54/267) of mumps IgM positives. The 5-9 year age group had the highest positivity rate (51.9%; 27/52), followed by the 1-4 year age group (41.9%; 13/31). Mumps cases peaked in July. Conclusion: Mumps affected males and females comparably, with the highest prevalence in children aged 5-9 years. Mumps positivity rate peaked in winter in South Africa. Trends observed in this study corroborate with previous literature. Continued monitoring of mumps incidence data can be used advise on vaccine policy and outbreak response.

GHHS-O-12: PrEP services for young men in rural South Africa: a qualitative analysis of opportunities beyond public facilities

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Background: Young men in South Africa remain underserved by facility-based HIV prevention services, contributing to low of pre-exposure prophylaxis (PrEP) uptake and continuity. This study explored opportunities for community-based PrEP delivery in rural South Africa using the WHO Differentiated Service Delivery framework. Methods: A cross-sectional qualitative study was conducted in rural Bushbuckridge, South Africa including 13 in-depth interviews with young men aged 18–30 years; 25 key informants' interviews with health system and civil society stakeholders; and a focus group with six young men. Rapid qualitative template analysis examined what services were provided, where and by whom they were delivered, and when young men engaged with services. Results: Young men's engagement with PrEP services was shaped more by service attributes than by preferences for specific providers. Young men consistently valued services that were convenient, private, delivered by competent providers, and aligned with their intermittent patterns of healthcare engagement. These attributes were distributed across multiple providers and service platforms rather than concentrated within a single model of care. Schools were viewed as important for awareness generation and early engagement, pharmacies and private clinics for privacy, convenience, and accessibility, outreach services for extending reach; and community health workers and traditional health practitioners for health promotion, community engagement, and linkage pathways while clinics remained central for HIV testing, PrEP initiation, prescribing, and clinical monitoring. Conclusion: Improving PrEP uptake among young men may require coordinated delivery models that leverage the complementary strengths of different providers and service platforms while ensuring privacy, convenience, and flexibility.

GHHS-O-13: Assessing HIV vulnerability among young women in South Africa: A comparison of three risk assessment tools

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Background: Young women in sub-Saharan Africa remain disproportionately affected by HIV, yet self-perceived HIV risk often does not align with actual behavioural or biological risk. While self-reported risk perception and behaviours are commonly used to assess HIV vulnerability, behavioural tasks such as the Balloon Analogue Risk Task (BART) may capture additional dimensions of risk-taking. Examining these measures together may improve understanding of HIV vulnerability. Methods: We conducted a cross-sectional survey (July–November 2025) among self-reported HIV-negative young women aged 18–30 years in KwaZulu-Natal, South Africa. Outcomes included self-perceived HIV risk using the Perceived Risk of HIV Scale (PRHS), behaviour-based HIV risk using the Vaginal and Oral Interventions to Control the Epidemic (VOICE) Risk Score, and risk-taking propensity using the BART. Spearman's rank correlations assessed relationships between the measures. Results: A total of 250 young women participated. Median age was 22 years (IQR: 20–25); all identified as Black, and 53.6% (n=134) were students. High behaviour-based HIV risk was identified in 42.0% of participants, whereas only 36.8% perceived themselves to be at high risk. High risk-taking propensity on the BART was observed in 33.6%. Participants with high BART scores were older (mean 27.1 vs. 20.5 years; $p<0.001$) and less likely to be in school ($p<0.001$). Correlations between BART, PRHS, and VOICE scores were weak and non-significant (Spearman's $\rho=0.001–0.057$; $p>0.05$), indicating little agreement between measures. Conclusion: Self-perceived HIV risk, behaviour-based risk, and behavioural risk-taking captured distinct dimensions of HIV vulnerability. Combining self-reported and behavioural measures may improve identification of young women at elevated HIV risk and strengthen targeting of HIV prevention interventions.

GHHS-O-14: Preserved mitochondrial health in innate and adaptive immune cells from South African HIV-1 Controllers

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Background: Mitochondria are key regulators of cellular energy and immune signalling. In HIV infection, chronic immune activation and inflammation disrupt mitochondrial function, contributing to non-AIDS complications in people with HIV, including elite controllers. Mitochondrial dysfunction is well described in T cells and plasma; however, its characterization in innate immune cells such as monocytes and dendritic cells across diverse HIV phenotypes remains limited. This study investigated mitochondrial health in innate immune cells and T cells and assessed links with cytokine production, metabolic substrate use, and clinical markers of disease progression. Methodology: Black South Africans were recruited for this study, including people without HIV (PWOH, n=13), PWH on antiretroviral therapy (PWHART, n=18), elite controllers (PWHEC, n=11), and people with HIV progressive infection (PWHPROG, n=10). Using multi-colour flow cytometry, we assessed mitochondrial mass, mitochondrial membrane potential, and percentage of functional and dysfunctional mitochondria in innate immune cells (monocytes, myeloid dendritic cells [mDCs], and plasmacytoid dendritic cells [pDCs]) and T cells. Results: Mitochondrial membrane potential was reduced in monocytes ($p=0.04$ and $p=0.01$), mDCs ($p=0.04$), and CD8+ T cells ($p=0.03$) from PWHPROG compared to PWOH or PWHART. In contrast, mDCs from PWHEC showed preserved membrane

potential compared to PWHPROG. Across all groups, innate immune cells demonstrated higher mitochondrial mass and membrane potential than T cells ($p<0.05$). Conclusion: Mitochondrial dysfunction in monocytes, mDCs, and CD8+ T cells from treatment-naïve progressors is likely driven by persistent immune activation. Meanwhile, elite controllers exhibit preserved mitochondrial health in their mDCs, which may contribute to immune resilience and spontaneous viral control. Our findings highlight metabolic vulnerabilities that may inform therapeutic strategies

GHHS-O-15: Optimising Pathogen Recovery from Wastewater: Comparative Evaluation of Thirteen Concentration Methods for Wastewater-Based Epidemiology

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Background: Wastewater-based epidemiology (WBE) is a vital complement to clinical surveillance. However, the lack of standardised concentration workflows limits pathogen recovery and inter-laboratory comparability, constraining the reliable implementation of WBE in routine monitoring systems. Aims: To systematically evaluate thirteen wastewater concentration methods, identifying optimal, pathogen-specific workflows to enhance performance efficiency for multi-pathogen surveillance. Methods: Wastewater samples were spiked with measles virus, influenza A and B viruses, mpox virus, Salmonella Typhi and Salmonella Paratyphi A. Pathogen concentration approaches included polyethylene glycol (PEG) precipitation, two-phase separation, magnetic bead-based methods (Ceres Nanotrap® Microbiome and Dynabeads), and direct extraction from liquid and settled solid fractions. Recovery efficiencies were quantified using digital PCR, with all methods evaluated in triplicate to assess repeatability. Results: Recovery performance differed substantially by pathogen. Measles virus showed the highest repeatability using Dynabeads (10 mL) and Ceres Microbiome A+B and A (35 mL), achieving 100% repeatability with median recoveries of 65.10%, 46.39%, and 38.27%, respectively. Influenza A/B preferentially partitioned into the liquid fraction, with Dynabeads yielding optimal influenza A recovery (223.42%; 100% repeatability). Mpox II demonstrated preferential recovery from settled solids using the Quick-DNA/RNA Water Kit (18.53–28.23%; 100% repeatability). Salmonella Typhi achieved optimal performance using the same workflow (48.90–265.70%; 100% repeatability), while Salmonella Paratyphi A demonstrated 91.67% repeatability across multiple workflows. Conclusion: Pathogen-specific partitioning significantly influences wastewater recovery efficiency, indicating no single concentration method is universally optimal. Selecting fit-for-purpose workflows can improve multi-pathogen surveillance. These findings provide evidence supporting the standardisation of pathogen-specific concentration workflows for wastewater-based epidemiology, strengthening laboratory implementation, surveillance quality, and preparedness for emerging infectious disease threats.

GHHS-O-16: Context, fluidity and meaning of accountability in the public mental health sector of a South African province
BHSc alumni

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Background: Accountability is a cornerstone of health system governance, and essential for ethical stewardship, effective service delivery, and responsible use of public resources. The 2016 Life Esidimeni tragedy exposed the failures of accountability in South Africa's public mental health sector. This study used Bovens conceptual framework to explore how health policy actors conceptualise and enact accountability in the public health sector of the Gauteng province. Methods: An exploratory qualitative study was conducted with 44 key informants from six stakeholder groups: public sector managers at national, provincial, and hospital level; the private health sector; regulatory entities; mental health professionals; professional associations or trade unions; and representatives from civil society. Participants were recruited through purposive and snowball sampling. In-depth interviews explored perceptions and experiences of accountability with focus on the public mental health sector. Data were analysed inductively using thematic analysis, informed by Brinkerhoff's conceptual framework. Results: Four interrelated themes emerged. First, accountability was viewed as context-dependent and shaped by role ambiguity, overlapping responsibilities, and fragmented health system structures. Second, key informants emphasised stewardship, service, and redress, highlighting obligations to manage public resources responsibly and respond to community needs. Third, accountability was associated with ownership, responsibility, and answerability for decisions, actions, and outcomes. Finally, accountability was framed as a moral and ethical commitment grounded in integrity, honesty, and public service values. Conclusion: The study findings suggest that strengthening accountability in public mental healthcare will require attention to both formal governance structures and the ethical values that shape decision-making and practice.

GHHS-O-17: Factors Associated with All-Cause Mortality During Tuberculosis Treatment Among Patients in Blantyre, Malawi between 2014 and 2021

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Background: Tuberculosis (TB) remains a major public health challenge in Malawi despite sustained control efforts. Identifying the factors associated with death during TB treatment is essential for improving patient outcomes. Aims: To identify factors associated with all-cause mortality during TB treatment among patients in Blantyre, Malawi. Methods: A retrospective cohort study was conducted using linked laboratory, TB register, and hospital questionnaire data from Blantyre, Malawi, including 12,699 TB patients. Descriptive statistics summarised patient characteristics, and chi-square and Fisher's exact tests assessed associations between categorical variables. Multivariable logistic regression identified factors independently associated with mortality, and model discrimination was evaluated using the area under the receiver operating characteristic curve (AUROC). Results: Of the 12,699 patients, 1,588 (12.5%) died during TB treatment. Increasing age was independently associated with higher odds of mortality among patients aged 45–54 years (AOR 1.61; 95% CI 1.29–2.02), 55–64 years (AOR 1.77; 95% CI 1.35–2.31), and ≥65 years (AOR 2.38; 95% CI 1.80–3.14). Residence was associated with lower odds of mortality (AOR 0.68; 95% CI 0.60–0.78). HIV-positive patients not on antiretroviral therapy (ART) had increased odds of mortality (AOR 1.90; 95% CI 1.50–2.40), as did HIV-positive patients on ART (AOR 2.21; 95% CI 1.93–2.53). The adjusted model showed improved discrimination over the crude model (AUROC 0.624 vs 0.573). Conclusion: and Implications: Mortality during TB treatment remains substantial in Blantyre. Older age, HIV status, ART status, and residence were independently associated with mortality. Targeted interventions focusing on early diagnosis, timely HIV management, and improved treatment monitoring for high-risk groups may help reduce TB-related mortality.

GHHS-O-18: From Simulation to Clinical Practice: Building Obstetric Readiness Among Clinical Associate Students

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Background: Preparing a competent health workforce is essential for strengthening maternal healthcare in South Africa. Clinical Associate students often have limited opportunities to participate in obstetric emergencies during clinical placements, making simulation an important strategy to support clinical readiness. However, little is known about how learning acquired during simulation transfers into authentic clinical practice. Aims: To explore second-year Clinical Associate students' perceptions of obstetric simulation and how learning transferred into clinical practice following obstetric rotations. Methods: A qualitative study was conducted with second-year Clinical Associate students at the University of the Witwatersrand. Five focus group discussions (n=33) were conducted within 24–48 hours following obstetric simulation, and three follow-up focus group discussions (n=19) were held one week after completion of a nine-week obstetric rotation. Data were analysed using reflexive thematic analysis and interpreted through Kolb's Experiential Learning Cycle. Results: Four interconnected themes reflected students' learning journey: simulation as a safe rehearsal space (Concrete Experience); reflection through debriefing (Reflective Observation); reinterpreting simulation during clinical placement (Abstract Conceptualisation); and applying learning to patient care (Active Experimentation). Students reported increased confidence, communication, clinical reasoning, teamwork and preparedness for obstetric practice. Learning transfer was strengthened by psychological safety, structured debriefing and supportive clinical supervision, while limited participation opportunities and differences between simulation and clinical reality constrained transfer. Conclusion: Students completed the experiential learning cycle by translating simulation learning into authentic clinical practice, demonstrating that simulation supports both technical competence and professional development. Simulation should be integrated with structured debriefing and intentional clinical supervision to strengthen workforce preparedness and improve maternal healthcare training.

POSTER PRESENTATIONS (103)

GHHS-P-01: Uptake and Completion of Tuberculosis Preventive Therapy in Populations Beyond Household Contacts and People Living with HIV: A Systematic Review and Meta-Analysis

Tionge Sikwese*, *Hussein H Twabi, Bryan Vonasek, Takondwa Charles Msosa, Wilber Sabiiti, Marriott Nliwasa, Glory Makhumba, Lulama Yawa, Glodi Kabobya, Chisomo Msefula, Victor Ndhlovu*

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Background: Tuberculosis (TB) preventative therapy (TPT) is a key intervention for eliminating TB worldwide. TPT is recommended for individuals who are at higher risk, such as household contacts, people living with HIV (PLHIV), health care workers (HCWs), prisoners, immigrants, and those with comorbidities. Implementation of TPT among PLHIV and children under 5 years old has been extensively studied, demonstrating gaps in coverage. There is a lack of evidence regarding uptake and completion across a wider variety of populations. Methodology We systematically searched Medline, Embase, Global Health and PubMed for studies reporting TPT uptake and/or completion in non-PLHIV and non-household contact populations. Narrative synthesis focused on describing diversity of groups. Pooled estimates of uptake and completion rate were calculated using random-effects meta-analysis. Subgroup analyses examined population type and TPT regimen. Results: Thirty-six studies (50,190 participants) were included. The included studies targeted the following groups: prisoners, immigrants, healthcare workers, solid-organ transplant candidates, general population (child, adolescent, and adult subgroups), individuals with silicosis, gold miners, college students, renal disease patients, individuals with diabetes mellitus, the homeless, refugees, and patients with specific infections. TPT uptake was near-universal (pooled proportion = 100%; 95% CI: 88%–100%), but the estimate of pooled completion was 71% (95% CI: 65%–77%) and varied by subgroup; highest in general populations at 76.0% and lowest among prisoners and immigrants at 60%. Shorter regimens demonstrated higher

completion rates (70% [95% CI: 55%–83%]) compared to standard 6–9-month isoniazid (59%(95%CI:49%–68%]), though this difference was not statistically significant. Conclusion: Despite high uptake, TPT completion remains suboptimal; short-course regimens, adherence support, and more LMIC research are needed.

GHHS-P-02: Integrating Science, Safety and Performance: A Transdisciplinary Assessment of Whey Protein Supplement Labelling

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Background: Whey protein supplements are widely used to support athletic performance and health. However, concerns regarding labelling accuracy, transparency, marketing practices, and consumer safety continue to raise regulatory and public health questions. Aims: To investigate the information content presented on the labels of commercially available whey protein concentrate (WPC), whey protein isolate (WPI), and whey protein hydrolysate (WPH) supplements in South Africa. Methods: Seventeen whey protein supplements were purchased from two major South African pharmacy retailers. Labels were assessed for serving information, claims, disclaimers, and warnings. Scoop sizes were measured and compared with manufacturer-stated values. Data were analysed descriptively. Results: Of the 17 supplements analysed, 59% were locally produced and 41% internationally manufactured. All products contained claims, warnings, and disclaimers. Claims averaged six per product, compared with four warnings and two disclaimers. Common claims related to muscle gain and recovery (88%), muscle protein synthesis (77%), and banned-substance testing (65%). Warnings and disclaimers were generally less prominent and displayed in smaller fonts. The mean measured scoop size (27.8 ± 8.5 g) was lower than the manufacturer-stated value (31.3 ± 2.2 g). Only 41% of products indicated that claims had not been evaluated by SAHPRA or the FDA, and only one product disclosed the use of nitrogen-based protein determination. Conclusion: Whey protein supplement labels prioritise performance-related marketing claims over scientific transparency and consumer safety information. Enhanced labelling standards and greater regulatory transparency are needed to support informed consumer choice and responsible supplement use.

GHHS-P-03: Effects of global HIV funding shifts on donor-supported staffing and HIV service delivery in South African primary healthcare facilities

Elizabeth Kachingwe*, *Khumbo Shumba, Sophie Pascoe, Sydney Rosen, Amy Huber, Idah Mokhele*

***[Affiliation pending]**

Background: In early 2025, the suspension of PEPFAR funding disrupted HIV programmes across sub-Saharan Africa. We assessed the effects of these funding changes on South African primary healthcare facilities. Methods: Between May and June 2025, we conducted cross-sectional assessments at 18 public-sector primary healthcare facilities in three previously USAID-supported districts: Ehlanzeni, King Cetshwayo (KC), and Alfred Nzo (AN). Structured interviews were conducted with facility managers or designated staff, and facility registers, TIER.Net, and District Health Information System (DHIS) data were reviewed. Staffing levels and facility-level HIV indicators were compared with an October 2024 baseline. Results: In October 2024, study sites had 55 implementing partner (IP)-funded staff and 78 Department of Health (DoH)-funded staff in similar cadres. Between October 2024 and February 2025, IP-funded data and community outreach staff declined substantially, particularly in Ehlanzeni and AN. Community outreach cadres experienced the largest losses, while nearly all DoH-funded staff remained in post. Facilities responded through task shifting to DoH nurses, community health workers, and administrative staff, consolidating roles, and prioritising facility-based services over outreach activities. Although these adaptations maintained service continuity, they were associated with increased workloads, service delays, reduced tracing and linkage activities, and data backlogs. Consistent with staffing reductions, key HIV indicators declined between October 2024 and February 2025 in AN (−81%, −31%, −41%, −65%) and Ehlanzeni (−19%, −35%, −20%, −40%). KC showed stable ART initiations and a temporary increase in condom distribution (35%), although HIV testing and PrEP initiations declined by 18%. By May 2025, some recovery was observed; however, only condom distribution in Ehlanzeni returned to baseline levels.

GHHS-P-04: Influenza A and Other Respiratory Pathogens in Adults Hospitalised with Acute Respiratory Illness in Soweto, South Africa (2025-2026): A Preliminary Analysis

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Background: Contemporary data on influenza among hospitalised adults in South Africa are limited. In a high HIV-burden setting with low vaccine uptake, surveillance is essential to inform prevention strategies. We report preliminary findings on Influenza A and other respiratory pathogens among adults hospitalised with acute respiratory illness (ARI) in Soweto. Methods: Prospective surveillance was conducted at Chris Hani Baragwanath Academic Hospital, Soweto, from March 2025 to March 2026. Adults aged ≥18 years admitted with ARI were enrolled. Respiratory specimens collected within 72 hours of admission were tested using multiplex PCR for Influenza A and B, Respiratory Syncytial Virus (RSV), SARS-CoV-2, Human Metapneumovirus (hMPV), Rhinovirus, Adenovirus, Parainfluenza Virus type 3 (PIV-3), and Bordetella pertussis. This

preliminary analysis describes overall pathogen positivity and monthly detection patterns. Results: Among 1,052 adults, median age was 52 years (IQR 40–65), and 33.9% (357/1,052) were living with HIV. Overall, 18.9% (199/1,052) had at least one pathogen detected. Rhinovirus (48.2%; 96/199) and Influenza A (30.7%; 61/199) predominated, followed by SARS-CoV-2 (8.0%), RSV (7.5%), hMPV (4.0%), and PIV-3 (4.0%). Co-infections were uncommon (5.0%). Influenza A was detected in 5.8% overall and showed a bimodal pattern, peaking in June and September–October, while Rhinovirus circulated year-round. Conclusion: Respiratory pathogens were identified in nearly one in five adults hospitalised with ARI, with Rhinovirus and Influenza A predominating. Influenza A increased in winter and early spring, while Rhinovirus circulated year-round. The high HIV prevalence underscores its ongoing contribution to adult respiratory illness burden. These findings support continued surveillance and prevention strategies, including influenza vaccination.

GHHS-P-05: Giving a voice to silent disabilities- Exploring the journey of people with systemic lupus erythematosus

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Background: Systemic lupus erythematosus (SLE) is a multisystem autoimmune disease whose often invisible symptoms delay diagnosis and contribute to stigma, poor support, and psychosocial distress. Aims: To explore the lived experiences of people with SLE in South Africa, including diagnosis, treatment, coping, and psychosocial impact, and to identify barriers to patient-centered care. Methods: A qualitative study used semi-structured interviews with 20 participants (18 women, 2 men). Data were analyzed inductively to identify biological, psychological, and social themes. Results: Participants reported delayed diagnosis, multi-organ symptoms, treatment side effects, and difficulty navigating care. Fatigue, pain, cognitive problems, stigma, strained relationships, and workplace discrimination were common. Many concealed symptoms, reducing support. Resilience, faith, humor, and social support aided coping. Male feedback highlighted gendered influences on emotional responses. Conclusion: SLE should be recognized as a multisystem disease with major psychosocial effects. Equitable treatment access and integrated mental health support are essential. Care should include practitioner training, empathetic communication, psychological support, improved workplace protection, and broader access to essential and biologic treatment. Research and advocacy should reduce stigma and improve support.

GHHS-P-06: The effect of the SREBP-1c rs2033690347 and NR1H3 rs2279238 gene polymorphisms on lipid accumulation in a human hepatocellular cell line

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Background: Metabolic dysfunction-associated steatotic liver disease (MASLD) is a growing global health burden characterised by excessive lipid accumulation in hepatocytes. Genetic variation in lipid regulators SREBP-1c and LXR may contribute to MASLD susceptibility. SREBP-1c and LXR regulate hepatic lipid metabolism, inducing genes involved in lipogenesis and triglyceride production. Two polymorphisms, SREBP-1c rs2033690347 (Arg527Cys) and LXR rs2279238 (C>T), have been linked to altered lipid profiles, but effects on intracellular lipid accumulation (ICLA) remain unclear. Aims: This study investigated the effect of SREBP-1c rs2033690347 and LXR rs2279238 polymorphisms on intracellular lipid accumulation in HepG2 cells. Methods: HepG2 cells were plated at 0.4×10^6/well and transfected with plasmids carrying rs2033690347 C or T alleles, rs2279238 C or T alleles, or empty vector control. ICLA was induced with oleic acid–BSA (2:1). Lipid accumulation was assessed using Oil Red O staining on days 1 and 4, quantified spectrophotometrically and visualised microscopically. Statistical analysis used unpaired t-tests for intraday and paired t-tests for interday analysis. Results: ICLA increased significantly from baseline to day 4 in control cells (100±0.0 vs 372.8±25.5; p=0.003). No significant differences were observed between rs2033690347 C and T alleles on day 1 (282.3±165.5 vs 267.7±253.9; p=0.938) or day 4 (198.2±68.4 vs 183.5±117.9; p=0.863). Similarly, no differences were found for rs2279238 C vs T alleles on day 1 (169.2±27.8 vs 137.41±20.5; p=0.192) or day 4 (185.5±59.7 vs 117.2±23.4; p=0.176). Conclusion: The two polymorphisms did not affect ICLA in HepG2 cells. Potentially, the effect is small and masked by endogenous expression. Future studies in cell lines lacking these proteins may clarify their role in MASLD pathogenesis.

GHHS-P-07: User Experiences with Long-Acting Injectable CAB-LA PrEP in South Africa: Qualitative Insights into Acceptability, Motivations for Use, and Challenges

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Background: Long-acting injectable cabotegravir (CAB-LA) provides an important alternative to daily oral PrEP and an opportunity to enhance effective PrEP use among individuals who experience challenges with daily pill-taking. Experiences from the introduction and delivery of injectable CAB-LA offer important lessons for the rollout and optimisation of future long-acting HIV prevention options, including emerging injectable PrEP agents and the recently introduced lenacapavir (LEN). Methods: Between June and July 2025, we conducted 70 in-depth interviews with CAB-LA users aged 16–56 years

from a parent cohort that offered PrEP choices (oral PrEP, dapivirine ring, or CAB-LA) at six fixed and three mobile clinics in South Africa. Eligible participants were HIV-negative individuals aged ≥15 years interested in HIV prevention services and who had used CAB-LA. Interviews explored experiences with CAB-LA use, including benefits, motivators, and challenges. Audio-recorded interviews were transcribed, translated, and analysed thematically. Results: CAB-LA was preferred over oral PrEP for its long-acting protection, removing daily pill burden, and reducing concerns about missed doses during travel or social activities. Participants described CAB-LA as convenient, with protection "already in the system." Strong social support from partners, family, and friends encouraged disclosure and follow-up visits, while reminders, clinic cards, and planning supported continued use. Challenges were mainly injection-related discomfort, mostly mild and transient. Conclusion: CAB-LA was acceptable and preferred for its convenience, effectiveness, and reduced adherence demands. Social support and motivation supported use, while injection-related challenges were manageable. These findings highlight long-acting PrEP's potential to improve effective use and strengthen HIV prevention outcomes in diverse settings.

GHHS-P-08: The Impact of Donor Funding Disruptions Across the Paediatric HIV Care Cascade in Sub-Saharan Africa (2005–2025): A Scoping Review

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Background: Paediatric HIV outcomes in SSA have improved substantially over the past two decades, largely due to donor-funded programs supporting early infant diagnosis, antiretroviral therapy, and community-based service delivery. However, these gains remain vulnerable because of donor funding transitions, delays, and cuts/reductions. Aims: This scoping review examined how donor funding disruptions affect paediatric HIV treatment continuity in SSA by synthesising evidence on the processes, system-level consequences, and clinical implications of donor transitions for children. Methods: Studies published between January 2005 and November 2025 were screened using the Rayyan platform. Following PRISMA-ScR guidelines, studies were systematically identified and analysed using descriptive statistics and qualitative narrative synthesis. Results: were organised across the paediatric HIV care cascade. As most studies lacked child-specific outcomes, paediatric impacts were inferred using proxy measures such as loss to follow-up and service continuity indicators. Results: Nine studies were included. Donor transitions, particularly those related to PEPFAR, were associated with workforce reductions, supply chain disruptions, and the loss of community-based outreach programs. These changes delayed early infant diagnosis, weakened linkage to care, disrupted ART initiation, and reduced retention through system-wide capacity constraints. Donor withdrawal acted as a system shock, affecting multiple interconnected components of paediatric HIV service delivery. Conclusion: Paediatric HIV services remain highly dependent on donor-supported systems, with limited transition preparedness, making donor withdrawal a clinically significant event for children. Transition frameworks that prioritise paediatric continuity, strengthen health system resilience, and align accountability across donors and governments are needed to reduce preventable paediatric morbidity and mortality.

GHHS-P-09: The causes and contribution of severe and antimicrobial-resistant infections to morbidity and mortality among hospitalised adults with advanced HIV disease in Johannesburg, South Africa

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Background: Although infections cause severe illness and death among people with advanced HIV disease (AHD, CD4 count<200 cells/μL), aetiology is often unknown. Methods: Adults admitted to two Johannesburg hospitals were screened and those with HIV enrolled into a cohort from 11/11/2024-17/03/2026. We ascertained the incidence and aetiology of infections among people with and without AHD (CD4 count>350 cells/μL) by reviewing hospital records. Participants with AHD were interviewed. Results: Of screened adults, 29% (1488/5131) were known to have HIV. Compared to people without AHD (464/1488 [31%]), people with AHD (727/1488 [49%]) were significantly more likely to be younger (42 [35-50] versus 47 [39-55]) men (393/727 [54%] versus 154/464 [33%]) admitted with sepsis signs (364/727 [50%] versus 154/464 [33%]) and clinically/laboratory-diagnosed infections (314/413 [76%] versus 97/277 [35%]), receive long antimicrobial courses (93/332 [28%] versus 24/126 [19%]), have longer admissions (9 [6-17] versus 8 [4-12] days), and die (113/696 [16%] vs 21/438 [5%], aHR 3.0 [1.8-4.8]). Of interviewees with AHD, 79% (164/208) had previously interrupted antiretroviral treatment. In the preceding year, 13% (28/208) reported taking prophylaxis and 38% (80/208) were hospitalised. Among in-patients with AHD, pathogens were identified in 48% (297/615) of routinely-collected samples. WHO bacterial priority antimicrobial-resistant pathogens were identified in 42% (25/59) of people with relevant culture-positive infections, associated with in-patient death (OR 3.9 [1.6-9.2], p<0.001). Most infective causes of admission were unknown (119/333 [36%]). Conclusion: Infections cause severe illness among people with AHD in Johannesburg, yet aetiology often remains unknown. Our findings could inform interventions to address this diagnostic gap.

GHHS-P-10: Strengthening professional ways of knowing, doing and being as clinical education practitioners

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Background: Despite targeted interventions, physiotherapy clinical education at the University of the Witwatersrand (Wits) continues to exhibit persistent gaps in professional behaviour, selected foundational competencies, and interpersonal skills. Aims: To develop sustainable, collaborative, and contextually relevant solutions to improve clinical education practices and professional competencies in physiotherapy through an inclusive and equitable framework. Methods: A multistakeholder Indaba was convened, bringing together students, clinicians, and educators in a neutral, non-hierarchical setting. The process was guided by four pedagogical layers: Being and Becoming, Engagement, Knowledge Generation and Transformation, and Decolonisation. Driscoll's reflective model informed the critical reflexive methodology. The curriculum design promoted inclusive, contextually relevant, authentic engagement and addressed power dynamics. The CanMeds framework was adapted to the South African context for structured competency development. Results: The Indaba enabled active, collaborative engagement among students, clinicians, and educators, resulting in the co-development of contextually relevant strategies to strengthen clinical education and professional competencies. Participants demonstrated increased critical awareness of power relations, inclusivity, and the role of decolonised pedagogies in training. Notwithstanding these gains, gaps remained, including limited rural clinician participation and underrepresentation of student voices. Conclusion: Inclusive, contextually responsive pedagogies are essential for addressing persistent issues in physiotherapy clinical education. Continued collaborative efforts are necessary to improve clinical training outcomes. Clinical Implications This approach offers valuable insights into enhancing professional competencies and fostering a collaborative, inclusive learning environment. It highlights the importance of stakeholder engagement and contextually relevant frameworks in clinical education reform.

GHHS-P-11: Integrating Cost-Effectiveness in Physiotherapy Curricula: Developing Resource-Conscious Practitioners for Under-Resourced Communities

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Background: Rehabilitation, including physiotherapy, offers cost-effective benefits at individual, economic, and societal levels. Effective rehabilitation services remain inaccessible in developing countries, particularly resource-constrained settings. Cost-effectiveness in physiotherapy balances resource use with health, functional, and participation outcomes. The extent to which South African undergraduate physiotherapy curricula incorporate cost-effective practices aligned with Primary Health Care (PHC) and Universal Health Coverage (UHC) remains underexplored. Aims: To evaluate how South African physiotherapy curricula equip graduates for competent, confident practice in under-resourced environments, focusing on cost-effective, PHC-aligned rehabilitation. Methods: This exploratory cross-case analysis reviewed documents from seven consenting universities using methodological triangulation: interpretive qualitative content analysis of curricula and unstructured discussions with representatives. The study setting was all universities in South Africa (SA) that offer undergraduate physiotherapy programmes. Results: All curricula addressed cost-effectiveness via efficient time/resource use, featuring models like group rehabilitation, Community-Based Rehabilitation (CBR), and Home-Based Rehabilitation (HBR). Implementation tools included fiscal responsibility, time management, and creative resourcing. Governing principles encompassed leadership, sustainability, UHC, and PHC. Theoretical coverage was consistent, but experiential learning in communities was inconsistent, hampered by safety, supervision, cultural/language barriers, and resource limitations. Conclusion: South African physiotherapy curricula incorporate cost-effective interventions, leadership, and fiscal responsibility, though depth and consistency vary. Gaps in community immersion and practical exposure limit graduate readiness for real-world challenges. Clinical Implications: Curriculum variations undermine preparedness for resource-constrained practice. Strengthening experiential learning, cultural sensitivity, safety protocols, and emphasis on cost-effective rehabilitation models is vital in developing adaptable physiotherapists who deliver equitable and sustainable rehabilitation in diverse contexts.

GHHS-P-12: Genomic Insights into Carbapenem and Colistin Resistance in Multidrug- resistant Acinetobacter baumannii and Pseudomonas aeruginosa
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Background: Antimicrobial resistance (AMR) among non-fermenting Gram-negative bacteria (NFGNB), particularly Acinetobacter baumannii and Pseudomonas aeruginosa, poses a major challenge to healthcare due to the increasing emergence of carbapenem and colistin resistance. Aims: This study aimed to characterise the phenotypic and genetic mechanisms of carbapenem and colistin resistance in multidrug-resistant clinical NFGNB isolates. Methodology A retrospective laboratory-based study was conducted using 150 multidrug-resistant clinical isolates obtained from the National Health Laboratory Service. Of the 150 clinical isolates, 109 (73%) were Acinetobacter baumannii and 41 (27%) were Pseudomonas aeruginosa. Results: The majority of the NFGNB were recovered from blood cultures in ICU and burn units. A. baumannii isolates demonstrated very high colistin MIC values, with 31% at 64 µg/ml, reflecting extensive resistance to one of the last-line therapeutic agents whereas P. aeruginosa showed a broader susceptibility distribution, with peaks at 4 µg/ml and 64 µg/ml. Molecular analysis demonstrated that blaNDM was detected in 45%, while blaOXA-23 was identified in 40% and mcr1

detected in 34% of isolates indicating the presence of clinically important resistance determinants among the study population. Conclusion: These findings demonstrate that carbapenem resistance among NFGNB in this setting is predominantly associated with blaNDM and blaOXA-23, with A. baumannii representing the predominant multidrug-resistant species. The detection of mcr-1 further highlights the emergence of colistin resistance and underscores the need for continued molecular surveillance, strengthened infection prevention and control measures, and antimicrobial stewardship programmes to limit the spread of these high-risk pathogens in South African healthcare settings.

GHHS-P-13: Advancing Social Justice in Physiotherapy Curricula: Preparing Socially Accountable Practitioners for Diverse and Underprivileged Communities

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Background: South Africa's quadruple burden of disease and National Health Insurance (NHI) priorities demand health professionals who advance social justice and deliver equitable, resource optimised care. Physiotherapy education must embed social accountability to produce graduates capable of strengthening health systems, yet evidence of curricular integration is limited. Aims: To examine how social accountability is integrated into undergraduate physiotherapy curricula at South African tertiary institutions, with implications for health systems strengthening. Methods: An exploratory cross case study reviewed curricular documents from seven consenting universities. We triangulated interpretive qualitative content analysis with unstructured discussions with institutional representatives. A curriculum document derived deductive codebook guided coding with three authors independently coding samples to ensure inter coder reliability. Results: Curricula include elements relevant to systems strengthening, namely, cost effectiveness, quality, equity, and relevance, but these are variably and often implicitly embedded. Positive features supporting system goals included training in cost efficient service models, attention to social determinants of health, and Equity, Diversity and Inclusion initiatives. Gaps undermining system transformation included limited emphasis on decolonial approaches, explicit leadership for structural change, dismantling of power hierarchies, intersectoral collaboration, and refugee health. The fragmented integration restricts graduates' capacity to lead reforms required by NHI and to implement scalable, equitable interventions within health systems. Conclusion: Undergraduate physiotherapy programs in South Africa substantially yet unevenly integrate social accountability. Clinical implications: Explicitly framed, experiential ladders and targeted EDI and leadership training can produce physiotherapists capable of implementing cost effective, scalable interventions, improving access for underserved populations, supporting NHI rollout, and advancing Sustainable Development Goal 3.

GHHS-P-14: Nutrition-specific interventions for prevention and control of anaemia among adolescents in low and middle-income countries (LMICs): An umbrella review

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Background: Anaemia remains a major public health problem among adolescents and is associated with impaired growth, cognitive development, reduced educational attainment, and decreased productivity. Although several nutritional interventions have been implemented globally, evidence on their effectiveness among adolescents in low- and middle-income countries (LMICs) remains fragmented. Aims: To synthesise evidence on the effectiveness of nutritional interventions for reducing anaemia prevalence and improving haemoglobin concentrations among adolescents in LMICs. Methods: We conducted an overview of systematic reviews published in English between 2015 and 2025. Two reviewers independently screened studies, extracted data, and assessed methodological quality using the AMSTAR-2 tool. Results: were synthesised according to intervention type and reported outcomes. Results: Twelve systematic reviews were included. AMSTAR-2 assessment identified two reviews with critically low confidence, while the remainder were of moderate or high quality. Iron supplementation and food fortification consistently reduced anaemia prevalence and improved haemoglobin concentrations among adolescents. Daily and weekly iron supplementation, iron–folic acid supplementation, and fortified foods demonstrated the strongest evidence of effectiveness. Dietary diversification and multiple micronutrient interventions showed promising but less consistent effects because of methodological and contextual heterogeneity. Conclusion: and Implications: Iron supplementation and food fortification are effective strategies for reducing anaemia and improving haemoglobin status among adolescents in LMICs. These findings support prioritising these interventions within national adolescent nutrition programmes while strengthening their implementation through schools and primary healthcare systems. Further adolescent-specific research, particularly in sub-Saharan Africa, is needed to inform contextually appropriate policies and integrated strategies for sustainable anaemia prevention and control. Policies should prioritise iron supplementation and food fortification for anaemia prevention

GHHS-P-15: Climate change and vertically transmissible infections in maternal and neonatal populations: a systematic review

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Background: Climate change influences infectious disease dynamics, and disrupts maternal and neonatal health services, impacting factors that are known to increase the risk of vertically transmissible infections. Methods: We systematically reviewed evidence on the association between climate-related environmental exposures and infection-related outcomes relevant to vertical transmission in pregnant or intrapartum women, neonates, and infants. Screening, extraction, and risk-of-bias assessment were performed independently in duplicate. Owing to substantial heterogeneity, findings were synthesised narratively. GRADE scoring was used to assess certainty of evidence. Results: Of 4,579 records identified, 42 full texts were reviewed and 6 studies included. Studies examined drought/famine, temperature, humidity, and climate zone in relation to HIV, group B streptococcus (GBS), varicella-zoster virus (VZV), and bacterial meningitis. No study reported vertical transmission as an outcome. Higher temperature and humidity were associated with increased maternal GBS colonisation. Three studies suggested cooler and/or drier conditions were associated with increased VZV transmission or earlier serological acquisition. One study found drought-associated famine was linked to increased HIV prevalence in pregnant women in rural Malawi. Certainty of evidence was very low across outcome groupings. Conclusion: This review found evidence suggesting climate-related exposures may be associated with infections relevant to vertical transmission through pathogen-specific biological pathways, broader social disruption, and deprivation. There is currently insufficient evidence to determine the impact of climate change on vertical transmission or related outcomes. Closing this gap should be a priority for research and climate adaptation in maternal and neonatal health.

GHHS-P-16: One Country, Different Clusters? Multimorbidity Patterns Across Rural South Africa, 2012–2022

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Background: Multimorbidity is increasingly common in South Africa, but it remains unclear whether pooled multimorbidity clusters adequately reflect site-specific patterns in rural settings. Aims: We examined whether pooled latent multimorbidity class profiles differed from site-specific profiles across three rural South African surveillance sites. Methods: We conducted a cross-sectional secondary analysis of harmonised verbal autopsy data from Agincourt, the Africa Health Research Institute (AHRI), and DIMAMO health and demographic surveillance sites in rural South Africa from 2012 to 2022. All eligible deaths with required analytic variables were included. The final descriptive analytic sample comprised 20,168 deaths (Agincourt 8,126; AHRI 9,032; DIMAMO 3,010). Descriptive statistics summarised chronic condition prevalence and multimorbidity burden. Pooled and site-specific latent class analyses identified multimorbidity profiles, and between-site differences were assessed using chi-square tests, ordinal logistic regression, and permutation-based matched-profile comparisons. Results: Hypertension was the most frequent chronic condition overall (29.4%). Compared with Agincourt, the odds of belonging to a higher multimorbidity category in the full sample were lower in AHRI (OR 0.82, 95% CI 0.77–0.86) and DIMAMO (OR 0.51, 95% CI 0.47–0.55). A pooled six-class latent class solution was retained. Pooled latent class membership differed across sites (χ^2=225.58, p<0.001; Cramér's V=0.133), but pairwise permutation tests showed no evidence that site-specific class profiles themselves differed. Conclusion: The major multimorbidity class profiles were broadly shared across the three sites, but their distribution varied by site. Pooled class structures may therefore support common multimorbidity typologies. Local multimorbidity planning still requires site-specific burden and class-distribution information.

GHHS-P-17: Knowledge, Attitudes, and Practices of Healthcare Professionals Towards Adverse Drug Reaction Reporting in Sierra Leone

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Background: Pharmacovigilance is vital for post-market surveillance of medicines, yet underreporting of adverse drug reactions (ADRs) persists, especially in low- and middle-income countries. Evidence on healthcare professionals' (HCPs) knowledge, attitudes, and practices (KAP) regarding ADR reporting in Sierra Leone is limited. Methods: A descriptive cross-sectional study involving 732 HCPs across nine (9) public facilities in Sierra Leone. A structured, self-administered, pretested questionnaire was used to assess participants' KAP related to ADR reporting. Descriptive statistics were used to summarise KAP scores and respondent characteristics. Independent-samples t-tests, one-way Analysis of Variance (ANOVA), and multivariable linear regression were used to examine associations between demographic and professional variables and KAP of ADR reporting. Results: Overall, less than a quarter (20.0%) of HCPs reported good knowledge of ADR reporting. While attitudes were generally favourable, only 41.0% demonstrated good individual ADR reporting behaviour, and 23.4% reported adequate facility readiness for ADR reporting. Only 19.4% had ever submitted an ADR report. Pharmacists and pharmacy technicians had significantly higher knowledge and practice scores than other groups ($p < 0.001$). Training and years of professional experience were significantly associated with better knowledge and practice outcomes ($p < 0.001$). Conclusion: Despite generally favourable attitudes, substantial knowledge and practice gaps persist among HCPs in Sierra Leone. Training, professional cadre, and experience were associated with ADR reporting. Strengthening pharmacovigilance systems through structured training, improved access to reporting tools, and enhanced feedback mechanisms is needed to support routine reporting and improve patient safety.

GHHS-P-18: Male access to healthcare and utilization of healthcare services in Africa: A scoping review

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Background: Men's health-seeking behaviour and healthcare utilization in Africa is generally suboptimal compared to women, resulting in higher morbidity and mortality rates among men. Despite growing global recognition of gender disparities in health, evidence on men's access to healthcare in African contexts remains fragmented. Aims: This scoping review aimed to map evidence on men's healthcare access and utilization of services across Africa, identify key barriers and facilitators, and highlight gaps to guide gender-sensitive health interventions. Methods: Guided by the Joanna Briggs Institute (JBI) framework and reported following PRISMA-ScR standards, we conducted a systematic search of five databases (PubMed, Scopus, Web of Science, African Journals Online, and Google Scholar) for studies published from 2010 to April 2024. Eligible studies focused on African males and examined healthcare access, utilization, or health-seeking behaviour. Data extraction used the PCC framework (Population, Concept, Context). Results: Out of 114,737 screened records, 60 studies met the inclusion criteria, covering 16 African countries, predominantly South Africa, Kenya, Uganda, Ethiopia, and Nigeria. Study designs varied and included qualitative, quantitative, mixed-methods, cross-sectional surveys, retrospective analyses, randomized trials, and narrative reviews. Barriers to men's healthcare access included structural factors (e.g., clinic hours and location), financial constraints (e.g., cost), cultural influences (e.g., masculinity norms), and health system challenges (e.g., male-unfriendly services). Facilitators comprised supportive community networks and outreach programmes. Conclusion: The findings highlight multiple barriers and facilitators influencing men's access to and utilization of healthcare services across Africa. Strengthening awareness, male-friendly services, community support, and policy attention to men's health may improve healthcare uptake and reduce disparities.

GHHS-P-19: Lenacapavir misinformation that is most likely to undermine uptake among young women in South Africa: Insights from an online survey

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Background: Lenacapavir (LEN), the first long-acting injectable pre-exposure prophylaxis (PrEP), represents a major advance in HIV prevention. However, misinformation may undermine uptake. We aimed to identify LEN-related misinformation claims most likely to reduce intentions to use LEN among young women in South Africa. Methods: We enrolled women aged 18-29 years from Indlela's Behavioural Hub between October-November 2025. We identified 104 LEN-related misinformation claims from publicly available Facebook posts. Participants completed two rounds of a ranking exercise in which they selected the three most and least concerning claims from sets of nine claims. Claims were ranked by the frequency with which they were selected. Results: 230 women participated in the study. The three most concerning claims identified were related to risky sexual behaviours due to LEN use, severe and potentially permanent side effects, and mistrust in officials. These included claims like "Is PrEP and anti-HIV injection enablers of risky sexual behavior?" (71%); "everybody who took it gonna have some kinda rare blood disease, nerve damage, or something that gonna fawkkk them up permanently" (68%); and "KZN university they found cure for HIV but suddenly they were told to stop producing cure there are ppl controlling the world and some benefit from this Arv's" (61%). Conclusion: Misinformation portraying LEN as enabling risky sexual behaviour, causing serious harm, or involving conspiracies about officials appears likely to reduce willingness for LEN uptake among young women. Targeted, proactive communication that addresses these claims and underlying mistrust is essential as LEN rollout occurs. Interventions are needed to address misinformation and sustain demand for long-acting PrEP.

GHHS-P-20: Assessment of facility-level factors influencing the adequacy of cervical screening specimens in Johannesburg community health centres and clinics, January to December 2025

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Background: Cervical screening is essential for cervical cancer prevention. Its accuracy depends on the adequacy of the specimen collected. Inadequate specimens cannot be reliably assessed, require repeat testing, delay diagnosis, and increase costs for both patients and health services. South African national guidelines specify a minimum screening specimen adequacy rate of 70%, however, variation amongst primary healthcare facilities in Johannesburg Health District in consistently meeting this standard has been observed, and whether facility-level factors may explain this variation has not been determined. Aims: To assess cervical smear adequacy and associated facility-level factors at primary healthcare facilities in Johannesburg Health District for 2025. Methods: A cross-sectional study with an analytical component was conducted using routinely collected aggregated cervical cytology data (January–December 2025). Facilities were categorised as high performing (≥70% adequacy) or low performing (<70%). A stratified random sample of 30 facilities (15 high, 15 low) underwent a structured facility survey

assessing five domains: staffing, training, supervision and quality assurance, equipment availability, and workflow processes. Composite domain scores were generated and logistic regression used to assess associations between facility-level domains and smear adequacy. Results: The study will describe smear adequacy profiles across Johannesburg Health District, report the proportion of facilities meeting national adequacy targets, and identify differences in facility-level domains between high and low performing facilities and the facility-level factors associated with smear adequacy. Conclusion: Findings on modifiable facility-level factors associated with smear adequacy will inform targeted quality improvement strategies. Results will inform targeted quality improvement strategies to improve cervical screening adequacy across primary healthcare facilities in Johannesburg Health District.

GHHS-P-21: Historical and contemporary distribution patterns of the Anopheles coustani group (Diptera: Culicidae) species in the Afrotropical Region

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Background: Malaria remains a major vector-borne disease, with sub-Saharan Africa carrying the greatest burden. Effective control requires understanding the diversity, distribution, and ecology of Anopheles mosquito vectors. Although primary vectors drive most transmission, secondary vectors may contribute to residual transmission where control interventions have reduced major vector populations. The Anopheles coustani Group has received increasing attention due to reports of human-biting behaviour, outdoor feeding, and malaria parasite detection in some species. Historical collections and surveillance records provide valuable resources for assessing long-term distribution patterns and potential vector importance. Aims: To investigate historical and contemporary distribution patterns of the Anophele coustani Group across the Afrotropical Region using museum records and geospatial approaches. Methods: Occurrence records collected between 1926 and 2026 were obtained from museum collections and surveillance datasets. Specimen data, including species identity, collection year, locality, and coordinates, were standardised and mapped using Quantum Geographic Information System version 3.40.15-Bratislava. Records were classified into historical (1926–1969), intermediate (1970–1999), and contemporary (2000–2026) periods to evaluate temporal distribution patterns. Results: A total of 2,178 Anopheles coustani Group specimens were analysed, including 1,755 georeferenced records. Temporal mapping demonstrated distribution changes, with historical records (4.6%) providing baseline data, intermediate records (36.3%) showing continued sampling, and contemporary records (59.1%) reflecting increased surveillance. Specimens originated from multiple Afrotropical countries, with South Africa contributing the highest number of records, particularly from Richards Bay and surrounding areas in KwaZulu-Natal. Conclusion: Integrating museum collections with geospatial analysis improves understanding of long-term distribution trends of understudied malaria vectors and supports future surveillance and control strategies in the Afrotropical Region.

GHHS-P-22: Association between blood pressure trajectories and kidney function in a cohort of urban black South African middle-aged men and women

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Background: While hypertension is a well-established major risk factor for chronic kidney disease, there are lack of studies evaluating the association between temporal trends of blood pressure (BP) trajectories and kidney function in Africa. Aims: The aim of this study was to determine the association between BP trajectories and kidney function in middle-aged men and women living in urban South Africa. Methods: This middle-aged Soweto cohort included 910 participants who had data collected between 2023 and 2025, with a mean age of 60.4 years. The exposure was systolic (SBP) and diastolic (DBP) trajectories previously identified separately in men and women. Kidney function was measured with estimated glomerular filtration rate (eGFR) and albumin-to-creatinine ratio (ACR). eGFR was further categorised as kidney dysfunction (eGFR<90mL/min/1.73m²) and ACR as albuminuria (ACR≥3mg/mmol). Results: In multivariable models, there was no association between BP trajectories and eGFR in either women or men. Women in moderate-increasing (β=0.36,95%CI: 0.01;0.70) SBP trajectories had higher ACR compared to low-increasing SBP trajectory. Men in moderate-stable (β=0.35,95%CI: 0.08;0.61) and high-stable (expβ=0.98,95%CI: 0.34;1.63) SBP trajectories had higher ACR compared to low-stable SBP trajectory, and men in very-high-decreasing (expβ=0.73,95%CI: 0.08;1.39) DBP trajectory had higher ACR compared to moderate-decreasing DBP trajectory . There was no association between BP trajectories and kidney dysfunction in both women and men, and albuminuria in women. Men in high-stable (OR=4.20,95%CI:1.57-11.26) SBP trajectory compared to low-stable SBP trajectory, and men in very-high-decreasing (OR=3.03,95%CI: 1.11-8.30) DBP trajectory compared to moderate-decrease trajectory were associated with albuminuria. Conclusion: High risk BP trajectories may link with kidney damage rather than decline in kidney function.

GHHS-P-23: Efficacy and safety of essential oils in treating oral and dental diseases

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Background: Despite advances in mechanical and chemical treatments, oral diseases remain highly prevalent globally due to persistent social barriers and the growing challenge of antimicrobial resistance. Essential oils, with their antimicrobial properties, may serve as complementary agents in oral care, particularly when used in combination to enhance efficacy and potentially reduce toxicity Aim: To determine the antimicrobial efficacy and safety of selected essential oils implicated in oral health. Methods: Thirty-three essential oils were tested individually and in selected combinations against 11 oral micro-organisms for planktonic antimicrobial activity (broth microdilution assay), antibiofilm efficacy (crystal violet assay) as well as toxicity (brine shrimp lethality). Results: Susceptibility varied among pathogens. Cinnamomum cassia had the most consistent and potent planktonic antimicrobial activity (0.13 - 0.75 mg/mL) against all pathogens tested. Nine synergistic combinations were identified, the best of which included Mentha piperita with Pogostemon cablin, and M. piperita with Thymus vulgaris against Staphylococcus saprophyticus 15305 (fractional inhibitory concentration (FIC) index = 0.42 for both). Coriandrum sativum had the strongest biofilm inhibition (81% at 0.5 mg/mL against Streptococcus mutans 25175, and 78% at 0.25 mg/mL against Aggregatibacter actinomycetemcomitans 25922), while Pelargonium graveolens showed the strongest biofilm eradication (77% at 1 mg/mL against A. actinomycetemcomitans 25922). Reduced toxicity was observed for Eugenia caryophyllata with Origanum vulgare, with a synergistic interaction (FIC index= 0.44). Conclusion: Selected essential oils have antimicrobial potential against oral pathogens. Combination studies demonstrate synergy for some essential oils in combination which improves antimicrobial efficacy and reduces toxicity. Essential oils may complement oral treatments for safe and effective oral management.

GHHS-P-24: Bridging Regulatory Silos: Biosimilar Regulatory Oversight in the East African Community (EAC)

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Background: Biosimilars can improve access to biologic medicines by reducing treatment costs; however, their approval depends on clear, predictable regulatory pathways. Despite harmonisation efforts under the EAC Medicines Regulatory Harmonisation initiative, biosimilar requirements remain inconsistently documented and implemented across member states. To date, limited systematic evaluation exists of how these requirements are operationalised across EAC regulatory authorities, creating fragmentation that may reduce regulatory efficiency and delay patient access to biologic medicines. Aims: To evaluate biosimilar regulatory requirements across EAC member states and explore regulatory experts' experiences of policy implementation, institutional capacity, and regulatory assessment practice. Methods: Explanatory sequential mixed-methods design was employed. A modified Biosimilar Development, Evaluation and Approval questionnaire was administered to all eight EAC agencies, of which five participated. Responses were descriptively benchmarked against the WHO 2022 Biosimilars Guidelines. Semi-structured interviews were conducted with representatives from three agencies to contextualise the quantitative findings and analysed using Braun and Clarke's reflexive thematic analysis. Results: Considerable variations were identified in biosimilarity demonstration requirements, comparative quality characterisation, and clinical evidence expectations, although all five reported using both full-review and reliance-based pathways. Qualitative analysis identified five interconnected themes, highlighting outdated national policy frameworks, limited technical capacity, inconsistent application of reliance mechanisms, developing pharmacovigilance systems, and knowledge gaps among regulators and stakeholders. Conclusion: Regional harmonisation instruments are formally established across the EAC but have not yet translated into substantive regulatory convergence, revealing a gap between regional regulatory ambition and national implementation capacity. Regulatory divergence may increase regulatory burden, discourage biosimilar market entry, and delay access to affordable biologic medicines across the EAC.

GHHS-P-25: Developing Empirical Boundary of Maximum Follow-Up Durations for HIV Outcomes Using a Precision-Based Survival Analysis Framework

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Background: HIV cohort studies in resource-limited settings often rely on arbitrarily selected follow-up durations, despite the progressive decline in the precision of survival estimates over time. Follow-up time is also commonly summarised using medians or person-years, which poorly reflect the true temporal extent of observation. The Empirical Boundary of Maximum Follow-up Duration (EBMF) is a data-driven cut-off that defines the maximum follow-up time at which Kaplan–Meier survival estimates remain reliable based on predefined precision criteria within the Kaplan–Meier framework. Aims: To develop the EBMF using survival analysis with predefined precision criteria incorporated within the Kaplan–Meier framework, and to evaluate its applicability across multiple HIV outcomes. Methods: The EBMF framework was applied to two South African HIV cohorts comprising 3,529 participants. Kaplan–Meier survival analyses were conducted for viral suppression, virologic failure, viral rebound, and chronic kidney disease. The EBMF was estimated using five precision criteria: event proportion, risk ratio, standard error, coefficient of variation, and the Clark Completeness Index. The maximum follow-up duration was defined as the latest time point at which all predefined criteria were simultaneously satisfied. Results: The framework identified distinct cohort-specific follow-up boundaries of 6.42 years for the CMJAH cohort and 10.91 years for the Agincourt cohort. Outcome-specific EBMF estimates ranged from 5.97–6.10 years in CMJAH and 9.97–10.37 years in Agincourt. Survival estimates remained highly precise at these boundaries (standard error ≤0.02), with acceptable to high completeness (Clark Completeness Index: 0.65–0.98) and stable risk sets across outcomes. Conclusion: The EBMF framework

identified both cohort- and outcome-specific maximum reliable follow-up durations using explicit precision, completeness, and risk-set stability criteria within Kaplan–Meier survival analysis. Provides an objective, standardized, and reproducible

GHHS-P-26: "I would just have cravings" Appetite changes in South African women using intramuscular depot medroxyprogesterone acetate, levonorgestrel implant and copper intrauterine device
BHSc alumni

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Background: Weight gain is associated with progestogen-only hormonal contraception, but there is limited evidence on how weight change may be linked to appetite regulation. The Evidence for Contraceptive Options and HIV Outcomes (ECHO) trial compared the effect of three contraceptive methods (Intramuscular depot medroxyprogesterone acetate (DMPA-IM), levonorgestrel (LNG) implant and copper intrauterine device (IUD) on HIV acquisition. Aims: and Objectives: To describe the relationship between the study contraceptive methods and changes in appetite in an ancillary study at one site in South Africa. Methods: An ancillary study was conducted at one site in KwaZulu-Natal. Participants completed a structured questionnaire at the final study visit, which explored changes in appetite across their study participation. Data were analysed descriptively to identify trends and relationships. Results: The exit questionnaire was completed by 772 participants. Over a third (38.1 %, n= 98) of DMPA-IM, over a quarter (28.7%, n=74) of LNG implant, and 7.4% (n=19) of copper-IUD users reported an increase in appetite. Of these, common reports included increased food consumption, and many DMPA-IM and LNG Implant users specifically mentioned cravings, usually for junk food (e.g., "I would just have cravings; I would just want to eat everything"). Many DMPA-IM and LNG implant users linked appetite increase to gaining weight: "Now I am eating too much. This is since I started using the injection. Conclusion: Increased appetite and cravings were more prevalent among DMPA-IM and LNG implant users. Appetite increase and weight gain should be addressed in method counselling, in particular as weight gain is a frequent reason reported for discontinuation

GHHS-P-27: Investigating causes of death in children under five years who are dead on arrival at healthcare facilities within Soweto

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Background: In low- and middle-income countries, many childhood deaths occur outside health facilities. In South Africa, deaths must be certified at a health facility, making children declared dead on arrival an important proxy for out-of-hospital mortality. Aims: To describe the burden, age distribution, and causes of out-of-hospital under-5 deaths in the Soweto Child Health and Mortality Prevention Surveillance (CHAMPS) Network. Methods: The CHAMPS Network conducted active surveillance of under-5 deaths from January 2017 to December 2025. A subset underwent minimally invasive tissue sampling (MITS), and causes of death were determined by expert review of clinical records, laboratory results, histopathology, immunohistochemistry, and molecular testing. Results: Among 8,634 under-5 death notifications; 11.8% (1,023/8,634) were out-of-hospital and 88.2% (7,611/8,634) were facility deaths. Out of hospital deaths occurred mainly in infants 49.7% (n=508), and children 34.5% (n=353), while facility deaths (n=7,611) were predominantly neonates 62.9% (n=4,787) and infants at 24.8% (n=1,888). MITS was conducted on 56.1% (574/1,023) of the out-of-hospital deaths, 15.3% (88/574) were neonates, 52.6% (302/574) were infants, and 32.1% (184/574) were children. Most investigated out of hospital deaths, were due to natural causes (71%, n=406), 16% (n=90) were undetermined, injury 7% (n=41), and poisoning 6% (n=37). These accidental causes were concentrated among the children, accounting for 39.6% (72/184). Of these natural deaths, most common cause identified anywhere in the causal pathway were lower respiratory tract infections (301%, n=248/806) and sepsis (18%, n=143/806). Conclusion: Neonates comprise most facility deaths, while infants and older children account for most out-of-hospital deaths. Natural causes predominated, but injury and poisoning contribute substantially after infancy, highlighting the need for safer environments.

GHHS-P-28: Tobacco Use and Smoking Cessation among Inpatients at a South African Psychiatric Hospital

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Background: Tobacco use is a leading cause of preventable morbidity and mortality and is disproportionately prevalent among people with mental illness (PWMI). South African data on smoking prevalence, motivation to quit, and access to smoking cessation support among psychiatric inpatients remain limited. Aims: To determine the prevalence of tobacco use, associated factors, motivation to quit, and accessibility of smoking cessation interventions among inpatients at Sterkfontein Psychiatric Hospital (SFH). Methods: A cross-sectional quantitative study was conducted among 152 adult inpatients at SFH using a

structured survey adapted from the Global Adult Tobacco Survey. Participants were selected through simple random sampling. Data were analysed using descriptive statistics and Fisher's exact test. Results: Current tobacco use prevalence was 86.8%, while lifetime prevalence was 95.4%. Participants were predominantly male (97.4%), unemployed (64.4%), and diagnosed with schizophrenia spectrum disorders. Tobacco use was significantly associated with schizophrenia spectrum disorders ($p=0.026$) and comorbid substance use ($p<0.001$). Over half of participants (51.3%) had attempted to quit smoking in the previous 12 months, and 20.4% planned to quit within one month. Access to evidencebased cessation support, including counselling and nicotine replacement therapy, was limited. Conclusion: Tobacco use among psychiatric inpatients at SFH is substantially higher than in the general South African population. Despite demonstrated motivation to quit, cessation support remains inadequate. Integrating routine smoking cessation counselling, pharmacological interventions, healthcare worker training, and family support into psychiatric care may improve cessation outcomes and reduce tobacco-related harm among PWMI.

GHHS-P-29: Utilising Health and Demographic Surveillance Systems for Population-Based Active Surveillance of Background Rates of Adverse Events of Special Interest

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Background: Reliable background rates for potential adverse events of special interest (AESIs) are essential for interpreting vaccine safety signals in observed-versus-expected analyses, particularly for new vaccines such as for Lassa fever, Mpox and Ebola. In many low- and middle-income countries, pharmacovigilance relies mainly on hospital data, which may underestimate transient, self-managed, or primary-care-treated events. Health and Demographic Surveillance Systems (HDSS) provide population denominators and longitudinal follow-up but are not routinely configured for active vaccine safety surveillance. The Global Vaccine Data Network's Background Rates of Adverse Events for Vaccine Evaluation in Africa (BRAVE) project addresses this gap. Aims: To adapt HDSS platforms to actively ascertain population-based AESI background rates. Methods: A harmonised screening and follow-up module was integrated into routine HDSS data collection in Ghana (June 2025) and Kenya (January 2026) and is planned for Democratic Republic of Congo. Screening identified health events requiring medical attention or disrupting usual activities. Positive screens triggered structured community follow-up to characterise symptoms, severity, timing, and care-seeking. Standard procedures guided training, data quality, ethics, governance, and incidence estimation using HDSS person-time denominators. Results: Preliminary results were available. In Navrongo, Ghana, 274,391 people were surveyed during July–December 2025, generating 2,155 (0.79%) potential AESI reports. Overall, 1,400 of 2,155 people (64.96%) sought medical care. In Kilifi, Kenya, 326,142 people were surveyed during January–April 2026, generating 199 (0.06%) potential AESI reports. Overall, 196 of 199 people (98.49%) sought medical care. Conclusion: HDSS platforms can support large-scale community-based AESI ascertainment beyond hospital surveillance. Differences in crude reporting yields require site-specific evaluation before incidence rates are estimated from person-time denominators.

GHHS-P-30: Anaemia in Pregnancy: Haemoglobin Screening Coverage and Distribution in a South African CHAMPS Pregnancy Surveillance Cohort (2022–2025)

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Background: Anaemia in pregnancy is a major public health concern associated with maternal morbidity and adverse perinatal outcomes. Despite national guidelines recommending universal haemoglobin (Hb) testing during antenatal care, implementation gaps persist. This study assessed antenatal anaemia screening coverage, maternal awareness of anaemia status, and the distribution and severity of anaemia among pregnant women enrolled in the CHAMPS Pregnancy Surveillance (PS) programme in Soweto. Methods: We conducted a cross-sectional analysis using CHAMPS PS data collected between March 2022 and July 2025. Women were enrolled during pregnancy or within one year postpartum at healthcare facilities. Comprehensive data collection included variables on routine antenatal visits conducted, laboratory tests performed, and self reported symptoms. Results: A total of 8,038 women were enrolled. Most women were aged 18–35 years (83.0%, n = 6,662/8,038), enrolled during pregnancy (82.8%, n = 6,657/8,038), and had secondary education (71.3%, n = 5,624/8,038). More than half (56.3%, n=4522/8,038) reported receiving a hemoglobin test during pregnancy, of whom 23.8% (n=1078/4522) reported having had anaemia. Over two-thirds (77.8%, n=3518/4522) had documented Hb values with a mean of 11.91g/dL (SD 1.69). Of those with documented Hb values, 25.4% (n=893) were anaemic. Most cases (14.4%, n=506) were mild (Hb range 10.0-10.9 g/Dl) or 10.5% (n=368) moderate (Hb range 7.0-9.9), while severe anaemia (Hb<7.0) was rare (0.54%, n=19). Conclusion: Anaemia screening remains suboptimal in this setting. Compared to the general public, our findings show an underestimation in the prevalence of anaemia. Strengthening routine Hb monitoring, improving documentation and communication of results are essential to improving detection and management of anaemia.

GHHS-P-31: Individual and community level factors influencing modern contraceptive use among women of

reproductive age in South Africa: a multilevel analysis

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Background: Modern contraceptive use is a global public health priority because it improves maternal and child health, promotes gender equality, and supports sustainable development. Despite these benefits, women with sensory disabilities in low- and middle-income countries experience barriers to accessing family planning services. However, little is known about the influence of sensory disability on modern contraceptive use in South Africa. Aims: To examine the association between sensory disability status and individual- and community-level factors associated with modern contraceptive use among women of reproductive age in South Africa. Methods: Data were obtained from the 2016 South Africa Demographic and Health Survey. The analysis included 7,040 sexually active women aged 15–49 years. Two-level multilevel binary logistic regression models were used to assess the association between sensory disability status and modern contraceptive use while accounting for individual- and community-level characteristics. Results: The prevalence of modern contraceptive use was 57.3% (95% CI: 55.6–59.0). Women with sensory disabilities had lower odds of using modern contraceptives (aOR=0.81, 95% CI: 0.67–0.98). Lower use was also associated with desiring five or more children (aOR=0.67, 95% CI: 0.47–0.97) and living in communities with a high ideal number of children (aOR=0.75, 95% CI: 0.63–0.90). Mobile phone ownership (aOR=1.45, 95% CI: 1.15–1.82) and residence in communities with high employment (aOR=1.32, 95% CI: 1.06–1.64) were positively associated with contraceptive use. Conclusion: Sensory disability status is associated with lower modern contraceptive use among women in South Africa. The findings highlight the need for disability-inclusive family planning programmes that improve contraceptive access through accessible communication, disability-sensitive healthcare worker training, and integrated reproductive health services.

GHHS-P-32: Assessing Oncology Clinicians' Knowledge and Attitudes Towards Vaccination in Adult Cancer Patients Before, During and After Cancer Treatment
BHSc alumni

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Background: Patients with cancer face a substantially elevated risk of vaccine-preventable infections, yet vaccination remains one of the most overlooked components of oncology care. International guidelines are clear; the evidence is compelling; the vaccines exist. And still, the gap between recommendation and practice persists – not from indifference, but clinical complexity, systemic barriers, and evidence never translated into locally relevant guidance. In SouthAfrica – where the oncology burden is rising and infectious disease pressures are amplified – this gap has never been measured. Aims: To conduct the first national assessment of oncology clinicians' knowledge, attitudes, and practices regarding vaccination in adult cancer patients across the treatment trajectory, and to identify barriers and facilitators to implementation. Methods: A national cross-sectional electronic survey administered to oncology clinicians across SouthAfrica, capturing knowledge of vaccination recommendations, attitudes toward vaccine safety, efficacy and timing, and perceived implementation barriers. Composite knowledge scores and descriptive statistics will summarise quantitative findings; thematic analysis will be applied to open-ended responses. Results: Anticipated findings include knowledge gaps, attitudinal variation across treatment contexts, and recurrent systemic barriers – including uncertainty around immunosuppression and timing, competing clinical priorities, and fragmented care pathways Conclusion This is the first study in SouthAfrica, sitting at the intersection of oncology, vaccinology, infectious disease, and implementation science – asking a question that should have been asked sooner: are we protecting our cancer patients from infections we have the tools to prevent? Implications Findings will generate the first locally relevant evidence base to inform guidelines and health system reform, reducing preventable suffering in one of medicine's most vulnerable populations.

GHHS-P-33: Skeletal muscle mass associates with handgrip strength independent of total and central adiposity in black South African young adults.
BHSc alumni

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Background: Handgrip strength (HGS) is a marker of overall health and is strongly associated with muscle strength. However, this relationship may be influenced by body fat and its distribution. Aims: To investigate whether body fat influences the relationship between skeletal muscle mass and HGS in South African young adults. Methods: This cross-sectional study included 116 men and women aged 18 to 34 years, recruited in the Johannesburg Metropolitan area. Maximum handgrip strength was measured using a hand dynamometer, and body fat and skeletal muscle mass were assessed using dual-energy X-ray absorptiometry. Multiple linear regression was performed to assess the relationship between HGS and total appendicular skeletal muscle mass (ASMM), while controlling for age, sex, smoking, alcohol, physical activity, food insecurity and height. Body fat percentage (BF%) and visceral adipose tissue (VAT) were also included to test their moderating effects. Results:

HGS, ASMM and VAT were higher in men (median=43.00 vs 25.00; mean=5.89 vs 3.36 and median=66.00 vs 61.00, respectively). BF% was higher in women (median=44.00 vs 27.00). Both total ASMM and arm skeletal muscle mass were associated with higher HGS even after adjusting for covariates (β:1.575, p<0.0001; β:0.210, p<0.0001, respectively). These associations remained even after adjusting for BF% (β:0.591, p=0.0060; β:2.50, p<0.0001) and VAT (β:0.578, p=0.0400; β:2.609, p<0.0001). Conclusion: While measures of skeletal muscle mass were associated with HGS, the relationships were not influenced by whole-body fat and central adiposity. These findings suggest that HGS is a reliable proxy for muscle strength irrespective of body fat levels in the young adult black population.

GHHS-P-34: Trends in advertising expenditure and exposure to ultra-processed food advertisements in South Africa between 2013 and 2022

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Background: Ultra-processed foods (UPFs) contribute substantially to unhealthy diets and the growing burden of obesity and diet-related non-communicable diseases (NCDs). Marketing of unhealthy food is an important influence of dietary behaviours and consumption patterns. Aims: This study aimed at examining advertising expenditure and exposure patterns for UPF advertisements in South Africa. Methods: A quantitative descriptive study was conducted using secondary advertising monitoring data obtained from Nielsen South Africa between 2013 and 2022. Food and beverage products classified as ultra-processed according to the NOVA classification system were included. Advertising expenditure was aggregated by media type, food category, manufacturer, and broadcasting time. Broadcasting times were regrouped into daypart categories to assess exposure patterns. Descriptive analyses were conducted using Stata version 18 and Microsoft Excel. Results: Total advertising expenditure of UPFs exceeded ZAR 13 billion. Carbonated beverages accounted for the largest share of beverage advertising expenditure (60.9%), while ready-to-eat cereals (14.5%), chocolate coated lines (14.0%), and chocolate slabs (13.3%) accounted for the highest food-related expenditures. Coca-Cola South Africa accounted for 61.1% of beverage advertising expenditure. Television was the dominant advertising platform, accounting for 69.2% of beverage and 92.2% of food-related advertising expenditure. Evening broadcasting periods accounted for the highest advertising expenditure for both beverage and food-related UPFs. Conclusion: Substantial investment in UPF advertising occurred in South Africa, particularly through television advertising during peak evening viewing periods. The findings support stronger statutory regulation of unhealthy food advertising to reduce population exposure, particularly among children and adolescents.

GHHS-P-35: Wastewater surveillance to monitor pulmonary tuberculosis burden? Exploring TB case counts, socio-economics, and TB nucleic acid signals in wastewater in South Africa, 2025

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Wastewater surveillance offers potential tuberculosis (TB) prevalence monitoring in high-burden settings. We investigated whether wastewater Mycobacterium tuberculosis (Mtb) nucleic acid (NA) signals reflect TB burden and TB socio-demographic risk factors at the wastewater catchment level in Gauteng Province. Methods: We conducted a retrospective analysis from October 2024 to December 2025 in two Gauteng wastewater catchments serving over 1,3 million people. Samples were collected twice weekly from two treatment plants, 12 community sewers, and two tertiary hospitals. Samples were tested for Mtb-specific nucleic acid targets (GTF and IS6110). Laboratory-confirmed pulmonary TB cases from clinics within catchments were aggregated by epidemiological week. Catchment socio-demographic characteristics were obtained from the 2023/24 Gauteng City-Region Observatory Quality of Life survey. Epidemiological curves were constructed of 3-month moving averages of catchment cases and wastewater TB NA positivity rates (PR). Linear regression models assessed associations between pulmonary TB (PTB) cases, sub-catchment socio-demographics, and cumulative wastewater TB NA positivity rates. Results: Over 15 months, 1,138 wastewater samples were tested, of which 502 (44%) were positive. Clinical testing identified 3,657 TB-positive results among 101,595 samples (3.47%). Positive correlations between GTF, IS6110 PRs and TB cases were observed in one catchment. Association with wastewater TB NA positivity was associated with higher proportions of low-income households (p=0.008 (univariate), p=0.014 (multivariable)) and households using coal or wood for cooking (p=0.010, univariate). Conclusion: Wastewater Mtb detection is associated with lower income, and in one geographical area, correlates with a three-month moving average of laboratory-confirmed PTB cases. More refined spatial analysis is required to overcome likely misalignment between clinic-based case data and catchment-based wastewater signals.

GHHS-P-36: The use of climate modelling in predicting mosquito population distribution for Gene drive deployment.

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Abstract Background: Anopheles arabiensis remains a major malaria vector in South Africa despite efforts to reduce its population. This might be due to its versatile ecological preference and opportunistic feeding behavior which extends outdoors. In order to effectively eliminate this malaria vector, there is need to implement vector control methods which target the outdoor populations as well. Background: Gene drive technique is one such method that targets outdoor populations. However, effective implementation of this technique requires understanding of targeted vector distribution and climate is one factor that influences this vector. Aims: To model the relationship between climatic variables and An. arabiensis population dynamics and to predict future gene drive deployment using climate. Methods: Mosquito density and climatic data (temperature, rainfall, humidity) from Mamfene, South Africa (2018–2021) were analyzed using time series analysis, Cross Correlation Function (CCF) for lagged relationships, and Pearson's correlation for climatic associations. Results: An. arabiensis collections were highest in 2021 and lowest in 2018, peaking in summer and declining in winter. Temperature and rainfall were positively correlated with mosquito density, whereas humidity showed a weak negative correlation, with positive associations at lags 2–5 months and a 1-month lag for temperature and rainfall. Conclusion: Climate conditions influence the seasonal patterns of An. arabiensis populations. Nevertheless, the weak correlations noted implied that other ecological and environmental factors might also impact An. arabiensis populations. Observations of An. arabiensis populations and climate is essential for informing the potential future gene drive deployment. Keywords: Anopheles arabiensis, gene drive, climate, KwaZulu-Natal.

GHHS-P-37: Prevalence of Prosthetic Joint Infection Following Joint Arthroplasty in Patients with Haemophilia: A Systematic Review and Meta-analysis

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Background: Joint arthroplasty is an effective treatment for end-stage haemophilic arthropathy; however, prosthetic joint infection (PJI) remains a serious complication. Reported infection rates vary widely, and the overall prevalence of PJI in patients with haemophilia has not been comprehensively quantified. Aims: To determine the pooled prevalence of prosthetic joint infection following joint arthroplasty in patients with haemophilia and assess whether haemophilia subtype or arthroplasty type influences infection risk. Methods: A systematic review and meta-analysis was conducted according to PRISMA guidelines. PubMed, Scopus, Web of Science, ClinicalTrials.gov, and the Cochrane Library were searched from inception. Two reviewers independently performed study selection and data extraction. The primary outcome was pooled PJI prevalence. Random-effects meta-analysis with the Freeman-Tukey double arcsine transformation was performed. Heterogeneity was assessed using the I^2 statistic, with subgroup analyses by haemophilia subtype and arthroplasty type. Results: Thirty-five studies comprising 1,673 arthroplasty procedures were included. The pooled prevalence of PJI was 4.0% (95% confidence interval [CI]: 2.0%–6.0%) with moderate heterogeneity (I^2=54.3%). Infection rates ranged from 0% to 26%. No significant difference was observed between mixed haemophilia cohorts (4.0%, 95% CI: 3.0%–6.0%) and haemophilia A-only cohorts (2.0%, 95% CI: 0.0%–6.0%; p=0.2997). Similarly, PJI prevalence did not differ significantly between total knee arthroplasty and non-total knee arthroplasty procedures (3.0% vs 6.0%; p=0.1447). Conclusion: Approximately one in twenty-five arthroplasty procedures in patients with haemophilia is complicated by PJI. Infection risk did not differ significantly by haemophilia subtype or arthroplasty type. These findings provide contemporary pooled estimates to inform patient counselling, perioperative planning, and future research.

GHHS-P-38: Central Obesity and Hypertension as Predictors of Arterial Stiffness in Young South African Adults
BHSc alumni

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Background: Cardiovascular disease (CVD) claims over 200 lives daily in South Africa, a leading cause of premature death, with risk escalating rapidly. Central obesity and hypertension may independently and synergistically accelerate arterial stiffening, a precursor to premature CVD. Whether sex modifies this association in this population is unknown. Aims: To investigate individual and combined associations of central obesity and hypertension with arterial stiffness (PWV) in young South Africans (18–40 years), and to explore sex-specific differences. Methods: This cross-sectional study of 255 participants (112 males, 143 females) defined central obesity using IDF waist circumference (WC) thresholds (≥94 cm males, ≥80 cm females). Hypertension was defined as BP ≥130/85 mmHg. Participants were categorised into four groups: healthy, elevated WC only, hypertensive, and elevated WC+BP. PWV was measured via SphygmoCor XCEL. One-way ANOVA with Tukey's post-hoc and multiple linear regression were performed. Results: Elevated WC prevalence was 39.1% and hypertension 19.8%. Males had higher WC (86.10±17.50 vs 82.34±16.14 cm, p=0.0115) and PWV (6.04±1.00 vs 5.52±1.00 m/s, p=0.0017). Age correlated with WC, DBP, and PWV; WC correlated with DBP and PWV (all p<0.01). The WC+BP group had higher PWV than healthy controls (p=0.0296). In multivariable regression adjusting for age, sex, and ethnicity, WC (β=0.233, p=0.0218), DBP (β=0.524, p=0.0027), and sex (β=0.274, p=0.0177) independently predicted PWV. Conclusion: Central obesity and hypertension independently predict arterial stiffness, with combined effects conferring the greatest risk. Males have higher WC and PWV. Sex independently predicts PWV, supporting sex-specific early cardiovascular screening and intervention in young South Africans.

GHHS-P-39: Efficacy of Zonisamide for Body Weight and Adiposity: A Systematic Review and Meta-Analysis

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Background: Obesity is a chronic relapsing disease associated with substantial morbidity and mortality. Although pharmacotherapy has expanded, achieving sustained weight reduction remains challenging. Zonisamide, an antiepileptic agent with appetite-suppressing and antiadipogenic effects, has emerged as a potential adjunct for obesity management. Aims: To evaluate the efficacy of zonisamide for weight reduction and metabolic improvement in adults with overweight or obesity. Methods: A systematic review and meta-analysis of randomized controlled trials was conducted according to PRISMA guidelines. PubMed, Scopus, Web of Science, and CENTRAL were searched from inception to April 2026. Mean differences (MD) with 95% confidence intervals (CI) were pooled using random-effects models. Heterogeneity was assessed using the I^2 statistic, with sensitivity analyses evaluating robustness. Results: Eight studies were included qualitatively, with five randomized controlled trials (407 participants) included in the meta-analysis. Zonisamide significantly reduced body weight versus placebo (MD -2.91 kg; 95% CI -4.24 to -1.57; $p<0.0001$). Although heterogeneity was substantial ($I^2=75.6\%$), sensitivity analyses confirmed robust findings. Additional studies demonstrated reductions in waist circumference and attenuation of antipsychotic-associated weight gain. Conclusion: Zonisamide significantly improves weight loss and central adiposity in adults with overweight or obesity. Zonisamide may represent an effective adjunctive pharmacological option for obesity management. Larger, high-quality trials are needed to establish its long-term efficacy and safety.

GHHS-P-40: Background Rates of Adverse Events for Vaccine Evaluation in Africa (BRAVE): Laying the Groundwork for Safer Vaccines in Africa

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Background: When new vaccines are introduced, side effects must be quickly identified. In many African countries, health systems lack data on how often serious medical conditions occur naturally, independent of vaccination. Without these background rates, it is impossible to tell whether a post-vaccination health event is truly vaccine-related or would have happened anyway. Aims: BRAVE aims to measure the natural occurrence of selected serious medical conditions across African countries, providing essential context for assessing vaccine safety — particularly for new vaccines targeting emerging pathogens such as Lassa fever and mpox. Methods: BRAVE is a multi-country observational study funded by the Coalition for Epidemic Preparedness Innovations (CEPI), with data collection running from August 2025 to mid-2027 across Ghana, Nigeria, Rwanda, Kenya, and the Democratic Republic of Congo (DRC). Data are collected through active hospital admission monitoring and community health surveillance. Results: As of 29 June 2026, 46,649 patients have been screened across Nigeria, Rwanda, Ghana, and Kenya, with 8,125 enrolled (Nigeria: 2,988; Rwanda: 1,955; Ghana: 1,700; Kenya: 1,482). DRC has enrolled 80 of 198 screened as of 22 June 2026. The most common conditions identified include maternal and neonatal complications (2,595), ARDS (2,388), generalised convulsions (1,675), and TTS (1,581). Conclusion: BRAVE has enrolled over 8,200 hospital patients across five African countries, demonstrating the feasibility of large-scale, multi-site background rate data collection in LMICs. These data will strengthen Africa's capacity to evaluate vaccine safety accurately, support future vaccine trials and roll-outs, and help sustain public trust in life-saving immunisation programmes.

GHHS-P-41: Ethnic Disparities in Hypertension among Women in the May Measurement Month Global Capmaigns 2021-2023

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Background: / Objective Hypertension is a leading global risk factor for cardiovascular disease. The May Measurement Month (MMM) initiative promotes blood pressure (BP) screening. Data on hypertension prevalence, awareness, treatment, and control among Black women in Sub-Saharan Africa (SSA) are limited. This study compared this group with other ethnicities participating in MMM 2021–2023. Methods: Adults (≥18 years) underwent BP screening using a standard protocol. Three seated BP readings and a demographics/comorbidities questionnaire were collected. Included were women identifying as Black SSA (n=91,916), East/Southeast Asian (ESA, n=347,718), South Asian (n=73,779), or White European (n=82,071). Hypertension was defined as systolic BP ≥140 mmHg, diastolic BP ≥90 mmHg, or BP-lowering medication use. Results: 595,484 participants from 62 countries were included (mean age: 46.4 years). Black SSA women were the youngest (41.7 years) and had the highest age-standardised mean systolic (125.4 mmHg) and diastolic (79.9 mmHg) BP. Hypertension prevalence was highest in Black SSA women (39.7%), lowest in ESA women (25.2%). Among hypertensives, awareness and treatment rates were lowest in ESA women (37.3% and 35.7%), while control among treated hypertensives (BP <140/90 mmHg) was lowest in Black SSA women (54.1%). Of untreated women (n=93,509), combined systolic-diastolic hypertension was most common in Black SSA (41.3%) and White (36.3%) women, isolated diastolic hypertension predominated in ESA

(37.5%), and isolated systolic hypertension in South Asian women (36.9%). Conclusion: Black SSA women demonstrated a high burden of hypertension and poorer BP control. Along with low awareness and treatment rates in ESA women, these results highlight the need for culturally tailored screening, education, and interventions to improve detection and management.

GHHS-P-42: Cohort Profile: The Soweto and Thembelihle Health and Demographic Surveillance System (SaT-HDSS)

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info@wits-vida.orgBackground: The Soweto and Thembelihle Health and Demographic Surveillance System (SaT-HDSS) was established in 2017 to support the Child Health and Mortality Prevention Surveillance (CHAMPS) programme and to provide a longitudinal platform for monitoring population health and demographic dynamics. It operates in Soweto peri-urban township and Thembelihle informal settlement, approximately 20 km south-west of Johannesburg. Aims: and Objectives SaT-HDSS aims to track vital events, household characteristics, and demographic changes in a rapidly evolving urban context, thereby enabling the estimation of key health and population measures. Methods: At baseline, the cohort comprised 112,148 individuals across 31,391 households. Data collection includes pregnancy outcomes, deaths, in- and out-migration, and household-level indicators. The open cohort is visited twice annually, with attrition occurring through out-migration, death, loss to follow-up, and refusal. Results: Baseline demographics showed a sex ratio of 0.92, young-age dependency ratio of 0.43, and old-age dependency ratio of 0.08, with 53% of women of reproductive age. By 2024, the cohort had expanded to 117,587 participants, reflecting ongoing population dynamics in peri-urban South Africa. Conclusion: SaT-HDSS provides a robust longitudinal resource for understanding demographic and health transitions in urbanizing communities. The platform offers opportunities for collaborative research, including the development of new questionnaire tools or analysis of existing data. Requests for data access and partnerships can be directed to info@wits-vida.org.

GHHS-P-43: Timely tracking of positive cryptococcal antigen results for people with HIV in South Africa: lessons from the CAST OFF-SA study

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Background: Cryptococcal meningitis (CM) is the second leading cause of mortality among people with advanced HIV disease (AHD, defined as CD4 count<200 cells/μL). South Africa's reflex serum/plasma cryptococcal antigen (CrAg) screening programme aims to identify, diagnose, and treat cryptococcal disease early to prevent CM-related deaths. To ensure timely results review, positive results are published weekly on a National Health Laboratory Service (NHLS) Results for Action (RFA) report. Aims: To explore experiences and feasibility of using the RFA in primary care and the EFFECT trial (Efficacy of Flucytosine and Fluconazole as Early Cryptococcal Treatment, ISRCTN30579828) in South Africa. Methods: We conducted 21 focus group discussions with primary healthcare workers in 4 provinces to discuss experiences of the RFA and barriers to widespread use and in-depth interviews with EFFECT staff to explore prior RFA experience, ease of implementation and use, and barriers to effective use in healthcare settings. Transcripts were analysed thematically. Results: Research staff were more familiar with the RFA, the majority only became aware of it during the trial. Those who used the RFA reported that it was easy and efficient to use and allowed rapid identification of positive serum CrAg results. Disadvantages included missing patient contact information. Barriers to RFA use in clinics included lack of awareness, lack of assigned responsibility to regularly check reports, and lack of infrastructure. Conclusion: Interventions to address barriers inhibiting widespread use of RFA reports in South Africa could lead to timely identification of positive plasma/serum CrAg results among people with AHD.

GHHS-P-44: Prevalence and factors associated with congenital disorders identified through the UBOMI BUHLE pregnancy exposure registry in Soweto, South Africa

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Background: Congenital disorders (CDs) are structural or functional abnormalities arising during the intrauterine period and represent a growing contributor to neonatal and under-five morbidity and mortality globally. Data on the burden and spectrum of CD in South Africa are limited. The Ubomi Buhle Pregnancy Exposure Registry (UBPER) is a sentinel site-based platform that evaluates maternal exposure and pregnancy outcome data across 17 facilities in three provinces. Aims: We present the prevalence and spectrum of CD from the Soweto sites of the UBPER. Methods: Data collected from UBPER sentinel sites in Soweto between July 2021-May 2026 were included. Pregnant women were enrolled at first antenatal visit and followed to delivery. CD were identified through neonatal surface examination as recorded in the Maternity Case Record and categorized using the ICD-10 classification. Results: 9803 pregnancies and 9969 outcomes were included. Of the outcomes 96.37% were

livebirths (n=9607;); 2.11% stillbirths (n=210); 1.36% miscarriages (n=136); and 0.16% medical terminations of pregnancy (MTOP) (n=16). 157 (1,57%) were born with CD: 1.55% of livebirths (149/9969), 2.38% of stillbirths (5/210) and 18.75% of MTOP (3/16). The most common CD was polydactyly (n=61, 38.9%), followed by talipes equinovarus (n=26,16.6%). Eleven babies (7%) presented with chromosomal abnormalities: trisomy 21(6), trisomy 13 (2), trisomy 18 (2), and trisomy 8(1). Conclusion: CD were more common in stillbirths and MTOP. UBPER represents a platform to better understand CD in. Expanding the analysis to include all UBPER sites will enhance the robustness and generalisability of findings. Results: can guide policy, resource allocation, and care planning.

GHHS-P-45: Idiopathic Chondrolysis of the Hip in a 29-Year-Old Male: A Rare Adult Presentation with Bilateral Sequential Hip Destruction
BHSc alumni

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Background: (49 words) Idiopathic chondrolysis of the hip (ICH) is a rare disorder characterised by progressive loss of articular cartilage, resulting in pain, stiffness and functional limitation. It predominantly affects adolescents, while adult presentations are exceptionally uncommon. Diagnosis is one of exclusion because no clinical, radiological or histological feature is pathognomonic. Aims: (22 words) To describe a rare adult presentation of suspected idiopathic chondrolysis of the hip with adolescent-onset symptoms and sequential bilateral joint destruction. Methods: (49 words) A 29-year-old male with bilateral hip pain beginning in adolescence and progressing over more than a decade underwent comprehensive clinical assessment, laboratory investigations, radiography, magnetic resonance imaging and histopathological evaluation. Infectious, inflammatory, vascular and secondary causes of chondrolysis were systematically excluded. Results: (57 words) The patient developed progressive bilateral destructive hip arthropathy requiring staged bilateral total hip arthroplasty. Imaging demonstrated advanced concentric joint-space narrowing with femoroacetabular remodelling. Histopathology showed mild non-specific chronic synovitis and severe osteoporosis without evidence of osteonecrosis, septic arthritis, granulomatous inflammation, marrow infarction or other specific pathology. Conclusion: (38 words) This case represents a rare adult presentation of suspected idiopathic chondrolysis with adolescent-onset disease, prolonged progression and bilateral hip destruction. The diagnosis was supported by characteristic clinical progression following exclusion of more common alternative diagnoses. (45 words) Idiopathic chondrolysis should remain a differential diagnosis in young adults presenting with unexplained destructive hip arthropathy. Early recognition and thorough exclusion of infectious, inflammatory and ischaemic conditions may facilitate appropriate management and improve understanding of this rare disorder.

GHHS-P-46: Successful Implementation of a Cohort Supervision Strategy for an Honours Research Project in Human Genetics

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Background: Cohort supervision is a group-based approach where postgraduate students are supervised by a team, rather than traditional one-on-one supervision. In our setting, this approach was implemented for the research component of the BSc Honours programme (Human Genetics). The strategy involves supervisors and genomic data analysis project which is methodology focused and uses different monogenic disorders. Aims: To assess the effectiveness of cohort supervision strategy in the Division of Human Genetics Method: The strategy was introduced in 2023 following a directive from the University to increase the number of postgraduate students enrolled. Staff resources were not similarly increased. The projects use genomic data from selected genes of the multi-disease targeted panel. Each student is assigned one specific disorder from the panel and provided with their own data to analyse independently. Staff with various expertise are involved in different phases of the research process. Results: The strategy allowed annual intake of approximately 14 students per year, which is double the number of students enrolled previously. Students acquire skills on genomic data manipulation, including annotation, prioritization, visualisation, classification and validation of clinically significant variants. The students are assessed via several assignments throughout the duration of the projects. Conclusion: This approach has been successfully implemented and shows that innovative ways of supervision are effective in instilling the necessary skills for genomic variant interpretation using limited resources. This approach has led to 41 graduates since inception, with 11 students currently enrolled. The success of the current study enabled the implementation of same variant interpretation strategy in training master's students, registrars and interns.

GHHS-P-47: From Clinical to Care: Understanding Women's Antenatal Care Journeys in Soweto, South Africa.

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Background: Antenatal care (ANC) is a public health intervention that is important in providing comprehensive healthcare services to pregnant women to prevent maternal and infant mortality. In low- and middle-income countries, ANC attendance is hindered by varying factors and in some instances these factors emerge from the healthcare system itself, e.g. infrastructure, resources, and health care worker attitudes and behaviours. Aims: Explore barriers and facilitators experienced by pregnant women in accessing ANC services. Understand cultural and religious factors that influence ANC attendance. Methods: The study was conducted in Soweto and Thembelihle (Johannesburg) as part of a multi-site study across the Child Health and Mortality Prevention Surveillance network. Through purposive sampling, semi-structured interviews were conducted with seven mothers, three fathers, and four grandparents; whilst two focus group discussions were conducted with health care workers and traditional healers respectively. The data was translated and transcribed into English, and deductive and inductive coding was formulated to analyse the data in Dedoose. Thematic analysis was subsequently applied. Results: The study found that mothers faced several challenges during ANC attendance, which included long clinic waiting times, poor treatment and judgemental attitudes from nurses, and poor health education especially upon discharge with their baby. Family support was found to be incredibly important, improved the pregnancy experience, and maternal family provided health education. Conclusion: Negative ANC experiences may reduce care-seeking and delay the detection of complications leading to increased risk for mothers and newborns. Strong family support improved maternal well-being and filled education gaps, reflecting the need for more efficient, respectful, and family-inclusive maternal healthcare services.

GHHS-P-48: Assessing Readiness for Maternal RSV and GBS Vaccines in South Africa: From Policy to Uptake

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Background: Maternal immunisation protects pregnant women and infants against vaccine-preventable diseases. As maternal respiratory syncytial virus (RSV) and Group B Streptococcus (GBS) vaccines become available, assessing readiness is essential. Aims: To evaluate maternal immunisation readiness in South Africa (SA) by assessing health system capacity, vaccine delivery, information systems, and behavioural determinants of vaccine uptake. Methods: A mixed-methods situational analysis through the Maternal Immunisation Readiness Network in Africa and Asia (MIRNA) included policy review, 11 focus group discussions (n=84), a cross-sectional survey of women of reproductive age (n=500), and key informant interviews (n=31). Results: were analysed using the 6As framework. Results: SA demonstrated strong readiness in health system capacity and vaccine delivery, but moderate readiness in demand. This includes 4,000 public health facilities, over 3,100 immunising facilities, and 52 healthcare professionals per 10,000 population. Although antenatal care attendance for first visits was high (69–84%), only 50% of pregnant women completed four visits. Sixty percent were unaware of maternal vaccines, 59% had not been informed they could be vaccinated during pregnancy, and 62% never discussed vaccination with a healthcare provider. Over 83% perceived vaccines as safe, and 87% would accept vaccination if recommended. Barriers included transport costs, waiting times, workforce shortages, and migration-related disruptions. Conclusion: SA has a strong foundation for maternal immunisation, but gaps remain in awareness, provider communication, continuity of antenatal care, and access. Implication: Strengthening healthcare worker engagement, improving communication to pregnant women, and reducing barriers will support the introduction and uptake of maternal RSV and GBS vaccines.

GHHS-P-49: Developing a User-Centred Vaccine Demand Strategy for Maternal Vaccines in South Africa

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Background: Successful introduction of new maternal vaccines requires demand-generation strategies that address barriers to and facilitators of acceptance and uptake. Evidence on translating research into contextually relevant strategies remains limited. Aims: To develop a stakeholder-informed Vaccine Demand Strategy for introducing maternal respiratory syncytial virus (RSV) and future Group B Streptococcus (GBS) vaccines in South Africa (SA) using a User-Centred Design (UCD) approach. Methods: A multi-phase UCD process was undertaken. Evidence from policy and guideline reviews, literature, community surveys, group discussions and key informant interviews informed a stakeholder orientation session. A two-day UCD workshop with 15 stakeholders used the 6As framework to prioritise barriers and co-design interventions. Outputs were subsequently reviewed with 11 community stakeholders to assess agreement. Workshop outputs were analysed thematically and refined through expert validation. Results: Participants prioritised 18 barriers, informing six strategic priorities: community awareness and demand generation; healthcare worker knowledge and capacity; service accessibility; health system communication and coordination; and sustainable procurement and funding. The Vaccine Demand Strategy comprised six strategic objectives and 24 implementation activities, with defined roles, communication approaches, and monitoring indicators. Key interventions included strengthening healthcare worker communication, integrating maternal vaccination into antenatal care and community outreach, improving care coordination, and reducing barriers to access. Validation confirmed relevance, feasibility, and acceptability. Conclusion: A UCD approach produced a practical, evidence-informed Vaccine Demand Strategy to support the introduction of maternal RSV and GBS vaccines in SA. Implication: This co-designed strategy

provides a scalable, stakeholder-informed framework to strengthen demand generation and support implementation in SA and similar settings.

GHHS-P-50: Group B Streptococcus Serotype-Specific IgG Responses and Transplacental Antibody Transfer in Mother–Newborn Dyads Across Low- and Middle-Income Countries in Africa and South Asia
BHSc alumni

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Background: Group B Streptococcus (GBS) is a leading cause of neonatal sepsis and meningitis, with the greatest burden in low- and middle-income countries (LMICs). Maternal antibodies against GBS capsular polysaccharide (CPS) provide passive infant protection, but the proportion exceeding protective thresholds varies regionally. Aims: To assess GBS-CPS-specific IgG responses in HIV-uninfected pregnant women and evaluate transplacental antibody transfer from mother to infant across LMIC settings. Methods: Maternal and cord serum samples were collected at nine sites: Bangladesh, Bhutan, Ethiopia, India, Kenya, Mali, Mozambique, Nigeria, and South Africa. Serotype-specific IgG antibodies against CPS Ia, Ib, II, III, IV, and V were measured using a validated Luminex assay. Geometric mean concentrations (GMCs), cord:maternal ratios (CMRs), and the percentage of cord samples exceeding 80% risk-reduction thresholds were calculated with 95% confidence intervals. Results: Bangladesh and South Africa had the highest serotype Ia GMCs (0.37 and 0.18 µg/mL). Mali had the highest IV (0.10) and V (0.34) GMCs. CMRs for Ia were highest in Bangladesh, India, and South Africa (>0.76), while India, Ethiopia, and Bhutan had the highest CMRs for III (0.73–0.83), and strong transfer for II, IV, and V (0.70–0.74). Serotype II showed the widest and most efficient transfer range (0.80–1.12). Bangladesh had the highest proportions above threshold for Ia (57%) and II (79%), followed by South Africa for Ia (48%); most other sites were below 20%, except Mali for IV and Bangladesh for Ib. Conclusion: Maternal GBS immunity and transplacental transfer varied by region and serotype across LMICs. These findings may inform maternal vaccine design and threshold-based protection strategies.

GHHS-P-51: Safe Mkhukhu: Co-Designing Low-Cost Child Injury Prevention Solutions for Informal Settlements

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Background: Childhood injuries are a major but preventable cause of death in South Africa. Child Health and Mortality Prevention Surveillance (CHAMPS) data indicate that injuries, mostly hot water burns, contribute to 12% of deaths among infants aged 28 days to <12 months and 43% among children 12–59 months in Soweto. Our burns prevention study demonstrated that caregiver education improved burn prevention knowledge and first-aid practices within Soweto, however, structural and spatial constraints within informal housing limit the effectiveness and sustained adoption of education-based injury prevention interventions. Aims: To identify implementation barriers and co-design contextual injury prevention interventions that are feasible, acceptable, and scalable within informal settlement settings. Methods: The Safe Mkhukhu Project uses human-centred design and participatory implementation approaches, bringing together caregivers, researchers, and partners from the Faculties of Health Sciences and Engineering and the Built Environment to collaboratively identify barriers to injury prevention and develop interventions that fit local contexts and resource constraints. During a three-day workshop in Thembelihle (29 June–2 July 2026), participants identify and prioritize hazards to target in informal households, develop micro-intervention prototypes, and redesign household spaces using recycled, freely available, or low-cost materials to address burns, poisonings, drowning, electrocution, and other preventable injuries. Results: Results: will be presented following completion of the workshop and are expected to include community-designed implementation strategies, injury prevention interventions and spatial redesign concepts for pilot testing and future implementation evaluation. Conclusion: Safe Mkhukhu applies a transdisciplinary, community-centred approach to injury prevention in informal settlements. Co-designed interventions may provide scalable, low-cost strategies to reduce preventable childhood injuries.

GHHS-P-52: Pregnancy-Associated Invasive Group B Streptococcal Disease in South Africa, 2020–2024

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***[Affiliation pending]**

Background: Streptococcus agalactiae (Group B streptococcus, GBS) is an important cause of maternal and neonatal morbidity. Data on pregnancy-associated invasive GBS disease in South Africa are limited. Aims: To describe the epidemiology, clinical features, outcomes, and serotype distribution of pregnancy-associated iGBS disease in South Africa (2020–2024). Methods: We conducted a retrospective analysis of pregnancy-associated invasive GBS cases identified through the GERMS-SA national laboratory-based surveillance programme (2020–2024) across 30 sentinel sites. Cases included GBS isolated from sterile or non-sterile specimens in pregnant or postpartum women. Demographic, clinical, pregnancy outcome,

HIV, treatment, and serotype data were analysed descriptively. Results: A total of 341 cases were identified, mainly among women aged 25–44 years (70%, 238/341), followed by 15–24 years (27%, 92/341). Most episodes were identified from genital tract cultures (89%, 302/341), with blood cultures accounting for 6% (19/341). Antibiotics were administered in 51%(174/341), not given in 43.4%(148/341), and unknown in 5.6%(19/341). HIV status was available for 317 women; 25%(79/317) were living with HIV, 70%(55/79) were on ART, and 16%(8/50) had CD4 <200 cells/µL. Maternal mortality was 0.6%(2/341). Pregnancy outcomes were known for 19.6% (67/341), including stillbirths (50.7%, 34/67), neonatal GBS(6%, 4/67), clinical infection(7.5%, 5/67), neonatal deaths (4.5%, 3/67), and miscarriages(10.4%, 7/67). Serotype data were available for 21% (71/341), including Ia (22), Ib (12), II (6), III (18), IV (4), V (9), and non-typeable (2). Conclusion: Pregnancy-associated invasive GBS disease remains an important cause of adverse maternal and neonatal outcomes in South Africa. Implication Enhanced surveillance and serotype monitoring are needed to inform maternal GBS vaccine policy in South Africa.

GHHS-P-53: Guidelines for interpretation of mpox wastewater surveillance results: learning from field experience in Gauteng Province, South Africa, 2025

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Background: Mpox surveillance using wastewater can provide population-level evidence transmission independent of healthcare-seeking behaviour. However appropriate public health responses following wastewater detection remains unclear. We describe public health responses at national and district level to mpox detection in wastewater, to clarify interpretation and guide public health actions. Methods: We conducted a retrospective analysis of wastewater and clinical mpox surveillance data by epidemiological week and district from national and community sites in Gauteng in 2025. Public health responses to wastewater and clinical surveillance data were reviewed through analysis of surveillance officer reports, Incident Management team minutes. We propose guidelines for interpretation and public health action. Results: From 1 January to 31 December 2025, eight clinical mpox cases were laboratory confirmed (seven clade 1b in Ekurhuleni (weeks 7,8,11 & 12) , one clade IIb case in Johannesburg (week 24) . Of 1,826 wastewater samples tested, 40 (2.2%) were positive across three metropolitan districts. Clinical cases triggered investigation, contact tracing, and health promotion, while wastewater detections without clinical cases were monitored or followed by distribution of health promotion material including posters, and community radio interviews. Sustained or recurrent wastewater detections with no clinical case detections did not result in escalation of public health response. Conclusion: Wastewater surveillance provided evidence of virus shedding despite the absence of clinical cases, however inconsistent public health responses were observed. Guidelines for interpretation and public health action incorporating temporal and spatial wastewater detection patterns and relationship to clinical cases can strengthen mpox surveillance systems.

GHHS-P-54: Title: From Knowledge to Action: Community-Based Burns Education for Paediatric Burn Prevention in South Africa

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Background: South Africa's healthcare system remains treatment-focused despite prevention being more cost-effective. Paediatric burns are a growing public health concern, causing substantial morbidity, mortality, and healthcare costs. Most burns occur in the home, are preventable, and are exacerbated by inadequate first aid and limited caregiver knowledge. Although burns awareness programmes are effective, few initiatives in South Africa target caregivers. This study explored whether community-based education could improve knowledge retention and promote the wider dissemination of burn prevention and first-aid information. Aims: To assess community members' retention of burns prevention and first-aid education and explore whether knowledge gained was shared within their communities. Methods: A qualitative study was conducted following a burns awareness workshop in June 2024 involving 100 participants (40 Community Advisory Board [CAB] members and 60 community members). Six months later, semi-structured interviews were conducted with 27 purposively sampled CAB members to examine knowledge retention and dissemination. Data were analysed using thematic analysis. Results: Participants demonstrated sustained knowledge retention and reported positive behavioural changes six months after the workshop. CAB members actively shared burn prevention and first-aid information through informal conversations, community meetings, and education sessions at daycare centres and primary schools. Several participants also described applying their knowledge to provide appropriate assistance during burn incidents, particularly involving children. Conclusion: Community-based burns education supports lasting knowledge retention, behaviour change, and the dissemination of prevention and first-aid messages through trusted community networks. Empowering community members represents a feasible and cost-effective strategy to improve caregiver knowledge, strengthen paediatric burn prevention, and reduce the burden of childhood burns in South Africa.

GHHS-P-55: From Heat Awareness to Workplace Protection: Heat-Health Literacy and Occupational Risk Management Among Healthcare Workers in Tshwane, South Africa

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Background: As climate change intensifies extreme heat, healthcare workers are increasingly exposed to occupational heat risks, including in indoor clinical environments where ventilation, workload, infrastructure, and protective clothing can amplify heat strain. While climate and heat-health literacy are gaining attention, less is known about whether healthcare workers understand heat as an occupational health risk, or whether this knowledge is reflected in workplace monitoring, protocols, and occupational risk management systems. This study assessed heat-health literacy and occupational management for heat stress risk in the health sector in Tshwane, South Africa. Methods: A mixed-methods cross-sectional study was conducted among 80 healthcare personnel across two health facilities in Tshwane, South Africa. Quantitative questionnaires collected data on socio-demographic characteristics, work experience, wellbeing, heat strain symptoms, and adaptation strategies. Qualitative data were generated through approximately 25 in-depth interviews and 9 key informant interviews conducted across process and impact evaluations with healthcare workers from antenatal, labour, and postnatal units. Qualitative data were analysed thematically using inductive and deductive approaches. Results: Participants were mostly female (98.75%), with a median age of 40.5 years. Heat-related burden was substantial: 41% reported recent heat strain symptoms and 33% recorded dangerous heat strain levels. Yet qualitative findings showed that heat was commonly normalised as discomfort rather than recognised as an occupational risk. Training and heat champion exposure improved awareness, prompting increased hydration and temperature vigilance. However, most participants (79%) reported low availability of occupational risk management assessments for heat monitoring, highlighting a major gap in occupational health training and institutional preparedness. Conclusion: The findings show a critical disconnect between healthcare workers' exposure to heat risk and the systems

GHHS-P-56: Detection, Characterization, and Genetic Relatedness of Clostridioides difficile in Hospital Wastewater and Clinical Isolates from Johannesburg, South Africa.

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Background: Clostridioides difficile (C. difficile) is increasingly being identified in low-risk populations outside the hospital setting. This suggests the presence of environmental reservoirs that facilitate spore dissemination into the community. Despite wastewater being a known source elsewhere, there is currently no information regarding its presence in South African wastewater or the genetic relatedness between wastewater and clinical strains. Aims: This study aimed to isolate and characterise C. difficile from both clinical isolates and wastewater samples and to investigate their genetic relatedness. Methods: A laboratory-based descriptive study was done at the University of the Witwatersrand, Clinical Microbiology Department, in collaboration with the National Health Laboratory Services, Infection Control Laboratory. A total of 20 wastewater samples were collected from hospital wastewater in Johannesburg, and a total of 14 clinical C. difficile isolates previously collected from Charlotte Maxeke Johannesburg Academic Hospital (CMJAH) and the Chris Hani Baragwanath Hospital were used. Selective media and conventional Polymerase Chain Reaction were used for isolation and characterization of C. difficile, while whole-genome sequencing (WGS) will be used to investigate the genetic relatedness of C. difficile strains from wastewater and clinical strains. Results: Results indicated that 75% of the wastewater samples and 100% of the clinical isolates were culture-positive. Data consolidation is currently underway, and a comprehensive overview will be available at the time of the presentation. Conclusion: These findings will support the identification of wastewater as a potential transmission pathway for C. difficile into the broader environment, and demonstration of genetic relatedness between wastewater-derived strains and clinical isolates would underscore the need for urgent public health intervention.

GHHS-P-57: The changes over time of Hepatitis C Virus (HCV) seroprevalence, and viral load trends in South Africa, between 2017 and 2021

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Background: South African Hepatitis C Virus (HCV) guidelines have shifted from a traditional two-step diagnostic algorithm, involving anti-HCV serology followed by separate HCV RNA confirmatory testing; to reflex viral load (VL) testing. This change aims to reduce patient loss to follow-up and improve linkage to care. However, implementation gaps may remain in the public healthcare setting. Aims: To investigate changes in HCV seroprevalence and VL testing trends in South Africa, while assessing the proportion of seropositive individuals who receive confirmatory VL testing. Methods: A retrospective cross-sectional analysis was conducted using routine HCV serology laboratory data from Gauteng, extracted from the National Health Laboratory Service Corporate Data Warehouse for 2017–2019. Annual seroprevalence was expressed as percentages of Positive and Low Positive cases. Sociodemographic factors, including age and gender, were analysed. Linkage to reflex testing was assessed by matching seropositive and VL episode numbers, assuming these represented testing on the same patient sample. Results: A total of 134,318 HCV serology results were analysed. Seropositivity rates were 3.5% in 2017, 3.4% in 2018, and increased to 4.4% in 2019. The median age of seropositive patients remained stable at 36–38 years. Male predominance increased from approximately 70% in 2017 to over 77% in 2019. Reflex VL testing remained low at 7.8% in

2017, 8.8% in 2018, and declined to 5.3% in 2019. Conclusion: and Implications These findings highlight persistent gaps between serology and confirmatory VL testing across the study period. Further analysis will assess VL tests performed on separate samples to better evaluate linkage to care and strengthen HCV elimination strategies in South Africa.

GHHS-P-58: The Prevalence of Hepatic Steatosis and Liver Fibrosis in Middle-Aged Black South African Men and Women

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Background: Hepatic steatosis and fibrosis are major contributors to chronic liver disease worldwide, yet data from sub-Saharan Africa remain limited. This evidence gap is relevant in South Africa, where obesity and other cardiometabolic risk factors are increasing. Aims: To determine the prevalence of hepatic steatosis and liver fibrosis in middle-aged Black South African adults and assess sex differences. Methods: This cross-sectional study included 466 middle-aged Black South African adults (243 men and 223 women) from the Middle-Aged Soweto Cohort (MASC) at the Wits University Donald Gordon Medical Centre. Hepatic steatosis and fibrosis were assessed using vibration-controlled transient elastography. Hepatic steatosis was defined as a controlled attenuation parameter (CAP) ≥248 dB/m and significant fibrosis as a liver stiffness measurement (LSM) ≥8.2 kPa. Body mass index (BMI) and waist circumference were measured using standardised protocols. Data were analysed using Wilcoxon, Fisher's exact, and chi-squared tests. Results: Hepatic steatosis was present in 22.7% of participants, with a higher prevalence in women (26.1%) than men (19.8%). Significant liver fibrosis was present in 6% of participants (7.5% in men and 5.0% in women). In both sexes, participants with steatosis had higher BMI, waist circumference, and LSM than those without steatosis (all $p < 0.001$). In contrast, BMI, waist circumference, and CAP did not differ significantly between participants with and without fibrosis. Conclusion: Hepatic steatosis is common in middle-aged Black South African adults, particularly among women, while significant liver fibrosis affects a relatively small proportion of participants. The association between hepatic steatosis and greater adiposity highlights the need for targeted screening and prevention strategies in this population.

GHHS-P-59: Internal migration, healthcare utilization dynamics and HIV control among young adults in rural South Africa

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Background: Internal migration has been associated with poorer HIV outcomes, but it is unclear whether this reflects migration itself or differences in healthcare utilization. Cross-sectional studies cannot capture changes in migration and healthcare use over time. Aims: To examine how internal migration, biomedical healthcare utilization and migration-care dynamics were associated with HIV control among young adults in rural South Africa. Methods: Data were obtained from the Migrant Health Follow-up Study nested within the Agincourt Health and Demographic Surveillance System. Cross-sectional analyses included 3,092 participants, of whom 2,151 had valid HIV biomarker results, including 520 people living with HIV and 519 with viral load measurements. Modified Poisson regression assessed associations between migration, healthcare utilization and HIV care continuum outcomes. Longitudinal analyses of four survey waves (2018-2022; 12,116 observations) described migration and healthcare utilization dynamics, while migration-care transitions were modelled using a discrete-time Markov framework. Results: Migrants were less likely than non-migrants to use biomedical healthcare services (adjusted PR 0.63; 95% CI 0.55-0.71); utilization was 33.1% versus 52.5%, respectively. HIV prevalence and viral suppression were similar within healthcare utilization groups but differed across migration-care states. Migrants had lower retention in care, higher exit from care and limited entry into care. Most HIV control failures occurred before HIV diagnosis or those not using healthcare services. The migration-care transition system projected population viral suppression of 62.8%, compared with 67.6% at baseline. Conclusion: Migration affected HIV control primarily through healthcare utilization and continuity of care rather than migration status alone. Improving healthcare engagement and retention among mobile populations could strengthen population HIV control.

GHHS-P-60: Preconception left ventricular geometry and concentric remodelling in young women from Soweto, South Africa: the GenHeart Study

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WITHDRAW

GHHS-P-61: TLD uptake and maternal HIV viral suppression at delivery in pregnant women living with HIV in

Johannesburg, South Africa, July 2021-May 2026.
BHSc alumni

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Background: Tenofovir-Lamivudine-Dolutegravir (TLD), which rapidly suppresses HIV viral load (VL) has been recommended in pregnant women living with HIV (PWLHIV) in South Africa (SA) since June 2021. SA's Vertical Transmission Prevention guideline has recommended maternal VL testing at delivery since August 2023. Aims: We describe VL suppression at delivery in PWLHIV receiving TLD. Material and Methods: The study included pregnant women attending antenatal clinic delivering between July 2021-May 2026, who enrolled in the UBOMI BUHLE Pregnancy Exposure Registry at four sites in Johannesburg. Routine pregnancy data were captured into REDCap, including maternal HIV status and delivery VL (45 days pre- or 10 days post-delivery). HIV VL suppression was defined as VL<50. Results: Among 14,117 deliveries, 3,406 (24.1%) were to PWLHIV. During pregnancy 3,281/3,406 (96.3%, 95% CI: 95.6-96.9) PWLHIV received TLD: 2,036 (62.1%) were receiving TLD at the first ANC visit, 919 (28.0%) initiated during pregnancy (median of 22 (IQR 17-28) weeks gestational age), 227 (6.9%) changed to TLD during pregnancy (median of 25 (IQR 16-30) weeks gestational age) and 99 (3%) had unknown TLD initiation dates. Only 1,997 (60.9%) had a delivery VL recorded, of which 1,563 (78.3%) were suppressed with VL <50 copies/ml. Of the 434 (21.7%) with non-suppressed VL, 243 (56.0%) had VL >1,000 copies/ml and 191 (44.0%) had VL 50-999 copies/ml at delivery. Conclusion: Despite widespread use of TLD in PWLHIV, around a fifth were not virally suppressed at delivery, increasing risks of vertical HIV transmission. Viral suppression at delivery in PWLHIV, remains sub-optimal despite TLD rollout and increases risks of vertical transmission.

GHHS-P-62: Beyond Sun Exposure: A Scoping Review of Non-Melanoma Skin Cancer in South Africa

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Background: Non-melanoma skin cancer (NMSC), comprising basal cell carcinoma (BCC) and squamous cell carcinoma (SCC), is the most common malignancy worldwide. In South Africa, NMSC occurs within a unique context of high ultraviolet radiation (UVR), a substantial HIV burden, population-group differences, and evolving cancer surveillance systems. Despite its public health significance, NMSC epidemiology remains incompletely characterised. Aims: To synthesize evidence on NMSC epidemiology, risk factors, surveillance systems, methodological approaches, and research gaps in South Africa. Methods: A Joanna Briggs Institute scoping review was conducted using searches of PubMed, Scopus, Web of Science, Embase, and Google Scholar, supplemented by registry reports. Relevant data were extracted and narratively synthesized. Results: Key risk factors included ultraviolet radiation (UVR) exposure, HIV-associated immunosuppression, oculocutaneous albinism, and human papillomavirus (HPV). Evidence was dominated by retrospective hospital audits and pathology-based registry studies, with few population-based investigations. The National Cancer Registry remains the primary data source but is limited by pathology-only reporting, incomplete case capture, and restricted linkage with mortality and HIV datasets. Population-based registration improves case ascertainment but remains geographically limited. Key evidence gaps include HIV-cancer linkage, occupational UVR surveillance, environmental exposure mapping, and integrated surveillance systems. Conclusion: NMSC in South Africa remains under-characterised because of fragmented surveillance and limited population-based evidence. Strengthening integrated cancer surveillance, expanding population-based registration, and improving linkage between cancer, HIV, mortality, and environmental datasets are critical for advancing NMSC prevention, research, and cancer control in South Africa.

GHHS-P-63: Association of the EGFR rs712830 gene polymorphism with dysglycaemia and metabolic syndrome in a South African population
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Background: Obesity and metabolic syndrome are highly prevalent in South Africa. In obesity, epidermal growth factor receptor (EGFR) signalling is upregulated in adipose tissue macrophages, driving their proliferation, and pro-inflammatory cytokine production. The resulting chronic low-grade inflammation disrupts insulin signalling and increases cardiometabolic risk. Polymorphisms in the gene encoding EGFR may exacerbate these effects. An EGFR1 promoter polymorphism, rs712830, has been found to increase EGFR1 promoter activity and gene expression in a haplotype that includes the rs712829 variant. However, the association of rs712830 with metabolic dysfunction remains unknown. Aims: To investigate the association of the EGFR rs712830 (-191C>A) polymorphism with dysglycaemia and metabolic syndrome in a black South African population. Methods: Black South African adults (n=242), recruited from the greater Johannesburg area were genotyped for the rs712830 polymorphism using PCR-RFLP. Anthropometric and metabolic variables (blood pressure, blood glucose, waist circumference, BMI, HbA1c and lipid profile) were obtained for all participants. Dysglycemia is defined as an HbA1c concentration of ≥ 5.7 %. Associations were assessed using logistic regression analyses. Results: The rs712830 polymorphism

showed no significant association with any metabolic markers, or diabetes status. Age and waist-to-height ratio were independently associated with dysglycaemia and metabolic syndrome. Conclusion: and implications: These findings indicate that rs712830 is not significantly associated with metabolic dysfunction within this population. However, due to the relatively small sample size, small genetic effects may have gone undetected. Furthermore, the association between the EGFR haplotype and EGFR expression may be driven by rs712829 alone and not observed in our cohort due to different linkage patterns seen in African populations.

GHHS-P-64: Wastewater genomics complements clinical surveillance to resolve measles virus transmission

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Background: Measles virus (MeV) remains a major public health threat despite widespread vaccination. During infection, viral RNA is shed in stool and urine and enters community wastewater systems, making wastewater and environmental surveillance a promising complementary surveillance tool, particularly where clinical surveillance is limited. Furthermore, conventional genotyping using the 450-nucleotide nucleocapsid gene fragment (N450) lacks sufficient resolution to distinguish closely related strains, highlighting the need for whole-genome sequencing (WGS). Aims: To evaluate a sensitive wastewater genomic surveillance workflow integrating virus concentration, whole-genome amplicon sequencing, and bioinformatics alongside routine clinical genomic surveillance during the 2024–2025 South African measles outbreak. Methods: MeV was concentrated from wastewater samples, followed by RNA extraction, reverse transcription, multiplex tiled PCR targeting the complete genome, and Illumina sequencing. A custom bioinformatics pipeline was used for genome assembly, variant calling, and phylogenetic analysis. Wastewater-derived genomes were compared with contemporaneous clinical genomes. Results: Near-complete genomes were recovered from wastewater (n=69) with sufficient coverage for phylogenetic analysis. Both genotypes B3 and D8 were identified in wastewater and matched those identified in clinical cases (n=39). Wastewater genomes clustered closely with clinical sequences, enabling identification of shared transmission lineages. Integrated analysis demonstrated that wastewater surveillance captured active community transmission, including infections potentially missed by routine clinical surveillance. Conclusion: Wastewater WGS complements clinical surveillance by improving outbreak detection and overcoming the limited resolution of N450 genotyping for distinguishing closely related lineages. Integrating wastewater and clinical genomic surveillance provides a scalable, non-invasive approach for early outbreak detection, enhanced transmission tracking, and more informed public health interventions to support measles control and elimination.

GHHS-P-65: Evaluating Electronic Health Record Readiness for Vaccine Safety Surveillance in African Hospital Settings: Evidence from BRAVE

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Background: Robust vaccine safety surveillance is essential for global health security and equitable immunisation programmes. Estimating background rates of adverse events of special interest (AESIs) and detecting safety signals require high-quality, timely clinical data. Electronic health records (EHRs) offer an opportunity to strengthen surveillance; however, their utility in African settings is shaped by fragmented infrastructure, variable data quality, and limited interoperability. Aims: To assess the capacity and readiness of hospital EHRs within the BRAVE (Background Rates of Adverse Events for Vaccine Evaluation) network to support vaccine safety surveillance. Methods: A standardised EHR readiness assessment was conducted across hospitals in the Democratic Republic of Congo, Ghana, Kenya, Nigeria, and Rwanda. Assessment domains included governance and data security, data completeness, diagnostic coding, timeliness, record linkage, interoperability (including HL7/FHIR compatibility), and data export functionality. Site capabilities were evaluated against a predefined minimum dataset for AESI identification and background rate estimation. Results: EHR platforms were heterogenous, ranging from open-source to locally developed systems. Most sites captured core inpatient data sufficient for retrospective AESI identification. Six of ten hospitals reported high data completeness, timely capture, functional record linkage, and automated exports. ICD coding supported standardisation, though dual paper–electronic workflows increased workload. Some sites were better suited to hybrid approaches combining EHR-based pre-screening with manual review. Conclusion: EHRs can support vaccine safety surveillance across diverse African health systems, though readiness varies by context. Targeted improvements in interoperability, data quality, and digital integration can enhance scalable, equitable surveillance and strengthen global health security.

GHHS-P-66: “Parents Want Antibiotics”: A Qualitative Study Exploring Antibiotic Use for Childhood LRTI Symptoms from the Perspectives of Caregivers, Healthcare Workers and Key Stakeholders in Ehlanzeni District, Mpumalanga

BHSc alumni

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Background: Lower respiratory tract infections (LRTI), such as pneumonia, are among the leading causes of illness and death in children globally. They are also a common reason for antibiotic prescribing, as clinical signs alone often cannot differentiate viral from bacterial LRTIs. This uncertainty can lead to unnecessary antibiotic use, undermining antimicrobial stewardship efforts. Aims: The aim of this study is to explore caregiver expectations and healthcare worker (HCW) prescribing practices around antibiotic use for childhood LRTI symptoms. Methods: Data were collected across four hospitals in Mpumalanga between July 2025 – February 2026. We conducted observations to understand the clinical processes and procedures followed when children present with LRTIs. As part of the observations, we also conducted rapid qualitative interviews with caregivers. In addition, we conducted focus groups with caregivers, in-depth interviews with HCWs and key stakeholders. Results: Caregivers reported that the sick children and not understanding clinical processes were their greatest concerns. There was less emphasis on the types of medication they wanted their child to receive. In contrast, HCWs and stakeholders reported that many caregivers who bring children with LRTI symptoms request antibiotics. HCWs sometimes prescribed antibiotics as a precaution because of concerns about possible deterioration post-examination. Conclusion: Caregiver concerns and HCW perceptions differed. While caregivers focused on their child's illness and care processes, HCWs often interpreted this concern as demand for antibiotics. Prescribing decisions were shaped by clinical uncertainty and perceived deterioration risk. Antimicrobial stewardship should include caregivers and HCWs through clear communication that aligns expectations and supports appropriate antibiotic use for childhood LRTI symptoms.

GHHS-P-67: Physical Activity as a Potential Behavioural Pathway Linking Cardiometabolic Health and Depressive Symptoms Among South African Office Workers.

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Background: Cardiometabolic risk and depressive symptoms are interconnected health challenges that contribute to reduced wellbeing and workplace functioning. Physical activity may represent an important behavioural pathway linking cardiometabolic health and mental health outcomes. However, limited evidence exists on the role of objectively measured physical activity in this relationship among South African office workers. Aims: This study aimed to investigate whether objectively measured physical activity mediates the relationship between cardiometabolic health and depressive symptoms among South African office workers. Methods: This retrospective cross-sectional study included office workers recruited from urban workplace settings in Johannesburg. Cardiometabolic health was assessed using anthropometry, blood pressure, glucose, and lipid measurements. Depressive symptoms were assessed using the Center for Epidemiologic Studies Depression Scale (CES-D). Physical activity was objectively measured using Axivity AX3 accelerometers, with raw accelerometry data processed using the GGIR package in R to derive movement behaviour metrics, including moderate-to-vigorous physical activity (MVPA). Mediation analysis will assess the extent to which physical activity explains the relationship between cardiometabolic health and depressive symptoms. Results: Preliminary analysis included 162 participants with cardiometabolic measurements and 52 participants with valid accelerometry data. Mean BMI was 29.1 ± 6.7 kg/m², with 36.4% classified as obese and 34.0% presenting with hyperlipidaemia. Depressive symptoms were present in 65.6% of participants. Mean MVPA was 77.7 ± 36.8 minutes/day. Conclusion: Preliminary findings demonstrate variability in cardiometabolic health, depressive symptoms, and objectively measured physical activity.

GHHS-P-68: Heat at home: pregnant women's experiences of household heat and adaptation in Tshwane, South Africa

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Background: Extreme heat is an under-recognised threat to maternal and newborn health in African healthcare facilities, with pregnant women and infants especially vulnerable. Evidence remains limited on how pregnant women experience heat at home and whether low-cost household adaptations are acceptable and feasible. This study explored women's heat experiences and intervention acceptability under the Heat Adaptation for Pregnant women and Infants (HAPI) project. Methodology: An exploratory mixed-methods study was conducted among 329 women attending maternal and neonatal services at a community health centre (CHC) in Tshwane, South Africa, in 2025. All received facility-level interventions (roof painting, air conditioning, water coolers, tree planting, thermal monitoring). A sub-sample of 30 pregnant women (26-32 weeks' gestation) received household interventions: roof painting, hand-held fans, umbrella hats, water bottles, desk fans and solar panels. Data included temperature monitoring, urine specific gravity (USG), uptake observations, and discussions on use/non-use, analysed thematically. Results: Median age was 26. Vulnerability was substantial: all lived under metal roofing, 83.3% reported hotter indoors than outdoors, 40.0% had no windows, and 46.7% lacked electricity. Indoor temperatures ranged 7.29-36.25°C (median 18.34°C); USG indicated dehydration in 50% at baseline. Desk fans and solar panels were most preferred, followed by hand-held fans and umbrella hats, with roof painting least preferred. Usefulness reflected immediate relief, power-cut reliability, and user control. Conclusion: Household heat exposure was a daily, embodied concern, marked by thirst, exhaustion, poor sleep and dehydration. Women preferred tangible, user-controlled interventions offering immediate cooling

or energy access, while structural interventions' acceptability depended on feasibility and visible benefit. Results: support combined heat-adaptation packages strengthening climate resilience.

GHHS-P-69: Temporal Trends and Risk Factors for Tuberculosis Case Notifications in Blantyre from 2011 to 2021, Malawi

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Background: Tuberculosis (TB) remains a major global health threat, with 10.7 million diagnoses in 2024. Southern Africa bears a disproportionately high burden. In Malawi, TB incidence stands at 113 cases per 100,000 annually, with 43% of patients co-infected with HIV, threatening progress toward the WHO's 2030 End TB targets(90% fewer deaths and 80% fewer cases). Aims: To analyse temporal trends and identify demographic, geographic, and HIV-related factors associated with bacteriologically confirmed TB cases, and to investigate stratified TB case detection gaps by sex, HIV status, geographical location, and time in Blantyre, Malawi (2011–2021). Methods: A cross-sectional study using anonymised Blantyre TB surveillance data (2011–2021), including all adults aged ≥15 years with confirmed TB residing in Blantyre during the study period. Results: TB notification risk was elevated from 2011 to 2016, declining approximately 50% by 2020–2021. HIV-positive adults had markedly higher TB risk (RR 7.47, 95% CI 6.79–8.21). Men had twice the risk compared to women; urban residents had 2.4 times higher risk than rural residents. Prevalence-to-notification ratios revealed significant case detection gaps, particularly among HIV-negative (PN Ratio 4.01) and rural populations (PN Ratio 7.26). Conclusion: Routine surveillance substantially underestimates the true TB burden, and observed gains may partly reflect limited case detection rather than reduced transmission. Targeted case-finding strategies and improved diagnostic access, particularly for HIV-negative and rural populations, are essential to achieving equitable and genuine progress toward End TB targets.

GHHS-P-70: Utilising public-sector laboratory data to monitor diabetes incidence and glycaemic control in South Africa for 2025
BHSc alumni

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Background: Localised studies in South Africa (SA) demonstrate a high incidence of type 2 diabetes and poor levels of glycaemic control in people living with diabetes (PLWD) however, studies at the national level are rare. The National Health Laboratory Service performs HbA1c testing for the SA public sector and data from 2010 till now is accessible via an HbA1c interactive dashboard. Aims: To utilize the dashboard to generate national and provincial measures of diabetes incidence and glycaemic control for 2025. Methods: HbA1c values were categorised as first-ever (diagnostic) or follow-up (glycaemic monitoring) tests. Diabetes was defined as an HbA1c of ≥6.5% for a first-ever test whilst good glycaemic control was defined as a follow-up test of <7.0%. Diabetes incidence was calculated using provincial and national population data from StatsSA (statssa.gov.za) assuming that 85% of the population were accessing the public healthcare sector. Results: Data was available for 1,417,273 subjects; 63.0% were female. The prevalence of good glycaemic control in PLWD nationally was 45.5%, being lowest in the Eastern Cape (32.9%) and highest in Gauteng (52.7%). National incidence of diabetes was 6.0 per 1000 person-years and for age groups <20, 20-39, 40-59 and ≥60 years it was 0.3, 2.2, 11.3 and 24.0. A higher incidence was reported for females (7.3) when comparted to males (4.3). Conclusion: and Implications: Routine public-sector laboratory data provides highly valuable information for monitoring the national burden of diabetes and assessing national levels of glycaemic control in PLWD. This data can be used for developing focused interventions.

GHHS-P-71: Associate Clinicians in African Emergency Care: A Qualitative Study

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Background: Africa faces a critical healthcare workforce crisis, shouldering a disproportionate global disease burden with a fraction of the world's health workers. Across the continent, task-sharing through associate clinician cadres — including Clinical Officers (COs) and Clinical Associates (Clin-As) — has emerged as a strategic response to acute care staffing deficits. Despite their growing deployment in emergency centres (ECs), the professional experiences and systemic challenges of these cadres remain poorly understood within the African context. Aims: To explore the professional experiences, challenges, and needs of Clin-As working in ECs in South Africa, contributing to the broader African evidence base on associate clinician integration in acute care settings. Methods: A descriptive exploratory qualitative study using an interpretivist paradigm was conducted. Purposive sampling recruited 11 qualified Clin-As (minimum six months EC experience) across public and private sectors. Data were collected via semi-structured interviews and analysed using Braun and Clarke's (2006) six-phase thematic analysis. Ethics approval was obtained from HREC UCT (Protocol No. 275/2025). Results: Three themes emerged: (1) Building competence through practice — participants bridged undergraduate preparation gaps through experiential and self-

directed learning, reflecting training challenges common to African associate clinician models; (2) The identity battle — interprofessional and patient-level role confusion mirrors experiences of COs across East and West Africa; (3) The invisible ceiling — regulatory restrictions, inequitable pay, and absent career pathways threaten retention, echoing continent-wide associate clinician workforce sustainability concerns. Conclusion: Associate clinician cadres are essential to bridging emergency care gaps across Africa yet face shared systemic barriers to retention and professional growth. Context-sensitive, African-led policy reform is needed.

GHHS-P-72: Genomic Epidemiology and Antimicrobial Resistance Patterns of Clostridioides difficile in Johannesburg Hospitals

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Background: Clostridioides difficile infection (CDI) is a major global health concern, yet data from South Africa remain limited. The absence of routine strain typing and antimicrobial resistance (AMR) profiling restricts understanding of circulating lineages, hypervirulent strains, and resistance patterns in clinical settings. Aims: To characterize the genomic epidemiology and AMR profiles of C. difficile isolates from hospitals in Johannesburg to inform transmission dynamics and strengthen infection control strategies. Methods: Three hundred residual stool specimens positive for toxigenic C. difficile were collected from National Health Laboratory Service (NHLS) laboratories serving Charlotte Maxeke Johannesburg Academic Hospital, Chris Hani Baragwanath Academic Hospital, and Helen Joseph Hospital. Specimens were cultured on selective media, and multiplex PCR was used to confirm C. difficile positivity and determine toxin gene profiles. A subset of toxigenic isolates (10 per site) was submitted to the National Institute for Communicable Diseases for whole genome sequencing (Illumina NextSeq 2000). Bioinformatics analyses using public databases will identify virulence determinants, sequence types, phylogenetic relationships, and AMR markers. Selected isolates will also undergo antimicrobial susceptibility testing for metronidazole and vancomycin using the E test method. Results: The study will generate high resolution data on circulating toxigenic strains, virulence factors, transmission patterns, and emerging AMR across major Johannesburg hospitals, enhancing local epidemiological insight into CDI. Conclusion: and implications Findings will support evidence based clinical management, guide antimicrobial stewardship, and contribute to national CDI surveillance efforts aimed at reducing disease burden in South Africa

GHHS-P-73: A Standardised Analytical Framework for Evaluating Mpox Diagnostics in Low-Incidence Settings: Implications for Diagnostic Preparedness

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Background: Following the 2022 mpox PHEIC, over 150 molecular assays and 70 rapid diagnostic tests entered the global market, yet regulatory approval remains limited. In South Africa, only two laboratory-based assays are SAHPRA-approved. Co-circulation of Clade Ib and IIb necessitates accessible diagnostics with clade differentiation. However, low case numbers limit clinical validation, necessitating analytical evaluation using standardised reference materials. Methods: We evaluated four molecular platforms (GeneXpert, CapeSprint, O-pox, Pluslife) using a standardised analytical panel comprising Zeptometrix Clade IIb controls, inactivated South African Clade IIb and Ib cultured isolates, and locally developed synthetic DNA biomimetics. Limit of detection (LoD) was determined by serial twofold dilution in triplicate. Cross-reactivity was assessed against a rash panel (VZV, HSV-1/2, HHV-6, Coxsackievirus A16). Precision was evaluated in pentaplicate replicates. Results: Analytical sensitivity ranged from ≤5.86 to 93.75 copies/mL. All assays detected Clade IIb, with three detecting Clade Ib material; however, none differentiated between clades. Two assays showed cross-reactivity with rash-causing pathogens. Locally developed biomimetics were consistently detected across platforms. A global landscape review identified 293 mpox assays, of which 115 (39%) had regulatory approval; only one African-developed assay was identified. Assay sourcing delays (>8 months) highlight supply chain barriers. Conclusion: A standardised reference material-based framework successfully evaluated mpox diagnostics despite low-incidence settings. However, prolonged sourcing delays emphasise the critical need for expanding local reference material development capacity, a recognised barrier to diagnostic preparedness in resource-constrained regions.

GHHS-P-74: Performance Evaluation of the VITA™ Point-of-Care Assay for CD4 Enumeration in HIV Care

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Background: CD4 cell count testing remains critical for identifying advanced HIV disease. The VITA™ CD4 point-of-care assay (POC; Accesso Biotech Corp, CA, USA) is a CD3/CD4 image-based CD4 enumeration platform that requires 20 µL of blood sample and reports results within 40 minutes. Aims: To conduct an independent laboratory-based performance

evaluation of the VITA CD4 POC assay. Methods: VITA™ CD4 testing was performed within 24 hours of blood draw on 143 HIV-positive remnant EDTA blood specimens referred to CMJAH, for standard-of-care (SOC) AQUIOS-PLG CD4 testing (Beckman Coulter). Analyses included Precision testing, concordance correlation, Bland–Altman analysis, and percentage similarity agreement. Results: The SOC assay reported a median CD4 count of 267 cells/µl while the VITA™ CD4 reported a median of 291 cells/µl. An overall error rate of 5.6% was observed. Overall agreement between VITA™ CD4 and the SOC was substantial with a concordance correlation coefficient of 0.96 (95%CI 0.95 to 0.97). The mean bias was 11.5 cells/µL, and the mean percentage similarity was 109.7% with upward misclassification of 27% (13/48) at the 200cells/µl threshold. Precision improved at higher CD4 counts (>200cells/µl) with %CVs ranging from 6.6% to 35.7%. The VITA™ CD4 assay demonstrated ease of use with a clear, integrated graphical interface. Conclusion: and Implication: The VITA™ CD4 assay demonstrated good overall performance. Further field-based studies are warranted to assess sensitivity and specificity for identifying patients with CD4 counts below 200 cells/µL, to support clinical management of advanced HIV disease.

GHHS-P-75: Balancing public health and commercial speech: The case for front-of-pack warning labels

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The rising burden of non-communicable diseases (NCDs) has intensified global attention on the commercial determinants of health, particularly the marketing and labelling practices of the food and beverage industry. In South Africa, Draft Regulation R.3337 proposes mandatory front-of-pack warning labels (FOPL) and marketing restrictions on unhealthy foods and beverages, aligning with international standards and WHO guidance. These measures, however, face strong opposition from industry stakeholders who invoke the constitutional right to freedom of commercial speech. This research critically examines whether the Draft Regulation passes constitutional muster under section 16(1) of the Constitution, read with the general limitations clause in section 36. Drawing on comparative jurisprudence from South Africa and abroad, including tobacco and alcohol advertising cases, the paper situates FOPLs within the broader public health and human rights imperative to protect consumers, particularly children, from misleading and harmful marketing. It argues that while commercial speech is protected, it is not absolute and may be reasonably limited to safeguard public health. By anticipating industry challenges, the paper provides a constitutional defence of Draft Regulation R.3337, demonstrating that the proposed limitations are proportionate, justifiable, and necessary to advance health equity and reduce the burden of diet-related NCDs in South Africa. The paper further argues that although both warning labels and restrictions on persuasive marketing constitute limitations on commercial expression, they engage distinct constitutional concerns and therefore require differentiated proportionality analysis under section 36 of the Constitution.

GHHS-P-76: Does Prior Pregnancy Loss Affect Antenatal Care Utilization in Kenya? A Propensity Score Weighted Analysis

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Background: Previous pregnancy loss increases the risk of complications in subsequent pregnancies, making timely and adequate antenatal care (ANC) essential. However, evidence on its effect on ANC utilization in Kenya is limited. This study estimated the causal effect of prior pregnancy loss on ANC utilization among Kenyan women. Aims: To estimate the causal effect of prior pregnancy loss on early ANC initiation and adequate ANC attendance, and assess whether these effects differ by pregnancy loss type. Methods: We analysed 2022 Kenya Demographic and Health Survey data on recent births linked to pregnancy histories. Propensity scores were estimated using survey-weighted logistic regression to generate Average Treatment Effect on the Treated (ATT) weights, which were combined with sampling weights. Weighted Poisson regression with robust standard errors estimated prevalence ratios (PRs) and 95% confidence intervals (CIs). Propensity score overlap and covariate balance were assessed before estimating treatment effects. Results: Adequate propensity score overlap and covariate balance were achieved after weighting. Prior pregnancy loss was associated with higher prevalence of early ANC initiation (PR = 1.40, 95% CI: 1.27–1.55), attending at least four ANC visits (PR = 1.11, 95% CI: 1.06–1.16), and attending at least eight ANC visits (PR = 1.95, 95% CI: 1.36–2.81). These associations were observed primarily among women with previous miscarriage, while no significant associations were found for previous stillbirth. Conclusion: Prior pregnancy loss, particularly miscarriage, was associated with improved ANC utilization in subsequent pregnancies. Pregnancy history should be assessed to support risk-based ANC counselling and follow-up.

GHHS-P-77: Prevalence and incidence of chlamydia and gonorrhoea infections in adolescent females using long acting injectable cabotegravir as HIV pre-exposure prophylaxis in South Africa, Zimbabwe and Uganda: results from HPTN 084-01.

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Background: Despite the high prevalence of curable sexually transmitted infections (STIs) in Africa, there are few data on prevalence and incidence adolescent females. We assessed the prevalence and incidence of C.trachomatis (CT) and N. Gonorrhoeae (GC) infections in female adolescents using long-acting injectable cabotegravir (LA CAB) as HIV pre-exposure prophylaxis. Methods: HPTN 084-01 was an open label clinical safety trial of LA CAB that enrolled HIV-negative sexually active female adolescents under age 18 from South Africa, Zimbabwe and Uganda between 2020 and 2021. Samples collected at screening, week 17 and week 33 visits were tested using GeneXpert for CT/GC. Socio-behavioural characteristics at baseline were summarised, and STI prevalence and incidence calculated. Results: Sixty-nine participants were screened and 55 enrolled. At enrolment, 27% (15/55) were aged 12 to 15 years, 69% (38/55) did not live with their regular partner, 57% (26/45) reported condomless sex, and 22% (12/55) reported transactional sex. At baseline, 33% (18/55) had CT/GC; 31% (17/55) with CT and 7% (4/55) with GC (3 had both CT and GC). Over 53.9 person-years (py) of follow-up, 10 participants had 12 diagnoses of CT (incidence rate [IR] 23 per 100 py, 95% CI 11.6-39.3) and 5 participants had 6 episodes of GC (IR 11.3 per 100 py, 95% CI 4.1-24.5). Overall CT/GC incidence was 33.4 per 100 py (95% CI 19.8-52.7). Conclusion: CT/GC prevalence and incidence was high in this population of young women, emphasising the need for STI testing and treatment to be integrated into PrEP programs in Africa to prevent future negative health outcomes.

GHHS-P-78: Working Faster to Escape the Heat: Silent Adaptation and Occupational Strain Among Midwives in Tshwane, South Africa

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Background: Rising temperatures are increasingly recognised as an occupational health risk, yet their effects on maternal healthcare remain poorly understood in low-resource settings. In South Africa, ageing maternity infrastructure intensifies heat exposure during clinical care. This study explored how midwives experienced, adapted to, and sustained clinical performance under heat stress in Tshwane, South Africa. **Methodology** Data were collected during the hot season in a public hospital with windowless, unventilated delivery rooms. Qualitative data included observations from 144 time-motion sessions and in-depth interviews with 12 midwives as part of the HIGH Horizons study. Reflexive thematic analysis was applied to field notes and interview transcripts. Results: Three themes emerged. First, midwives reorganised work by completing physically demanding tasks earlier to avoid peak heat, an informal adaptation unsupported by the health system. Second, participants described heat as a silent burden, reporting excessive sweating, restricted ventilation due to privacy requirements, and tension between personal discomfort and professional duty. Birth remained a professional anchor, compelling them to endure heat and fatigue. Third, clinical performance was maintained through acceleration, with midwives working faster during deliveries to minimise time in overheated rooms, suggesting speed was driven by both clinical urgency and thermal escape. Conclusion: Midwives relied on silent, self-managed adaptations that remain largely invisible within health systems. Sustained performance reflects not only resilience but also inadequate working conditions. Improving delivery-room ventilation while maintaining privacy and recognising heat as an occupational risk are essential to protect healthcare workers, patient safety, and quality maternity care.

GHHS-P-79: Depression during and after TB in a cohort of individuals with pulmonary TB from Johannesburg, South Africa

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Background: Depression is more common among individuals with TB than in the general population. The Patient Health Questionnaire 9 (PHQ 9) is widely used to screen for depression, monitor treatment, and assess symptom severity. Methods: We analyzed data from participants (≥15 years) recruited between 10/2022 and 04/2024 in South Africa as part of the IeDEA SA TB cohort. PHQ 9 was administered at TB treatment initiation, end of treatment (EOT), and 6- or 12-months post treatment. We assessed agreement between PHQ 9 scores ≥5 (any depressive symptoms) and a single-item question on perceived functional impairment (some vs. no difficulty). Logistic regression was used to identify factors associated with PHQ 9 ≥5 at 6- or 12-months post treatment. Results: 769 study visits were completed: 231 at treatment start, 186 at EOT, 121 at 6- and 54 at 12-months post treatment. Among those reporting functional impairment, 80% (79/99) had PHQ 9 ≥5 (Kappa=0.542;p=0.056). Half (6/12) of participants with PHQ 9 ≥5 at EOT had a prior history of depression. For those with PHQ 9 ≥5 at 6 or 12 months (n=7), three patterns emerged: (1) persistent depression from treatment start, (2) new symptoms at EOT continuing post treatment, and (3) symptoms only post treatment. Prior TB history (OR6.92;p=0.013) and depressive symptoms at EOT (OR12.56;p=0.003) were associated with PHQ 9 ≥5 post treatment. Baseline depressive symptoms, HIV status, marital status, education, and unemployment were not associated (p>0.05). Conclusion: Approximately one in ten individuals completing or returning after TB treatment experienced depressive symptoms. Further evidence is needed to clarify the bidirectional relationship between TB and depression.

GHHS-P-80: Characterising the multidimensional symptom experience of South African women with endometriosis: A descriptive phenomenological study.

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Background: Endometriosis is a chronic condition affecting 10% of reproductive-aged women worldwide. There is limited research conducted on the lived experience and symptom characteristics of endometriosis among South African women. Aims: Online semi-structured interviews were conducted to capture the lived experiences and symptoms among South African women with endometriosis to inform broader tool development. Methods: Participants, over the age of 18, with a laparoscopic-confirmed diagnosis of endometriosis, were recruited via an endometriosis support group. Interviews were audio-recorded and transcribed verbatim. Transcripts of complete interviews (n=16) were analysed using inductive thematic analysis. Results: Four overarching themes emerged from the analysis; multi-faceted symptom presentation, pain intensity and functional impact, temporal patterns and symptom fluctuations and symptom triggers. Pain phenotypes included pelvic pain, GIT symptoms, dyspareunia, urinary symptoms, reproductive symptoms as well as systemic and neurological symptoms. Pain intensity averaged 9 to 10, with majority reporting a near constant pain, exacerbated by menstruation and continuing thereafter. Pain was chronic in nature, affecting daily life activities, work productivity, relationships and school attendance. Conclusion: This study demonstrates that endometriosis is experienced as a chronic, multisystem disorder characterised by interconnected symptom domains, evolving temporal patterns and substantial functional consequences. Synthesising these findings enabled the development of a patient-derived conceptual framework.

GHHS-P-81: Mapping the Patient Journey: Lessons for Patient-Centred Hand-Injury Care in South Africa

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Background: Traumatic hand injuries are common and place a substantial burden on individuals and the healthcare system, little qualitative evidence exists on how patients experience and navigate hand-injury care services in South Africa. Understanding these experiences is essential for strengthening equitable, patient-centred care and improving health systems. Aims: To describe the experience of hand-injured adults accessing hand-injury care services in Gauteng Objectives: To map the journey of hand-injured patients through the healthcare system; to describe the experience of accessing hand-injury care services in Gauteng and to describe the experience of accessing occupational therapy intervention for a hand injury. Methods: A qualitative descriptive study was undertaken across one public and one private healthcare facility in Gauteng. Twelve adults with traumatic hand injuries participated. Data was generated through clinical note reviews, patient journey mapping, and in-depth interviews. Reflexive thematic analysis was used. Trustworthiness was ensured through reflexive journaling, data triangulation, and rich description. Results: Five themes emerged: Spectrum of Satisfaction, reflecting variable experiences of healthcare; An Emotional Journey, describing trauma, loss and resilience; Now Everything Has Stopped, illustrating the profound disruption of daily roles; The Cost, highlighting financial and caregiver burden; and The Occupational Therapist, portraying therapists as motivators. Patients' experiences shaped by both clinical care and broader health-system factors. Conclusion: Recovery from hand injury extends beyond physical rehabilitation and is influenced by emotional, social, financial and health-system experiences. Delivering patient-centred care requires attention to each of these dimensions. The findings support strengthening patient-centred, enhancing psychosocial support pathways, and developing clinician competencies to improve patient experiences.

GHHS-P-82: Distribution of Ceftazidime–Avibactam Minimum Inhibitory Concentrations Against Carbapenemase-Producing Enterobacterales Isolates at Charlotte Maxeke Johannesburg Academic Hospital, South Africa (2019–2020)
BHSc alumni

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Background: Carbapenemase-producing Enterobacterales (CPE) are a major global public health threat due to increasing antimicrobial resistance and limited treatment options. Ceftazidime–avibactam (Caz-Avi) is a novel β-lactam/β-lactamase inhibitor combination with activity against many carbapenem-resistant organisms. However, data describing the distribution of Caz-Avi minimum inhibitory concentrations (MICs) among CPE isolates in South Africa remain limited, highlighting the need for local surveillance to inform antimicrobial stewardship. Aims: To determine the distribution of ceftazidime–avibactam MICs among carbapenemase-producing Enterobacterales isolates collected at Charlotte Maxeke Johannesburg Academic Hospital between 2019 and 2020. Methods: A retrospective cross-sectional laboratory study will be conducted using stored CPE isolates. MICs for Caz-Avi will be determined using the E-test and confirmed by broth microdilution according to Clinical and Laboratory Standards Institute guidelines. Descriptive statistics will summarise MIC distributions, while inferential analyses will assess associations between MIC values and carbapenemase genotypes. Results: Data analysis is currently

underway. The study is expected to describe the distribution of Caz-Avi MICs, identify susceptibility patterns among CPE isolates, and explore differences according to carbapenemase genotype. Conclusion: This study will provide important local data on the in vitro activity of Caz-Avi against CPE isolates in a South African tertiary hospital. The findings will strengthen antimicrobial resistance surveillance, support antimicrobial stewardship programmes, and inform evidence-based treatment strategies for multidrug-resistant Enterobacterales infections.

GHHS-P-83: Constraints to heat adaptation among pregnant women in a low-resource South African setting: a cross-sectional analysis of the HAPI study

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Background: Pregnant women are particularly vulnerable to the adverse health effects of extreme heat. Although behavioural adaptations can reduce heat exposure, many women may be unable to implement protective measures because of financial, environmental, or social constraints. Evidence on these adaptation gaps in low-resource settings remains limited. Aims: To identify factors associated with constraints to heat adaptation among pregnant women in a low-resource South African setting. Methods: We conducted a cross-sectional analysis of baseline data from 528 pregnant women enrolled in the Heat Adaptation for Pregnancy and Infants (HAPI) study. The primary outcome was an adaptation gap, defined as wanting to undertake actions to protect against heat but being unable to do so. Multivariable logistic regression examined demographic, socioeconomic, housing, environmental, and heat-awareness factors associated with experiencing an adaptation gap. Results: Overall, 198/528 (37.5%) women reported an adaptation gap. Women who could cope financially with an unexpected expense most of the time (aOR=0.41, 95% CI: 0.24–0.70) or always (aOR=0.41, 95% CI: 0.22–0.76) had significantly lower odds of reporting an adaptation gap than those who could never cope financially. Women with no concern about heat-related health effects also had lower odds (aOR=0.59, 95% CI: 0.41–0.86). Among women reporting an adaptation gap, 70.7% cited lack of money as the primary barrier to adopting heat-protective behaviours. Conclusion: More than one-third of pregnant women were unable to implement heat-protective actions. Financial capacity emerged as the strongest predictor of experiencing an adaptation gap. Heat-health interventions for pregnant women should complement education with structural and financial measures that reduce barriers to adaptation in resource-constrained settings.

GHHS-P-84: Johannesburg Cohort Results from the Multi Country TB Sequel Study

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The TB Sequel Project is a multi-country, prospective observational cohort study following TB patients and survivors over years to examine long-term consequences of pulmonary TB, particularly post-TB lung disease (PTLD). It is among the first large-scale prospective cohorts designed to generate evidence for clinical care, policy, and new therapies. Methods: Adults (≥18 years) initiating standard treatment for pulmonary TB at health facilities in South Africa, Tanzania, Mozambique, and The Gambia were enrolled between 09/2017 and 02/2020. Participants received routine care per national guidelines and were prospectively followed at 2, 6, 12, 24, and 36 months. Clinical, functional, psychosocial, and economic outcomes were assessed using spirometry, chest imaging, symptom evaluation, and validated instruments. Results: One quarter of the cohort (n=1509) was recruited in Johannesburg, with 359 participants enrolled, with 82% completing treatment. Median age was 37 years (IQR 31–45); 63% were male, and 68% were living with HIV. Median pre-treatment delay was 5 weeks (IQR 3–9) from symptom onset to therapy initiation, with out-of-pocket expenses highest during this period. Severe lung impairment was 22.6% at Day 21, 13.2% at treatment end, and 9.8% at 6 months post. Across domains, quality of life, fitness, mental health, respiratory health, and economic outcomes were poorest at initiation, improved most during therapy, but showed limited recovery after completion. Employment and income recovery remained restricted, with many survivors below pre-TB levels 1–2 years post-treatment. Stigma persisted, disrupting daily life and employment, while 28% of survivors lived with long-term functional disability. Conclusion: Despite improvements, poor outcomes persist among some TB survivors, with links between multidimensional clinical outcomes still unclear.

GHHS-P-85: Immigration of medical doctors into South Africa from 2012 to 2021: An analysis of Health Professions Council of South Africa registrations

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Background: South Africa is both a source and a destination country for migrant medical doctors, defined as those born and trained outside the country. This study examined the immigration of medical doctors into South Africa from 2012 to 2021. Methods: A retrospective descriptive study design was conducted using de-identified administrative registration data obtained from the Health Professions Council of South Africa (HPCSA). The dataset included all medical doctors who were born and

trained outside South Africa and newly registered with the HPCSA between 1 January 2012 and 31 December 2021. Descriptive statistics and longitudinal analyses were used to examine changes in the demographic and professional characteristics of migrant medical doctors over time. Results: A total of 1 361 migrant medical doctors registered with the HPCSA during the period. The mean age at registration decreased from 52.7 years (SD ±9.8) in 2012 to 46.1 years (SD ±8.0) in 2021. . In 2012, Nigeria (28.1%) was the leading source country, followed by the Democratic Republic of the Congo (DRC) (12.5%) and the United Kingdom (12.5%). By 2021, the DRC (35.3%) was the dominant source country, followed by Cuba (17.7%), Nigeria (10.6%) and Zimbabwe (10.6%). During the study period, fast-track registration was phased out, public service replaced independent practice, and general practitioners from African countries comprised the majority of new registrations. By 2021, new registrations occurred exclusively through public sector employment. Conclusion: The findings demonstrate the value of analysing routine data to document changes in the characteristics of migrant medical doctors and could inform the discourse on health workforce migration in South Africa.

GHHS-P-86: Targeting Iron Homeostasis in Anopheles Larvae Using Chelation-Based Larvicides
BHSc alumni

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The increasing prevalence of insecticide resistance among African malaria vectors, including Anopheles gambiae and Anopheles arabiensis, necessitates the development of novel vector control strategies. This study investigated the larvicidal potential of five iron-chelating compounds, 2,2′-bipyridyl, phenanthroline monohydrate, 5-amino-8-hydroxyquinoline (5A8HQ), ellagic acid, and ferene by targeting iron homeostasis, an essential pathway for mosquito development. Larvicidal efficacy, iron-chelating activity, and selectivity were evaluated using in vitro bioassays and in silico approaches. Among the tested compounds, 2,2′-bipyridyl and phenanthroline monohydrate exhibited concentration and time-dependent larvicidal activity. After 72 h, 2,2′-bipyridyl demonstrated LC_{50} values of 30.99 ± 4.72 µM against A. gambiae and 18.10 ± 1.45 µM against A. arabiensis, while phenanthroline monohydrate produced LC_{50} values of 33.09 ± 3.08 µM and 14.59 ± 3.29 µM, respectively. However, both compounds were less potent than the reference mosquitocidal carbamate, propoxur. In contrast, 5A8HQ, ellagic acid, and ferene produced <50% larval mortality. Iron-chelating activity did not correlate with larvicidal efficacy. Although 5A8HQ exhibited the greatest iron-chelating activity (IC_{50} = 0.58 ± 0.07 µM), surpassing EDTA, it showed minimal larvicidal activity. Furthermore, the active iron chelators demonstrated limited selectivity, displaying comparable toxicity towards Artemia franciscana. Iron-chelating compounds represent potential lead scaffolds for malaria vector control; however, improving potency and species selectivity will be essential for their development as environmentally safe larvicides.

GHHS-P-87: The turnaround time in a dedicated orthopaedic emergency theatre at a tertiary hospital in South Africa.

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Background: Operating room efficiency is essential for timely orthopaedic trauma care. Theatre turnaround time (TAT), defined as the interval between one patient leaving the operating room and the next patient entering, is a key performance indicator that influences surgical capacity, resource utilisation, and patient outcomes. Aims: To evaluate theatre turnaround time in a dedicated orthopaedic emergency theatre at a tertiary referral hospital in South Africa. Methods: A retrospective review was conducted of all eligible procedures performed in JD Allen Theatre 10 at Chris Hani Baragwanath Academic Hospital between 1 January and 30 June 2024. Weekday daytime and after-hours cases were included, while weekends, public holidays, and cases with incomplete records were excluded. TAT was measured from patient exit ("time out") to the next patient's entry ("time on table") and categorised as good (<25 minutes), moderate (25–40 minutes), or poor (>40 minutes). Results: More than 1,200 orthopaedic trauma procedures were performed during the study period. The most common procedures were femur open reduction and internal fixation (ORIF)/nailing, ankle ORIF, tibia ORIF/nailing, radius ORIF, and forearm ORIF. The mean theatre turnaround time was 75 minutes, exceeding the benchmark for acceptable performance and falling within the poor-performance category. Conclusion: Theatre turnaround time in this high-volume orthopaedic trauma unit was substantially longer than recommended, indicating significant inefficiencies in theatre workflow. Identifying workflow bottlenecks and implementing targeted interventions, including improved communication, optimised staffing, and standardised theatre processes, may reduce turnaround times, improve theatre utilisation, and increase surgical capacity in resource-constrained settings.

GHHS-P-88: Perception and knowledge of healthcare workers towards "Emergency Department Physiotherapy" (EDP)
BHSc alumni

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Background: Physiotherapists as first-contact practitioners in Emergency Departments (EDs) can improve patient outcomes and service efficiency; however, dedicated Emergency Department Physiotherapy (EDP) services remain limited in South African (SA) public hospitals. Aims: To explore healthcare workers' and physiotherapists' knowledge and perceptions of EDP across four Gauteng public hospitals and to describe ED staffing, determine the perceived need for physiotherapist placement and assess healthcare workers' knowledge and perceptions towards EDP. Methods: quantitative cross-sectional conducted using electronic REDCap questionnaire and a retrospective review of ED patient records from four public hospitals (01/01–31/12/2023). Descriptive statistics and univariate analyses were performed. Results: EDs were staffed predominantly by doctors, nurses, physiotherapists, other therapeutic professionals, and support staff, with larger establishments at tertiary and central hospitals. A review of 2,242 patient records showed that pain, soft tissue injuries, respiratory conditions, neurological disorders, and fractures were the most common presentations. Although 73% of cases were considered appropriate for physiotherapy, only 23% were referred and 4% were screened by physiotherapists. Most healthcare workers (73%) had never heard of EDP, 81% reported no dedicated EDP service at their hospital, and 62% supported dedicated physiotherapy posts. Despite limited formal EDP training, physiotherapists recognized its potential value. Conclusion: Healthcare workers and physiotherapists acknowledged the potential contribution of EDP to emergency care, but awareness, referral practices, and dedicated services remain limited. First SA EDP study provides baseline evidence to inform workforce planning, policy development, and service integration. Results: support dedicated EDP posts, improved interprofessional awareness, and strengthened emergency-care training to enhance patient flow, early intervention, and access to rehabilitation.

GHHS-P-89: Investigating the effects of CKD and hypertension on central arterial haemodynamics in normotensive WKY and SHR rats
BHSc alumni

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Background: Chronic kidney disease (CKD) and hypertension are major risk factors for cardiovascular disease (CVD) and are closely linked to arterial stiffness. Unlike brachial blood pressure, central haemodynamic measures such as central pulse pressure (cPP) and characteristic impedance (Zc) are stronger predictors of cardiovascular outcomes. Since CKD and hypertension can coexist, their individual and combined effects on central haemodynamics remain poorly understood. Aims: To investigate the effects of CKD and hypertension on central arterial haemodynamics in normotensive WKY and SHR rats. Methods: Thirty-seven two-month-old male WKY (control, n = 9, adenine, n = 10) and SHR (control, n = 9, adenine n = 9) were assigned to control or adenine-treated groups. The CKD was induced using a 0.25% adenine- diet for eight weeks. Echocardiography and catheterisation, were performed from which Zc, cPP, central systolic blood pressure (cSBP), central diastolic blood pressure (cDBP), forward (Pf) and backward (Pb) pressure waves were calculated using wave separation analysis. Results: Adenine-treated SHR rats had elevated serum urea ($p<0.001$) vs SHR controls, with a greater decline than in WKY rats. cSBP, cDBP and cPP were all higher in SHR than WKY in both control ($p<0.001$, 0.003,0.036 respectively) and adenine-treated groups ($p < 0.001$), indicating a strain effect. The Pb was significantly higher in SHR's than in the WKY's ($p < 0.001$). Additionally, Pf ($p = 0.1056$) and Zc (WKY: $p=0.309$: SHR: $p=0.885$) showed no significant differences. Conclusion: Despite significant renal dysfunction, elevated central arterial haemodynamic measures were predominately attributed to pre-existing hypertension, rather than CKD.

GHHS-P-90: The life history characteristics of Anopheles arabiensis infected with Microsporidia MB, a Plasmodium blocking symbiont

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Background: Microsporidia MB (MB) symbiont in Anopheles arabiensis blocks the transmission of the Plasmodium parasite. The development of this mosquito-symbiont into a control tool is highly needed for an alternative malaria control. Aims: To investigate how diet affects the MB-Anopheles arabiensis symbiosis phenotypes and monitor the intergenerational spread of MB in infected An. arabiensis population under semi-field system. Methods: Four larval diet regimes were tested on MB+ and MB- mosquitoes as well as low and high adult diet mosquitoes. First filial generation of mosquitoes collected from the field were reared till the 6th generation. Results: Tetramin 0.3 mg/larva/day diet resulted in the quickest larval development, highest adult emergence, and increased size of mosquitoes with the highest prevalence and density of MB. Adult mosquitoes fed 6% glucose survived longer than those on a 1% glucose diet. Hence, MB fitness advantage is diet dependent. MB colonies, Replicates 1 and 3 reached F6, while Replicate 2 ended at F2, with MB prevalence rising from F1 to F3 before declining. MB intensity was similar in F1 and F6. A positive correlation with temperature was observed. Conclusion: and implication Microsporidia MB does not adversely impact the development and fitness of An. arabiensis mosquitoes, even under limited dietary conditions. Tetramin 0.3 mg/larva/day diet and 6% glucose can be used to mass produce MB mosquitoes for future trials to control malaria. This is the first successful establishment of MB mosquito colonies giving credence to its potential use as a control tool.

GHHS-P-91: The Screening and Testing Programme by Pharmacy Students for the screening of non-communicable

and communicable diseases at a university, South Africa

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Background: The co-existence of non-communicable and communicable diseases in low- and middle-income countries, such as South Africa, represents a dual burden for health systems and highlights the need for integrated screening and management strategies, including point-of-care testing. Aims: This study evaluated the Screening and Testing Programme by Pharmacy Students (STEPPS) to determine the burden of these conditions at the University of the Witwatersrand. Methods: A quantitative cross-sectional analysis of anonymised data from 816 consenting adults (staff, students, and visitors) screened in 2023 was conducted. The cohort was predominantly female (67.3%) and aged 18–24 years (56.9%). Results: Screening revealed elevated diastolic blood pressure in 19.6% (n = 120 of 612) and obesity in 21.1% (n = 82 of 388). Among those with a self-reported history of hypertension (n = 43), 41.9% had elevated systolic and 52.4% elevated diastolic readings; 16.3% on medication and 25.6% not on medication had elevated systolic pressure. Possible depressive symptoms were identified in 9.9% (n = 76 of 769), while HIV screening was 1.1% reactive (n = 3 of 284). Conclusion: The STEPPS initiative identified a high burden of uncontrolled NCD risk factors, supporting student-led programmes to improve outcomes and inform policy reform in university settings.

GHHS-P-92: Sex Specific Central Haemodynamic Determinants of Central Pulse Pressure in Young Normotensive Black South African Adults
BHSc alumni

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Background: Cardiovascular diseases account for 1 in every 6 deaths in South Africa, with individuals of African ancestry developing cardiovascular events approximately 20 years earlier than those in high income countries. Indeed, central pulse pressure (CPP) has been shown to predict cardiovascular outcomes better than brachial blood pressure (BP), but its determinants in young healthy adults remains unclear. Aims: To investigate the central haemodynamic determinants of CPP in normotensive Black South African males and females aged 18–34 years. Methods: In 132 participants (65 males, 67 females), we assessed anthropometric measurements, fasting glucose, cholesterol, brachial BP, heart rate (HR), pulse wave velocity (PWV), and aortic forward (Pf) and backward (Pb) pressure waves. Results: In a multivariate linear regression analysis, in males, Pf (β=0.545, $p<0.0001$) and Pb (β=1.163, $p<0.0001$) were positively associated with CPP, whereas HR was inversely associated with CPP (β=-0.100, $p=0.005$). In females, Pf (β=0.659, $p<0.0001$), Pb (β=1.069, $p<0.0001$), and waist-to-height ratio (β=10.04, $p=0.045$) were positively associated with CPP, while HR was inversely associated with CPP (β=-0.030, $p=0.005$). Age, PWV, body mass index, glucose and cholesterol were not independently associated with CPP in both sexes. Conclusion: The CPP in young normotensive Black South African adults was mainly influenced by both the Pf and Pb in males and females. HR was negatively associated with CPP in both sexes, while waist to height ratio was an additional determinant in females only. Central haemodynamic alterations may elevate CPP early in life, potentially contributing to premature cardiovascular risk in young Black South Africans before overt disease manifests.

GHHS-P-93: A description of the admission demographic, professional and academic characteristics of Radiology Registrars (Residents) in South Africa.
BHSc alumni

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Background: Specialist medical training has become increasingly competitive worldwide, with limited registrar positions relative to the growing number of applicants. Understanding the characteristics of successful candidates may assist prospective applicants and inform workforce planning. Aims: To describe the demographic, academic and professional characteristics of radiology registrars in South Africa who were successfully appointed to registrar training posts. Methods: We distributed a 20-question electronic survey, incorporating modified questions from a previously published study, to radiology registrars who undertook the first-semester Fellowship of the College of Radiologists (FCR) Part II examination in 2025. ars who undertook the first-semester Fellowship of the College of Radiologists (FCR) Part II examination in 2025. Results: Twenty-nine of 38 eligible registrars completed the survey (response rate 76%). Respondents were predominantly female (62%) and demonstrated strong academic performance, with 86% reporting an A-aggregate at school level and 69% reporting an undergraduate aggregate of at least 70%. The mean age at admission to registrar training was 31.6 years, increasing to 35.4 years at the time of the survey. Prior postgraduate clinical experience was common (69%), while 38% had worked as Medical Officers within radiology departments before appointment. Fifty-five percent had completed the Part I Colleges of Medicine of South Africa (CMSA) examination before entering registrar training. Conclusion: Successful radiology registrars in South Africa commonly demonstrated strong academic achievement, prior postgraduate clinical experience and substantial professional development before appointment.

GHHS-P-94 From Learning to Leading: Recommendations from Emerging Health Professions Educators Across South Africa – A Multi-Institutional Study
BHSc alumni

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Background: Health professions education (HPE) is central to developing clinicians who are not only technically competent but also pedagogically skilled, socially responsive, and critically reflective. In South Africa, the growing demand for contextually responsive HPE is shaped by historical inequalities, health system challenges, and calls for decolonisation and equity within higher education. Aims: The study aims to provide contextually grounded insights into the challenges and opportunities associated with postgraduate HPE in South Africa. Methods: This study explores the experiences of 17 graduates from South African postgraduate HPE programmes using collaborative analytic autoethnography. Results: Results: are expected to inform programme design, pedagogical strategies, institutional support structures, and policy development. Conclusion: . The study will contribute to a deeper understanding of how HPE initiatives can be effectively designed and implemented within resource-constrained settings.

GHHS-P-95: Consumption, Patterns, and Health Implications of Weight Loss Supplements By Athletes (Boxers) Worldwide: A Scoping Review Protocol

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Background: People utilize weight-loss supplements, which are advertised as safe despite having limited scientific support. Boxers use weight-loss supplements to meet weight requirements and enhance performance. Aims: This scoping review aims to map and summarize research on weight-loss supplement use in adult boxers, focusing on usage patterns, reasons for use, and health effects. Methodology: It was done in compliance with Joanna Briggs Institute (JBI) recommendations as well as the methodological framework by Arksey and O'Malley, reported using PRISMA-ScR. Results: Provides evidence why professional boxers use weight-loss supplements to meet weight requirements, plus potential side effects. Conclusion: People may benefit from weight loss supplements, but their efficacy and safety differ greatly; they shouldn't replace a healthy diet and exercise. Keywords: boxers, combat sports, consumption, dietary supplements, effectiveness, fat burners, nutraceuticals, weight loss supplements, weight reduction

GHHS-P-96: Prevention Strategies for Heel Pressure Injuries: A Scoping Review

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Background: Heel pressure injuries remain a common complication among critically ill patients, contributing to increased morbidity, prolonged hospitalisation, and healthcare costs. Aims: To review current evidence on heel pressure injury prevention strategies and evaluate their applicability across both resource-rich and resource-limited ICU settings. Methods: A narrative review of the literature was undertaken using PubMed, Scopus, and the Cochrane Library. Results: The strongest evidence supports heel offloading boots, multilayer silicone foam dressings, and multicomponent prevention bundles; widespread implementation is frequently limited by financial and staffing constraints. Conclusion: Heel pressure injury prevention requires balancing evidence-based interventions with the practical realities of available resources. Future research should prioritise heel-specific comparative studies and cost-effectiveness analyses.

GHHS-P-97: The metabolic effects of weaning age and D-allulose in juvenile Sprague-Dawley rats.

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Background: Early-life nutrition is a critical determinant of lifelong health. Early weaning and high-calorie sweetener (HCS) consumption in infancy are increasingly prevalent nutritional exposures implicated in early metabolic shifts. Aims: We used a prepubertal-to-adolescent rat model to investigate the impact of early weaning (EW), together with early introduction to the novel low-calorie sweetener allulose. Methods: SD pups were separated into early-weaning (PND 18) and normal-weaning (PND 21) groups and provided standard or allulose-enriched feed from weaning until PND 42. Results: Preliminary data show delayed growth followed by accelerated catch-up weight gain in EW groups; EW allulose groups exhibited higher body

weights than controls. This study provides insights into the mechanisms by which common nutritional insults can impact future health.

GHHS-P-98: Trends in Children's Living Arrangements in Rural South Africa: Findings from Agincourt Health and Demographic Surveillance System (HDSS), (1993-2024)

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Family instability in South Africa shaped by labour migration, HIV, and non-marital fertility has contributed to complex living arrangements for children. This study examines trends in children's living arrangements from birth to age 19 in rural northeast South Africa between 1993 and 2024. We used longitudinal data from the Agincourt HDSS, covering approximately 120,000 individuals in 31 villages in Mpumalanga Province. Children's living arrangements became increasingly diverse over time; the proportion living with both parents declined, while mother-only residence and absence of both parents increased, particularly between 2021 and 2024. Parental absence is a common and evolving feature of childhood in rural South Africa.

GHHS-P-99: Strengthening South Africa's legal framework to reduce children's exposure to unhealthy food and beverages marketing: Ensuring policy coherence

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Childhood overweight and obesity remain major public health challenges in South Africa, driven partly by widespread marketing of unhealthy food and beverages to children. South Africa has introduced the Draft Regulation Relating to the Labelling and Advertising of Foodstuffs (R3337), while the Draft White Paper on Audio and Audio-Visual Content Services (AAVCS) seeks to strengthen regulation of digital and broadcast media. However, differences in scope create regulatory inconsistencies. The study assesses the coherence of South Africa's statutory and self-regulatory regimes against national and international obligations, aiming to identify legal and governance gaps and develop evidence-informed recommendations.

GHHS-P-100: Community Knowledge and Malaria Prevention Practices in the Vaal Triangle, South Africa

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Malaria remains a significant public health challenge in Southern Africa. In South Africa, traditional phytomedicines are commonly used as mosquito repellents and regarded as important complementary prevention strategies. This study aimed to evaluate community knowledge, attitudes, and perceptions regarding malaria prevention, following WITS ethics clearance (M221039), using a semi-structured questionnaire (n=419) among residents of the Vaal Triangle. Despite high malaria awareness (86.9%), misconceptions about transmission and treatment were prevalent — 70.2% believed malaria could spread through contact with an infected person. 89.9% reported using mosquito repellents, though only 48.9% recognised the effectiveness of sleeping under mosquito nets. This study highlights the need for targeted, culturally sensitive educational interventions.

GHHS-P-101: From Development to Ageing in Sub-Saharan Africa: A Scoping Review of Non-Communicable Diseases, Prevention, and Health Systems Equity Across the Life Course

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Background: Non-communicable diseases (NCDs) are an escalating public health challenge in sub-Saharan Africa, affecting populations across all stages of the life course. Aims: The overall objective was to synthesise existing literature on NCDs, prevention strategies, and health systems equity across the African life course — from early development to ageing. Methods: A scoping review was conducted in accordance with PRISMA ScR guidelines. Literature published between 2015 and 2025 in PubMed, Scopus, and Web of Science was searched. Results: The review revealed gaps in prevention strategies targeting childhood and adolescence, limited integration of equity in health system design, and underrepresentation of ageing populations in NCD research. Conclusion: Equity-driven life-course approaches are urgently needed to strengthen NCD prevention and health systems in sub-Saharan Africa. Results: provide evidence to guide policy, resource allocation, and design of scalable interventions.

GHHS-P-102: Exploring the relationship between mycotoxin presence and oesophageal squamous cell carcinoma in South Africa
BHSc alumni

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Background: Oesophageal squamous cell carcinoma (OSCC) remains a significant health burden in South Africa, with high incidence and mortality rates that cannot fully be explained by established risk factors such as tobacco and alcohol. Recently, mycotoxin exposure has been suggested as a potential risk factor for OSCC. Aims: This pilot study aimed to determine the relationship between mycotoxin presence and OSCC in South Africa. Methods: OSCC cases (n=20) and non-cancer controls (n=20) were recruited from Charlotte Maxeke Johannesburg Academic Hospital and Grey's Hospital in Pietermaritzburg, screened for multiple mycotoxins using LC-MS/MS. Results: This study developed and validated a multi-mycotoxin method for the screening and identification of mycotoxins in tissue biopsies and serum. Conclusion: To our knowledge, this work represents the first biomarker-based approach to investigating mycotoxin exposure in South African OSCC patients.

GHHS-P-103: Pooling sputum specimens of people at high risk of TB reduces costs of Xpert Ultra TB testing: Results from the TUTTPlus study in South Africa.

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Background: Pooling sputum specimens reduces the number of diagnostic tests required, but its cost-saving potential in TUTT populations is uncertain. This study compared the cost (2025 USD and ZAR) per person tested and per TB diagnosis using pooled versus individual Xpert MTB/RIF Ultra testing. Methods: Within the TUTTPlus study, adults with at least one TB risk factor were recruited from ten primary healthcare facilities across three provinces. Each participant provided a 3 ml sputum specimen divided for individual and pooled testing (2–5 specimens per pool). Results: Among 2,866 participants, the mean age was 40.2 years (SD 11.5); 29% were male, 80.5% were living with HIV. Individual testing cost $15.41 (R272.45) per person, while the cost per TB diagnosis ranged from $393.96 (R6,965.21) to $1,020.16 (R18,036.43). Four-specimen pools achieved the greatest cost savings (60.9–64.4%), enabling approximately 2.5 times more people to be tested within the same budget. Conclusion: Pooled sputum testing is a cost-saving TB screening strategy in TUTT populations, particularly among people living with HIV and asymptomatic individuals. Wider implementation could expand TB testing in resource-limited settings, provided laboratory capacity supports pooled testing.

ORAL PRESENTATIONS (18)

BHAL-O-01: Comfortably Numb? Empathy, Childhood Adversity, and the Dark Factor of Personality in Medical Students

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Background: The Dark Factor of Personality (D) represents the common core of aversive traits (e.g., narcissism, sadism, vindictiveness). Its associations with empathy and adverse childhood experiences (ACEs) remain underexamined in medical trainees, a population whose interpersonal dispositions carry occupational relevance. Aims: We examined whether empathy and ACEs predict the dark factor, characterized its facet-level profile, and tested whether the dark factor relates to career-orientation preference. Methods: In a cross-sectional survey of 360 medical students at Wits University, we measured the dark factor (D70), empathy (Toronto Empathy Questionnaire; TEQ), and ACEs (ACE questionnaire), alongside demographic and training variables. Associations were examined using correlation, group comparisons, hierarchical multiple regression, and logistic regression (people-oriented vs technique/procedural orientation). Results: Lower empathy was strongly associated with a higher dark factor ($r = -0.70$) and predicted it robustly across complete-case and imputed models ($\beta \approx -0.69$; $R^2 = .52$). Empathy was the only invariant predictor; secondary associations (sex, age, ACE) were sensitive to missing-data assumptions. The empathy association was strongest for callousness and sadism, weakest for narcissistic entitlement. ACEs were unrelated to the dark factor. A higher dark factor was associated with preference for technique/procedural over people-oriented specialties (OR ≈ 1.7). Internal consistency was high for D70 ($\alpha = .95$) and TEQ ($\alpha = .90$), but only questionable for ACE ($\alpha = .67$). Conclusion: Dispositional empathy is closely and inversely tied to the dark factor in medical students, whereas childhood adversity is not. The dark factor's modest association with procedural career orientation warrants longitudinal follow-up to clarify whether aversive dispositions shape specialty selection.

BHAL-O-02: Alcohol-Induced Neuroinflammation Promotes Tau Hyperphosphorylation Through Differential Tau Kinase Activation

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Background: Tau hyperphosphorylation is a hallmark of Alzheimer's disease (AD), driving neurofibrillary tangle formation and neuronal dysfunction. Although chronic alcohol consumption increases AD risk, the molecular mechanisms linking alcohol use disorder (AUD) to tau pathology remain unclear. Aims: To determine whether alcohol-induced neuroinflammation promotes tau kinase activation leading to pathological tau phosphorylation. Methods: Postmortem amygdala tissue from male AUD patients and controls was analysed by proteomics to quantify inflammatory and tau-related proteins. Mechanistic validation was performed in U-87 MG astrocytes exposed to ethanol, acetate, or combined treatment, assessing NFκB activation, pGSK3β (Ser9), cytokine expression, total phosphorylated tau, and Ser404 localisation. Results: Proteomics showed increased S100A8/A9, S100B, CD14, TRAF6, NFKB1, GFAP, GSK-3β, CDK5, and FYN, consistent with TLR2–NFκB-mediated neuroinflammation and tau kinase activation. Ethanol increased NFκB and IL-6 but produced minimal cytoplasmic tau aggregation. In contrast, acetate increased IL-1β, IL-6, total phosphorylated tau, and cytoplasmic aggregation of Ser404-phosphorylated tau, with enhanced effects following combined treatment. Differential pGSK3β (Ser9) responses suggested distinct kinase engagement by ethanol and acetate. Conclusion: Chronic alcohol exposure promotes DAMP-mediated TLR2–NFκB activation that converges on tau kinase upregulation and pathological tau phosphorylation. Integration of human proteomic and cellular findings implicates acetate as a key mediator linking alcohol-induced neuroinflammation to pathological tau phosphorylation. Differential effects of ethanol and acetate suggest that alcohol metabolism, rather than ethanol alone, may drive tau pathology. These findings provide mechanistic insight into how chronic alcohol exposure may increase Alzheimer's disease risk and identify acetate-mediated neuroinflammatory signalling as a potential therapeutic target.

BHAL-O-03: The relationship between household asset index (HAI), food insecurity and post-traumatic stress disorder (PTSD) among older adults in rural, South Africa:2021-2022

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Background: Poverty and adversity may well overlap with experiences of trauma (traumatic events or TE) and influence the trajectory Limited data has examined the relationship between TE, PTSD, poverty and deprivation in South Africa among older adults. Aims: This study examined the relationship between different TEs, cumulative TE and PTSD among older adults in rural South Africa and also incorporated proxies for inequality: household asset index (HAI), and food insecurity in analyses where PTSD is the outcome. Methods: The data source was a primary cohort study, the Health and Aging in Africa: Longitudinal Studies in South Africa (HAALSI), set in rural Agincourt, Mpumalanga. TE, probable PTSD, HAI and food

insecurity were measured. Univariate and multivariate logistic regression methods were used to examine the relationships between TE, HAI and food insecurity and their probable link to PTSD. Results: Out of 3 332 HAALSI Wave 3 participants, 2.44% reported symptoms probable PTSD. There was evidence of a dose-response relationship between TE and probable PTSD with participants reporting five or more TEs scoring higher on the probable PTSD screener (aOR:3.07, CI:1.64–5.77, p<0.001). The highest HAI quintile participants were nearly twice as likely to be at risk of probable PTSD (aOR: 1.91, CI:1.10–4.66, p=0.027). Moderate food insecurity increased likelihood five-fold (aOR:4.91, CI: 3.04–7.94, p<0.001). Results: emphasise the need for targeted mental health interventions addressing poverty, TE exposure, and structural inequalities to improve psychological well-being and reduce the prevalence of probable PTSD in vulnerable, low-income populations particularly older adults.

BHAL-O-04: Prevalence of Neurodevelopmental Disorder among children in Rural South Africa: A community-based cross-sectional study.

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Background: Neurodevelopmental disorders (NDDs) are a characterised by impairments in motor, cognitive, speech, psychology or adaptive function which originate in early childhood. NDDs are a major contributor to childhood disability worldwide, yet population-based data from across sub-Saharan Africa remains limited. Aims: To estimate the prevalence of NDDs using the World Health Organization Ten Question Questionnaire (TQQ) among children living in a rural South African setting. Methods: A cross-sectional analysis was conducted using data from 25 451 children aged 2-15 years collected in the Agincourt Health and Demographic Surveillance system (HDSS) in 2024 to 2025. Completed screening data was available for 16 167 (65.7%) children. A positive screen was defined as a positive response to one or more of the TQQ items. Descriptive statistics and multivariable logistic regression examined factors associated with a positive screen. Results: 3215 (19.2%) children screened positive for at least one neurodevelopmental concern. The most common concerns were speech/language difficulties (13.7%), developmental/cognitive delays (7.8%) and motor impairments (2.0%). Less frequently were problems with vision (1.4%), hearing (1.1%) and seizures (0.6%). 12.4% screened positive for one item and 6.8% screened positive on two or more items. Children not attending school had higher odds of screening positive than those attending school (adjusted odds ratio 1.9%, CI 1.6-2.2; p<0.001). Conclusion: One in five children had at least one neurodevelopmental concern, with strong association between positive screening and non-school attendance. These findings demonstrate a substantial burden of neurodevelopmental concerns and the need for routine community-based screening, early identification and strengthened referral pathways to diagnostic, intervention and support services.

BHAL-O-05: Childhood community violence trajectories and adult intimate partner violence perpetration among South African men and women.

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Background: Exposure to community violence (CV) in childhood has been linked to adverse social-behavioural and health consequences across the life course, including intimate partner violence (IPV). There is limited literature on the effect of longitudinal patterns of CV exposure on adult IPV experiences. Aims: To identify longitudinal patterns of CV and assess their association with adult IPV experiences using a gendered approach. Methodology: Secondary data analyses were conducted using data from 943 participants in the Birth to Forty Cohort. Group-based trajectory modelling identified gender-specific childhood CV trajectories, and multivariable logistic regression examined associations with adult IPV perpetration, adjusting for childhood and adult factors. Results: Two CV trajectories were identified: temporal adolescent and persistent increasing exposure. Most participants followed the temporal adolescent trajectory (78.57% of males; 77.96% of females), while approximately one-fifth followed persistent increasing exposure (21.43% of males; 22.04% of females). After adjusting for covariates, persistent increasing CV exposure was associated with IPV perpetration among males ([aOR] 1.91, 95% CI 1.06–3.44). Among females, the association approached significance (aOR 1.55, 95% CI 0.95–2.52; p=0.07). Higher educational attainment was associated with lower odds of IPV perpetration among males (aOR 0.18, 95% CI 0.08–0.49) and females (aOR 0.46, 95% CI 0.28–0.78). Higher Raven's score at age 7 was protective among females only (aOR 0.72, 95% CI 0.53–0.98). Conclusion: & implications: Persistent CV exposure may increase later IPV perpetration risk, particularly among males. Interventions that reduce CV exposure and strengthen education may help interrupt life-course pathways to adult IPV.

BHAL-O-06: Emergency Neurosurgical Operative Workload at a High-Volume Tertiary Centre in Johannesburg, South Africa

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Background: Emergency neurosurgical services in sub-Saharan Africa operate under substantial resource constraints while

managing a high burden of trauma and intracranial infection. However, large contemporary procedure-level data from African neurosurgical centres remain scarce. Aims: To characterise the emergency neurosurgical operative workload at a high-volume tertiary referral centre in Johannesburg and identify trends relevant to service planning and training. Methods: A retrospective audit of a prospectively maintained neurosurgical database was performed. All consecutive emergency neurosurgical procedures undertaken between January 2023 and April 2026 were included. Demographic, procedural and diagnostic data were analysed descriptively, with subgroup and temporal trend analyses performed. Results: A total of 1,602 emergency neurosurgical procedures were performed over 40 months (mean 40/month). Patients were predominantly male (80.3%) with a median age of 36 years. Trauma accounted for 69.9% of procedures and infective pathology for 20.5%, demonstrating a significant dual burden of disease. The most common procedures were craniotomy (n=727) and burr-hole drainage (n=354). Leading indications included acute subdural haematoma (17.1%), chronic subdural haematoma (13.9%), hydrocephalus (8.6%), depressed skull fractures (8.2%), septic wounds (8.1%), extradural haematoma (7.1%), and intracranial sepsis. Annual operative volume increased from 428 procedures in 2023 to 503 in 2025. Paediatric patients represented 19.5% of cases. Conclusion: Emergency neurosurgical workload is substantial, increasing, and predominantly trauma-driven, with a significant contribution from intracranial infection. These findings provide critical evidence for workforce planning, theatre allocation, training requirements and resource distribution in resource-constrained neurosurgical systems.

BHAL-O-07: The prevalence of cannabis associated mania-like presentations in hospitalised psychiatric patients

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Background: Cannabis exposure is a known precipitant for psychotic disorders in the DSM-5-TR, but it is not clearly recognised as a precipitant for mania-like symptoms, despite evidence suggesting an association between cannabis use and mania. Aims: To determine the prevalence of cannabis-induced mania-like presentations in hospitalised psychiatric patients using the DSM-5-TR and the Young Mania Rating Scale (YMRS). A tertiary, academic hospital in South Africa. Methods: A retrospective clinical audit of 344 patients with a history of cannabis use was performed. Patients with a history of associated polysubstance use were also analysed using descriptive statistics, prevalence ratios, χ^2/Fisher association testing with effect sizes, and robust Poisson regression to estimate adjusted prevalence ratios (aPRs). Results: There were 181 males (52.6%) and 163 females (47.4%). Median age was 27 years; females were older than males (30 vs 26 years; $p<0.001$). Median length of stay (LOS) was 26 days. Polysubstance use occurred in 251 patients (73.0%); the most frequent co-exposures were methamphetamine 144 (41.9%) and alcohol 133 (38.7%). The most prevalent symptom domains were irritable mood 333 (96.8%), aggression 322 (93.6%) and impulsive behaviour 314 (91.3%). Symptom prevalences were similar between cannabis-only (n=93) and polysubstance groups (PR 0.90–1.15; all $p\geq0.21$). After adjustment for age and LOS, males had higher aggression (aPR 1.13; 95% CI 1.06–1.20; $p<0.001$) and lower decreased sleep (aPR 0.82; 0.68–0.98; $p=0.029$). Conclusion: The cannabis-only cohort showed a nearly identical prevalence across the eight mania-like symptoms (73.9%) compared to the polysubstance-use cohort (74.3%). The findings provide locally populated inpatient data to support integrated dual-diagnosis interventions and substance rehabilitation programmes.

BHAL-O-08: Mental disorders amongst students: trends before and during COVID-19 in a South African university *BHSc alumni*

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Background: Globally, student mental disorders are increasing, with social determinants shaping risk. In South Africa, pre-existing socioeconomic inequalities, student protests, and COVID-19 disruptions intensified distress. Aims: To compare trends in mental disorders and service use before (2016–2019) and during (2020–2023) COVID-19 at one university using a social determinants lens. Methods: A retrospective review of 941 student counselling records analysed DSM-5-TR diagnoses, psychosocial concerns, referral patterns, and utilisation. Temporal comparisons and subgroup analyses examined gender, level of study, and pandemic phases. Results: The university clinic demonstrated a service uptake predominantly by female students (72.4%) and utilisation mostly by undergraduate students (67.9%). A total of 983 diagnoses were recorded, with individual consultations most common. Mood disorders were most prevalent (78.1%), with depressive (38.8%) and anxiety disorders (39.3%) during 2021–2022, coinciding with the pandemic. Common psychosocial concerns included family problems, bereavement, and relationship difficulties. Gender-based violence, adjustment challenges, cultural stressors, and financial difficulties, though less frequent, remained significant contributors to mental health difficulties in the selected participants Conclusion: Depression and anxiety remained the primary burden, shaped by structural and interpersonal determinants rather than individual factors alone. Trends were closely linked to contextual stressors, including COVID-19, student unrest, and psychosocial challenges. Universities must implement integrated mental health strategies that combine clinical services with tailored social and public health interventions to comprehensively support student wellbeing. Gendered differences in service use requires special attention.

BHAL-O-09: Effects of Combination Antiretroviral Therapy on the Cerebellum and Pons in a Diabetic Rat Model: From Metabolic Disease to Brain Health

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The prevalent use of combination antiretroviral therapy (cART) in the treatment and as a preventative prophylaxis in HIV-exposed individuals has raised concern for its neurotoxicity. The diabetogenic effect of cART raises concerns for it neurotoxicity. Therefore, the cerebellar and pontine effects of cART were assessed using in diabetic male Sprague Dawley rats. Forty-two adult male Sprague Dawley rats were divided into four groups of six rats; untreated group (NC), cART alone group (AV), diabetes (DB), and diabetic cART treated group (AVDB), treated for 90 days and then terminated, brains excised, and homogenized. Cerebellar and brain stem samples were analysed for MDA Elisa, Caspase 3, Bcl2 and Occludin qPCR while Giemsa stain histology and Caspase 3 and cyclophilin A immunohistochemistry were also carried out on sectioned cerebellar tissue. Our results reveal increased oxidative stress and Caspase 3 mRNA in all treated groups, with elevated immunohistochemical Caspase 3 expression in Bergmann and cerebellar nuclei glial cells, but depleted cyclophilin A expression in these cells with AV treatments. The DB, and AVDB groups showed depleted occludin mRNA and elevated cyclophilin A expression in glial cells, apoptotic Caspase 3 expression mostly in the cerebellar nuclei neurons and Purkinje neurons. These results indicate the potential of cART to impair cerebellar nuclei and cortex glial cells but in combination with diabetes induces Purkinje and dentate nucleus apoptosis with depleted cyclophilin A expression. Therefore, these crucial cells for cerebellar homeostasis and coordination function should be monitored where these factors co-occur.

BHAL-O-10: Neuropathic pain in keloid scars in people of Black African ancestry

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Background: Keloids are scars are that appear as hard, fibrous nodules that grow outside the margins of the original lesion. Although commonly considered a cosmetic issue, keloids present with debilitating pain that can be considered as neuropathic in nature. The aim of this research was to characterise the pain in people living with keloids. Methods: A convenience sample of 40 people aged 18 to 40 years with keloid scars were recruited from Chris Hani Baragwanath Academic Hospital. Consenting individuals were administered a series of questionnaires, most notably the painDETECT for pain with neuropathic features, underwent quantitative sensory testing at three sites (keloid, perilesional, control) and provided a keloid sample for intra-epidermal nerve fibre density (IENFD) analysis. Results: The mean (SD) age of participants was 27 (6) years, and 54% of them were female. Those classified with neuropathic pain reported significantly higher pain severity compared to other classifications ($p = 0.0003$) and had abnormal sensory and mechanical testing results at the keloid site. Additionally, the average IENFD calculated for the cohort was 3,007 fibres.mm-1, almost 4 times lower than the average IENFD reported by previous researchers at 13.8 ± 6.7 fibres.mm-1. Conclusion: Pain is a frequent severe symptom in keloid scars that is not well understood or adequately treated in hospital settings. In addition to questionnaire results and abnormal sensory phenomena in keloids, there was also a lower nerve fibre density detected. The three factors together, questionnaire's, sensory testing and decreased nerve density provide strong evidence that the pain in keloid scars is most likely neuropathic in nature.

BHAL-O-11: Epigenetic Regulation of RELN and SHANK3 in a Neurodevelopmental in vitro Model of Schizophrenia: Investigating Creatine Monohydrate as a Methylation Buffer

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Background: RELN and SHANK3 are neurodevelopmental genes implicated in schizophrenia and related psychotic disorders, with aberrant promoter hypermethylation proposed as a key mechanism underlying their dysregulation. Aims: To characterise the biological pathways of RELN and SHANK3, investigate how schizophrenia-like insults alter their promoter methylation across neurodevelopmental stages, and evaluate creatine monohydrate (CrM) as a potential epigenetic buffer. Methods: Bioinformatic pathway analyses characterised the functional networks and protein interactions of both genes. Neurodevelopmental models were established using neuroblastoma SH-SY5Y cells across three stages: undifferentiated, partially differentiated (retinoic acid-treated), and fully differentiated (retinoic acid and BDNF-treated). Molecular neurotransmissions and neuroinflammation: Schizophrenia-like dysregulation conditions were induced using dizocilpine or and/or lipopolysaccharide. (Differential promoter methylation of RELN and SHANK3 was quantified across conditions. CrM was administered to partially and fully differentiated cells for 24 hours before and during the insult to assess its effect in buffering aberrant methylation changes. Results: A neuroinflammatory and NMDA-disrupted in vitro model was established, with MTT assays confirming differential cell viability across treatments. EVOS imaging revealed observable morphological changes consistent with neurotoxic stress. SHANK3 promoter methylation showed differential patterns across differentiation stages and insult conditions, suggesting stage-dependent epigenetic vulnerability. CrM intervention appeared to partially rescue cell viability, indicating a potential neuroprotective role. STRING network analyses implicated both genes in converging synaptic and immune-related pathways relevant to the pathophysiology of schizophrenia. Conclusion: These findings suggest that schizophrenia-like insults induce epigenetic dysregulation at the SHANK3 locus in a neurodevelopmentally sensitive manner, and that CrM may buffer against these changes, warranting further investigation.

BHAL-O-12: Microbial stimulation alters amyloid precursor protein processing transcription in human neurons

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Background: . The antimicrobial protection hypothesis of Alzheimer's disease reframes amyloid-beta (Aβ) as an antimicrobial peptide and its formation as an innate-immune response. Aβ is generated when amyloid precursor protein (APP) is processed along the amyloidogenic secretase pathway. Most work addresses what Aβ does once it exists, not whether an immune trigger directly changes how neurons process APP. Aims: . The study asked whether bacterial and viral pathogen-associated molecular patterns (PAMPs) alter transcription of the APP-processing pathway in a human neuronal cell model. Methods: . SH-SY5Y cells, undifferentiated or retinoic-acid differentiated, were exposed to the bacterial PAMP lipopolysaccharide (LPS) and the viral mimic poly(I:C). Transcription of the APP-processing pathway (APP, BACE1, ADAM10, PSEN1) and the neuronal marker synaptophysin (SYP) was measured by RT-qPCR, normalised to two reference genes (HPRT1 and PPIA). Results: . In differentiated cells, PAMP exposure produced coordinated transcriptional changes across the APP-processing pathway, with the neuronal marker changing in parallel. Undifferentiated cells showed little transcriptional response, indicating the effect depends on differentiation state. Conclusion: . Innate-immune stimulation with bacterial and viral PAMPs alters transcription of the APP-processing pathway in differentiated but not undifferentiated human neurons. The change is coordinated across the pathway. . Because APP processing is largely controlled post-transcriptionally, these changes need not translate directly into altered Aβ, but they show microbial signals reach the APP-processing machinery. Dysregulation of this pathway could favour a shift toward the amyloid accumulation seen in Alzheimer's disease. Further work is needed to establish what drives this shift.

BHAL-O-13: The Effects of Fluoxetine on Cranial Neural Crest Cell Migration in vitro: Implications on SSRI-Induced Craniofacial Malformations
BHSc alumni

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Background: Prenatal exposure to selective serotonin reuptake inhibitors (SSRIs) has been associated with an increased risk of craniofacial malformations, including craniosynostosis and cleft palate. However, the underlying mechanisms of SSRI-induced teratogenicity remain poorly understood. Given their critical role in the formation of craniofacial mesenchymal tissues, cranial neural crest cells represent a potential target of fluoxetine-induced developmental toxicity. Aims: The current study aimed to investigate the effects of fluoxetine on cranial neural crest cell migration and the expression of genes involved in cell migration and osteogenesis. Methods: Neural tubes containing cranial neural crest cells were dissected from 36-hour-old chick embryos and cultured in the presence of peak plasma concentrations of fluoxetine. Control cultures consisted of standard culture medium and culture medium containing DMSO as the vehicle control. Neural crest cell migration was quantified using a migration assay, while cytoskeletal organization was assessed by rhodamine-phalloidin staining. Quantitative PCR was performed to determine the expression of migration-associated genes (Rac1 and RhoB) and osteogenic genes (RUNX2 and Sox9). Results: Fluoxetine significantly inhibited cranial neural crest cell migration compared with both control groups and disrupted actin cytoskeletal organization. Gene expression analysis demonstrated downregulation of Rac1, RhoB, RUNX2, and Sox9 in fluoxetine-treated cultures. Conclusion: These findings suggest that fluoxetine impairs cranial neural crest cell migration and disrupts the expression of genes essential for cell migration and craniofacial development. These findings suggest new mechanistic insight into SSRI-induced teratogenicity and may support future efforts to improve the developmental safety of antidepressant therapy during pregnancy.

BHAL-O-14: Chronic LPS-Induced Neuroinflammation Alters Neurotransmitter Dynamics and Brain Proteomic Signatures
BHSc alumni

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Background: Chronic systemic inflammation is implicated in the pathogenesis of neurodegenerative disorders. Emerging evidence suggests that persistent neuroinflammation can disrupt neurotransmitter systems, contributing to alterations in neuronal communication and brain function. However, its effects on regional neurotransmitter abundance and the dynamic interactions between neurotransmitters remain underexplored. Aims: This study aimed to characterize the neurochemical and proteomic consequences of chronic lipopolysaccharide (LPS)-induced neuroinflammation using mass spectrometry imaging (MSI) and proteomics. Methods: Seventy-nine Sprague–Dawley rats received chronic LPS or saline treatment over four weeks, with ketamine intervention incorporated into selected experimental groups. Results: LPS did not significantly alter neurotransmitter abundance or excitation-inhibition balance but modified intra- and inter-neurotransmitter relationships. The strong baseline glutamate–GABA correlation ($r = 0.90$, $p = 0.0145$) was attenuated following LPS exposure ($r = 0.64$, $p = 0.180$), indicating impaired coordination between excitatory and inhibitory signalling. Proteomic analyses of the striatum,

hippocampus, and prefrontal cortex revealed alterations in proteins involved in neurotransmission, synaptic plasticity, neuroinflammatory signalling, and cellular metabolism. Conclusion: Chronic LPS-induced neuroinflammation altered neurotransmitter network dynamics and disrupted protein pathways associated with synaptic function, inflammatory signalling, and cellular metabolism. These findings indicate that persistent neuroinflammation induces widespread neurochemical and molecular changes within the brain. By providing insight into the mechanisms through which chronic inflammation affects brain function, this study advances our understanding of pathways that may contribute to neurodegenerative disease progression. Furthermore, the integration of MSI and proteomics offers a powerful approach for identifying potential biomarkers and therapeutic targets associated with neuroinflammatory disorders.

BHAL-O-15: Neutropenia-related clozapine discontinuation practices and cost of haematological monitoring

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Background: Clozapine is underutilised primarily due to concerns regarding side effects, including neutropenia and agranulocytosis, and its haematological monitoring requirements. Aims: To describe neutropenia-related discontinuations, haematological monitoring and costs among clozapine-treated inpatients. A tertiary specialised psychiatric hospital in Johannesburg. Methods: A retrospective cross-sectional file review of clozapine-treated inpatients admitted over a 2-year period. Demographic and clinical data, including white cell count (WCC) and absolute neutrophil count (ANC) results, were extracted. The number and cost of blood tests were captured from the hospital's laboratory accounts. Results: Among 108 clozapine-treated inpatients, baseline haematological testing was near universal; however, adherence to haematological monitoring declined over time. Mild neutropenia during clozapine treatment occurred in 25.9% of patients and moderate neutropenia in 1.9%. There were no cases of agranulocytosis. One neutropenia-related clozapine discontinuation (0.9%) occurred following an ANC result of 1.31 × 109/L. Baseline benign ethnic neutropenia was significantly associated with lower ANC values of between 1.0 – 1.5 × 109/L during clozapine treatment ($p = 0.001$). Race, gender and concurrent sodium valproate showed no associations. Haematological monitoring cost was R117 429.90, with a median per-patient cost of R 1 003.99. Conclusion: Moderate to severe clozapine-induced neutropenia and treatment discontinuations were rare in this cohort. Monitoring, though inconsistently followed, proved costly. This study advocates for adjustments to monitoring protocols to enhance cost-effectiveness and equitable clozapine access.

BHAL-O-16: Biomimetic neuromelanin synthesis and acellular ferrous-Iron chelation profiling
BHSc alumni

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Background: Parkinson's disease (PD) affects 11.77 million people globally, with no current disease-modifying therapy. Selective loss of neuromelanin (NM)-containing dopaminergic neurons in the substantia nigra pars compacta is the defining neuropathological hallmark. Intracellular NM chelates redox-active metals and scavenges free radicals; however, the threshold governing its transition to pro-oxidant behaviour and its role in glutathione-centred antioxidant defence remain poorly characterised. Aims: To synthesise a biomimetic NM analogue and characterise its ferrous-iron chelating capacity using an acellular ferrozine assay at physiologically relevant concentrations, benchmarked against ethylenediaminetetraacetic acid (EDTA). Methods: NM was synthesised via enzymatic oxidation of L-DOPA with L-cysteine and mushroom tyrosinase in phosphate buffer (pH 7.4), incubated at 37°C for 48 h, acidified to pH 3–4, and heat-matured at 95°C for 16 h Chelation capacity was assessed at physiologically relevant concentrations (1–100 µg/mL) using a ferrozine colorimetric assay $Fe(II)SO_4$ (2 mM) and sample were pre-incubated (20 min), ferrozine (5 mM) added, and absorbance measured at 562 nm, with EDTA as positive control. Results: Ferrozine assay revealed ~35% ferrous-iron chelation by synthetic NM at physiologically relevant concentrations, consistent with the metal-sequestering properties of endogenous NM. Conclusion: This study establishes an acellular iron-chelating profile of biomimetic NM, providing concentration-grounded data to inform future cellular investigations in PD. Results: may support NM-based iron-sequestering strategies in PD and provide a validated acellular framework for characterising endogenous pigment antioxidant chemistry.

BHAL-O-17: DNA methylation episignatures as a novel approach to improve diagnosis in African rare disease patients in the DDD-Africa study

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Background: Developmental disorders (DD) are rare conditions, often with genetic causes, yet molecular diagnoses are achieved in only ~30-40% of cases. DNA methylation episignatures are disorder-specific biomarkers that can support diagnosis when sequence-based testing is inconclusive. However, their utility in African populations remains unexplored. Aims: To evaluate whether integrating episignature analysis into the Deciphering Developmental Disorders in Africa (DDD-

Africa) diagnostic workflow improves molecular diagnostic yield and supports variant interpretation in African patients with unexplained DD. Methods: We evaluated episignature analysis in 248 DDD-Africa participants using the clinically validated EpiSign platform. Participants were stratified into a validation cohort (n=31; including 24 cases with known molecular diagnoses and 7 family members), a discovery cohort (n=5; for PGAP3-associated episignature discovery), and a testing cohort (n=212; comprising 198 unresolved cases and 14 variant interpretation cases). Genome-wide methylation profiles were analysed using the EpiSign v5 classifier and interpreted alongside available clinical and genomic data to assess diagnostic relevance. Results: Concordant disorder-specific episignatures were detected in 23/24 validation cases with confirmed diagnoses (95.83%), supporting the transferability of established episignatures to this African cohort. In the testing cohort, disorder-specific episignatures were identified in 10/198 previously unresolved cases (5.05%), providing evidence towards potential molecular diagnoses. Episignature findings supported the reclassification of variants to likely pathogenic or pathogenic in 3/14 variant interpretation cases (21.43%). Conclusion: Episignature analysis increased the diagnostic yield and supported variant interpretation in the DDD-Africa cohort. By addressing the limited epigenomic data available for African populations, this study supports the implementation of integrated genomic and epigenomic approaches in rare disease research and diagnostics.

BHAL-O-18: Exploring a profile of suicide victims in a large rural area, in Mpumalanga, South Africa.
BHSc alumni

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Abstract Background: Suicide remains an under-recognised yet significant cause of mortality both globally and in South Africa. Suicide has been widely studied in urban settings and high-income countries, with less known about the patterns and characteristics in rural South Africa. Aims: We set out to describe the biopsychosocial and mental health profile of individuals who died by suicide in Mpumalanga, South Africa and to compare these patterns with international literature. Rural communities within the Agincourt Health and Socio-Demographic Surveillance System in Mpumalanga Province, South Africa. Methods: Verbal Autopsy records for all completed suicides between 1992 and 2022 were reviewed. Cases were assessed for socio-demographic characteristics, prior mental health diagnosis and method of death. Descriptive analysis identified recurring patterns and explored associations between age, sex, and socioeconomic factors. Results: Most deaths 35,4% occurred among unemployed men aged late twenties to early forties. Documented mental illness was uncommon in men but more frequently documented in older women. Hanging was the predominant form of suicide method. Conclusion: Completed suicides in rural South Africa are most common among young, economically marginalised men, often without previous psychiatric contact. /Contribution: This study fills a key evidence gap by providing long-term, population-based data on suicide in rural South Africa highlighting the predominance of socioeconomically vulnerable men without prior mental health contact and underscoring the need for community based-based prevention strategies.

POSTER PRESENTATIONS (25)

BHAL-P-01: Subependymal Giant Cell Astrocytoma Presenting with Severe Bilateral Visual Loss in a Child with Tuberous Sclerosis Complex: A Case Report
BHSc alumni

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Background: Subependymal giant cell astrocytomas (SEGAs) are benign intraventricular tumors seen almost exclusively in tuberous sclerosis complex (TSC). They typically arise near the foramen of Monro, where enlargement may obstruct cerebrospinal fluid flow, causing hydrocephalus and raised intracranial pressure. Visual loss is an uncommon presenting feature. Aims: To describe a rare presentation of TSC-associated SEGA with severe bilateral visual loss in an African adolescent. Methods: We report a clinical case describing presentation, examination findings, neuroimaging, operative management, histopathology, postoperative outcome, and clinical implications. Results: A 15-year-old female of African descent presented with progressive bilateral visual loss and clinical features of TSC, including facial angiofibromas and fibrous cephalic plaques. Neurological examination revealed bilateral blindness with no light perception. Magnetic resonance imaging demonstrated a right-sided intraventricular mass centered at the foramen of Monro, extending into the third ventricle, with obstructive hydrocephalus. She underwent gross total resection via a neuronavigation-guided transcortical approach. Histopathology confirmed World Health Organization grade I SEGA. Postoperatively, she remained neurologically stable; however, visual function did not improve. Conclusion: This case describes a rare presentation of SEGA with severe bilateral visual loss, likely related to prolonged obstructive hydrocephalus and intracranial hypertension. The unusual clinical picture emphasizes the importance of early TSC recognition and timely neuroimaging in patients with visual symptoms, particularly in underrepresented African populations.

BHAL-P-02: Associations between depressive symptoms, behaviors and risk factors to HIV among HIV-negative men and women accessing prevention services in South Africa
BHSc alumni

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Background: Poor mental health may increase vulnerability to HIV by influencing behaviors that increase HIV-exposure whilst also undermining healthcare engagement and self-care. Understanding the link between these behaviors, poor mental health, and associated risk factors is a crucial component of effective HIV prevention. We explore this among HIV negative individuals accessing sexual and reproductive health services in Mthatha, Gqeberha and Tshwane, South Africa. Methods: Embedded in a cohort study, participants aged ≥15 years and HIV negative were eligible. Baseline surveys conducted between April and October 2024 collected data on sociodemographic characteristics and behaviors. Depression was measured using the Patient Health Questionnaire-9 (PHQ-9); those with a score ≥5 were considered to have depressive symptoms. Log binomial regression assessed the associations between depressive symptoms, behaviors and risk factors. Results: Of 3780 participants, majority were aged 18-24 years, female and unemployed with 13% experiencing depressive symptoms. Transactional sex, never using a condom, and having more than 2 intimate partners in the last 3 months was higher in those with depressive symptoms. Risk factors for depressive symptoms were being female, being from Mthatha, and having experienced gender-based violence (GBV). Transactional sex, sex under the influence, substance use, and number of partners were not associated with depressive symptoms. Conclusion: The results suggest that depressive symptoms did not influence behaviors considered to increase HIV vulnerability. However, females and those who had experienced GBV were more likely to experience depressive symptoms. Longitudinal studies should explore how depressive symptoms and behaviors change over time and whether extended exposure to depressive symptoms increases the likelihood of HIV acquisition.

BHAL-P-03: Neurotoxic Effects of HIV-1 Subtype B and C Viral Proteins: A Systematic Review and Meta-Analysis of in Vitro Central Nervous System Models

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Background: HIV-associated neurocognitive disorders (HAND) arise from neuroinflammation driven by HIV-1 protein toxicity. Subtype B predominates in Western countries, while subtype C is most prevalent globally, but differences in their neurotoxic profiles remain poorly characterized. Aims: To quantitatively compare the neurotoxic effects of HIV-1 subtype B and C viral proteins across in vitro central nervous system (CNS) models. Methods: A PRISMA-compliant search across PubMed, Scopus, and Web of Science (January 2006 to January 2026) identified in vitro CNS models exposed to HIV-1 proteins. Data were synthesized via random-effects meta-analysis and multivariable meta-regression using Stata 17. Results: Out of 59 studies, 22 (k=22) were included. The overall pooled standardized mean difference (Hedges' g) was 1.717 (95% CI: −0.899 to 4.334), indicating no statistically significant overall effect (p=0.20). Subgroup analysis initially suggested higher neurotoxicity for subtype C than B (Qb =14.45, p<0.001), but subtype C was limited to a single study, and corresponding meta-regressions found no significant subtype effect. Heterogeneity was extremely severe (I2 =98.91%, p<0.001). Multivariable meta-regression revealed that the choice of experimental system was the primary driver of this variance, with primary CNS cells yielding significantly lower effect sizes than immortalized cell lines (β=−6.49, p=0.015). Subtype (β=−2.04, p=0.457) and protein type were not significant predictors. Conclusion: There is insufficient evidence to conclude that HIV-1 subtype significantly influences neurotoxicity in vitro. Substantial heterogeneity remained unexplained across all models. Future research should use standardized comparative protocols in primary human CNS cell models. Experimental design and tissue culture methods skew study results far more than actual biological differences.

BHAL-P-04: Pharmacogenetic Screening to Address Benign Ethnic Neutropenia in Clozapine-Treated Patients with Treatment-Resistant Schizophrenia

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Background: Clozapine is the most effective treatment for treatment-resistant schizophrenia (TRS), but its use is frequently limited by haematological monitoring requirements. Benign ethnic neutropenia (BEN), strongly associated with the Duffy-null (rs2814778) genotype, is characterised by lower baseline neutrophil counts without increased infection risk, and may result in clozapine ineligibility or discontinuation, particularly in populations of African ancestry. Aims: This study aims to determine the prevalence of the Duffy-null genotype in clozapine-treated TRS patients and assess its association with neutrophil count patterns consistent with BEN. Methods: Genotype testing to assess Duffy-null status will be performed using blood samples collected from clozapine-treated patients with TRS. Neutrophil, white cell count and duration of clozapine treatment data will be extracted from clinical records to identify neutropenia patterns consistent with BEN. Results: It is anticipated that a substantial proportion of participants will carry the Duffy-null genotype and have lower baseline neutrophil counts. The genotype is expected to be more frequent among Black African participants, with lower frequencies across other

South African population groups. Duffy-null carriers are expected to be under-recognised as having BEN in clinical records, consistent with international evidence of under-diagnosis using routine haematological monitoring alone. Conclusion: Duffy-null–associated BEN is likely to be common among clozapine-treated patients with TRS in African populations and may contribute to delayed initiation or interruption of treatment. These findings support consideration of Duffy-null genotyping during pre-clozapine assessment. This may improve interpretation of baseline ANC values using population-relevant reference ranges, and potentially reduce unnecessary treatment interruption or exclusion.

BHAL-P-05: Risks and Awareness of NIHL Among Dental Students: A Scoping Review

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Background: & Aim: Noise exposure levels in the dental professional sector may be considered low when compared to other occupations. However, noise prevention strategies, especially for students, are necessary to conserve hearing. The current scoping review aimed to ascertain the risks and awareness of NIHL among dental students globally. Methods: The review selected articles from 2014 to 2025, including both quantitative and qualitative studies, existing systematic reviews, and grey literature. The PCC (Population, Concept, Context) framework was used to guide the articles' eligibility criteria. Databases included PubMed, CINAHL, ProQuest, Scopus, Web of Science, and EBSCO Host. Covidence software was used to extract and screen the studies; furthermore, studies were reported according to the PRISMA guidelines. Sixty-nine studies were initially extracted, and after screening, 10 met the study criteria. Thematic analysis was used to synthesize the data. Results: Of the 10 studies analysed, none were from Sub-Saharan Africa, and eight indicated significant risks associated with NIHL. The use of high-speed handpieces during clinical training increased the risk for NIHL, particularly with increased duration and frequency. Four articles reported on the awareness of noise exposure levels and associated risk for NIHL among students. Conclusion: The review suggested a risk of NIHL among dental students, particularly associated with cumulative noise exposure. However, awareness of NIHL among the students was poor; therefore, early identification, risk assessment, and awareness of the risks at undergraduate training are necessary for the active prevention of hearing loss. There is a need to encourage listening behaviors that promote awareness towards the prevention of NIHL among dental students.

BHAL-P-06: The prevalence of substance uses amongst 3rd year BCMP students at Wits

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Background: Substance use is defined as the selected use of substances including alcohol, tobacco products, drugs, inhalants, and any other substances that can be inhaled, consumed, injected, or otherwise absorbed with the possible effect of dependence or any other detrimental effects. University is a highly stressful environment not just including academic stress but also the pressure of transitioning from high school to first year and from pre-clinical to clinical years. People often turn to substances as a means of dealing with all these numerous factors which could in turn lead to potential dependence or other health related factors. Aims: There is a high prevalence of substance use amongst university students, therefore, the study aims to determine the prevalence of substance use and associated factors among third year Bachelor of Clinical Medical Practice (BCMP) students at the University of the Witwatersrand. Methods: A cross-sectional study design was used. Study population included third year BCMP students at the University of the Witwatersrand in their third year of study – registered in 2025. Random sampling technique was used and all eligible students were invited to participate Results/Findings The study achieved a response rate of 81%. Of the 44 participants, 27.27% males, 63.64% females, and 9.09% identified as non-binary. The majority of participants were female and predominantly within the 18–24-year age group. Substance use increased from 59.09% pre-university to 86.36% post-enrolment; alcohol and drug use risks were evident, with 50% reporting moderate stress and 50% high stress levels. Conclusion: , Implications Urgent targeted stress interventions may be necessary to avoid substance abuse amongst university students.

BHAL-P-07: An Integrated Pipeline Reveals A New Multi-target Therapeutic For Neurodegenerative Diseases.

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Background: Alzheimer’s disease (AD) is marked by cognitive decline, memory impairment, and progressive neurodegeneration. Molecularly, AD is understood through mitochondrial dysfunction, oxidative stress, neuroinflammation, metabolic dysregulation and Tau/Amyloid-β (Aβ) pathology. Despite extensive research, effective therapeutic options remain limited. CogniTivE was developed through a novel drug discovery pipeline that integrated molecular analysis, mathematical modelling, and chemical refinement. Subsequent in silico docking demonstrating strong binding affinity for a target protein involved in regulating several AD-associated processes. Aims: This study evaluated the neuroprotective and therapeutic potential of CogniTivE using in-vitro and in-vivo models, focusing on mechanistic and behavioural outcomes. Methods: U-87 MG astrocytic cells were exposed to H_2O_2-induced oxidative stress and treated with CogniTivE to assess inflammation,

mitochondrial dysfunction, metabolic and protein related changes. In vivo, 3xTg-AD mice received CogniTivE intranasally and underwent behavioural tests. Brain tissue was collected and analysed to assess molecular changes associated with CogniTivE administration. Results: In H_2O_2-treated astrocytic and neuronal cells, CogniTivE attenuated inflammation, improved mitochondrial function, reduced Aβ levels, and modulated cholesterol metabolism. In 3xTg-AD mice, CogniTivE reduced anxiety-like behaviour in marble burying and nestlet shredding assessments. Cognitive performance improved in the puzzle box and novel object recognition tests. CogniTivE also improved physiological outcomes, shown by enhanced glucose tolerance in the GTT, and improved motor coordination on the balance beam. Conclusion: CogniTivE demonstrated therapeutic potential by targeting a key transcription factor that modulated downstream AD-associated pathways. In vivo, enhanced cognitive performance and metabolic regulation in 3xTg-AD mice. These findings supported further investigation of CogniTivE and its target pathway as a novel therapeutic strategy for AD.

BHAL-P-08: Evaluating the neuroprotective potentials of hydroxybenzoic acid derivatives in a cellular model of Parkinson's disease.
BHSc alumni

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Background: Parkinson's disease (PD) is a progressive neurodegenerative disease marked by dopaminergic neuron loss in the substantia nigra, driven by neuroinflammation, oxidative stress, and protein aggregation. Current treatments target symptoms of the disease and are limited by long-term motor complications, necessitating alternative treatments. Hydroxybenzoic acids have been shown to possess anti-inflammatory and antioxidative abilities that may ameliorate PD pathophysiology. Aims: This study aims to investigate the neuroprotective effects of novel hydroxybenzoic acid (HBA) derivatives in an in vitro cellular model of PD using human neuroblastoma (SH-SY5Y) cells exposed to the neurotoxin MPP+. Methods: HBAs will be screened using MTT assays and trypan blue exclusion assays across various concentrations (10–100 uM) to identify non-cytotoxic HBA compounds and evaluate cell viability against MPP+-induced toxicity. Intracellular reactive oxygen species (ROS) and ATP levels will be quantified using cell-based assay kits. Mechanisms of neuroprotection will be determined via Western blotting and qPCR to assess changes in the expression of oxidative stress genes (NRF2), inflammatory markers (COX2, TNF-a, NF-κB), and indicators of apoptosis, autophagy, and endoplasmic reticulum stress. Results: Results: show that HBAs had minimal cytotoxicity on the cells as well as conferred neuroprotection when cells were exposed to MPP. Cells pre-treated with HBAs showed reduced intracellular ROS accumulation, preserved cellular ATP production, and suppressed pro-inflammatory and apoptotic pathways compared to cells treated with MPP+ alone. Conclusion: HBAs show potent neuroprotective properties in an MPP+-induced in vitro model of PD. These findings will provide vital insights into the molecular pathways of PD and may support the development of natural therapies to improve patient outcomes.

BHAL-P-09: Hypoxoside from African potato show neuroprotective potentials of in a cellular model of Parkinson's disease.
BHSc alumni

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Background: Parkinson's disease (PD) is a progressive neurodegenerative disease marked by dopaminergic neuron loss in the substantia nigra, driven by neuroinflammation, oxidative stress, and protein aggregation. Current treatments target symptoms of the disease and are limited by long-term motor complications, necessitating alternative treatments. Hypoxoside, the active ingredient in African potato, has been shown to possess anti-inflammatory and antioxidative abilities that may combat PD pathophysiology. Aims: To evaluate the neuroprotective potentials of African potato extract and hypoxoside in an in vitro model of PD. Aims: included MTT assays to determine neuroprotective effects, as well as light and fluorescent microscopy to determine cellular and nuclear morphological changes. Methods: Human neuroblastoma cells (SH-SY5Y) were used as the dopaminergic model. Cytotoxicity was evaluated using MTT assays across various concentrations (10–100 ug/mL). For neuroprotection, cells were pre-treated with the extracts for 2 hours before 24-hour exposure to MPP+. Cellular and nuclear morphological changes were assessed via light microscopy and Propidium Iodide /Hoechst fluorescent dual-staining. Results: Neither treatment exhibited baseline cytotoxicity, except for 100 ug/mL hypoxoside. Pre-treatment with hypoxoside (10 a 20 ug/mL) or African potato extract (10 and 80 ug/mL) significantly counteracted MPP+-induced cytotoxicity, increasing cell viability from 40% to over 70%. Furthermore, both treatments preserved cell body size, maintained neurite networks, significantly lowered PI fluorescence, and prevented chromatin condensation and nuclear distortion. Conclusion: African potato extract and hypoxoside show potent neuroprotective properties in an MPP+-induced in vitro model of PD. These findings support the potential use of African potato and hypoxoside for the development of therapeutic drugs that may delay PD progression

BHAL-P-10: Rescuing Cognitive Performance from Sleep Debt: A Systematic Review of Creatine Supplementation

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Background: Sleep deprivation impairs executive function, attention, psychomotor vigilance, and motor performance through disruption of cerebral energy homeostasis. Creatine supplementation may mitigate these effects by enhancing phosphocreatine availability and supporting adenosine triphosphate regeneration during periods of increased metabolic demand. Methods: A systematic search of PubMed, Scopus, and Web of Science was conducted from database inception to June 2026. Randomized controlled trials evaluating creatine supplementation in sleep-deprived adults were eligible for inclusion. Data extraction and risk of bias assessment were performed independently by two reviewers. Results: Six randomized controlled trials involving healthy adults and elite athletes met the inclusion criteria. Acute weight-based creatine supplementation improved logical reasoning, numerical processing, language processing speed, and psychomotor vigilance during sleep deprivation. Neuroimaging studies demonstrated preservation of cerebral high-energy phosphate metabolism, reduced hemispheric metabolic asymmetry, and increased phosphocreatine availability following creatine administration. Traditional loading protocols also improved aspects of executive function, although effects on simple reaction time were less consistent. In athletic populations, creatine prevented deterioration in motor skill execution during sleep loss. Three studies were assessed as low risk of bias, while three were judged to have some concerns. Conclusion: Creatine supplementation appears to attenuate cognitive and motor performance deficits associated with acute sleep deprivation, likely through preservation of cerebral bioenergetics. Although the available evidence is promising, larger trials using operational sleep restriction models are required to confirm efficacy and establish optimal dosing strategies.

BHAL-P-11: Psychometric Validation of a Mental Health Literacy Scale Among University Students in South Africa

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Background: Mental health literacy (MHL) is essential for the early recognition of mental health problems, appropriate help-seeking, and engagement in preventive behaviours. However, there is limited evidence on the validation of mental health literacy measures in African university settings. Aims: To investigate the psychometric properties of a Mental Health Literacy Scale and describe mental health literacy levels among university students in South Africa. Methods: A cross-sectional survey was conducted among 383 registered students in South African public university. The initial 16-item MHL Scale was assessed using exploratory factor analysis, confirmatory factor analysis, and internal consistency reliability. Model fit was evaluated using the chi-square statistic (χ^2), Root Mean Square Error of Approximation (RMSEA), Standardised Root Mean Square Residual (SRMR), Comparative Fit Index (CFI), and Tucker-Lewis Index (TLI). MHL domain and overall scores were summarised using descriptive statistics. Results: The final model demonstrated good construct validity ($\chi^2/df = 1.85$, RMSEA = 0.048, SRMR = 0.065, CFI = 0.934, TLI = 0.918) and acceptable internal consistency (Cronbach's $\alpha = 0.68$). Students reported high mental health literacy (mean = 4.48, SD = 0.33). The highest scores were observed for erroneous beliefs and stereotypes (mean = 4.69, SD = 0.46), while help-seeking recorded the lowest mean score (3.91, SD = 0.77). Conclusion: The validated 15-item Mental Health Literacy Scale offers a reliable measure of mental health literacy among university students. Despite high overall literacy levels, help-seeking remained the lowest. The findings imply that improving knowledge alone may not enhance help-seeking, hence, the need for a personalised AI chatbot to promote mental health literacy.

BHAL-P-12: Social reintegration after stroke in Africa: A scoping review of determinants and intervention gaps

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Background: Stroke is a leading cause of disability in Africa, and increasing survival has shifted attention towards long-term functioning and participation. However, limited evidence synthesis exists on how social reintegration after stroke is conceptualised, experienced, and supported across African settings. Aims: To map the extent and nature of evidence on social reintegration after stroke in Africa, with a focus on determinants and intervention gaps. Methods: A scoping review was conducted according to Joanna Briggs Institute (JBI) methodology and reported using PRISMA-ScR guidelines. Electronic databases and selected grey literature sources were searched for studies published between 2000 and 2025. Eligible studies included adults (≥18 years) with stroke in African settings that reported on social reintegration, determinants, or interventions. Data were charted and synthesised descriptively using the International Classification of Functioning, Disability and Health as a conceptual framework. Results: A total of 320 records were identified, of which 135 duplicates were removed. Following screening of 185 titles and abstracts and full-text review, eight studies met the inclusion criteria. Evidence was heterogeneous and predominantly descriptive. Studies using validated reintegration measures reported persistent participation restrictions across work, family and social domains. Common determinants included environmental barriers, economic vulnerability, stigma and depression. Only one study described a structured community-based support initiative. Conclusion: Social reintegration after stroke in African contexts remains under-researched and inadequately supported, with few evaluated interventions addressing participation outcomes. The findings highlight important gaps in participation-focused stroke rehabilitation and demonstrate the need for contextually relevant interventions and health system strategies that address social reintegration and promote disability inclusion across African settings

BHAL-P-13: Evaluating the neuroprotective potentials of molecular inclusion complexes of hydroxybenzoic acid derivatives in a cellular model of hydrogen peroxide-induced neurotoxicity.
BHSc alumni

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Background: Neurodegenerative diseases are characterised by progressive neuronal loss driven by several mechanisms, including but not limited to oxidative stress and inflammation. Although hydroxybenzoic acid derivatives (HBAs) possess antioxidant and neuroprotective properties, their therapeutic application may be limited by poor physicochemical characteristics, including low solubility and bioavailability. To overcome this, hydroxypropyl-β-cyclodextrin (HP-β-CD) inclusion complexation has the potential to improve these properties and further enhance biological activity. Aims: To investigate the neuroprotective effects of HP-β-CD inclusion complexes of hydroxybenzoic acid derivatives against hydrogen peroxide(H_2O_2)-induced oxidative stress in SH-SY5Y neuroblastoma cells, which have been validated as models for neurodegeneration research. Methods: Inclusion complexes were prepared and characterised using phase-solubility analysis, electrospray ionisation tandem mass spectrometry, and scanning electron microscopy, enabling the confirmation of inclusion complex formation. Chemical antioxidant activity was evaluated using the oxygen radical absorbance capacity assay. Furthermore, the neuroprotective potential of free and encapsulated HBAs was assessed in SH-SY5Y cells following H_2O_2 treatment using MTT assays for cell viability. Followed by quantification of intracellular reactive oxygen species levels using the 2',7'-dichlorodihydrofluorescein diacetate assay, assessment of mitochondrial function, changes in antioxidant and inflammatory markers, and assessment of caspase-3/7 activity. Results: Results show that inclusion complexation improves the physicochemical properties of HBAs while potentiating their antioxidant and neuroprotective efficacy. Conclusion: HP-β-CD inclusion complexation enhanced physicochemical properties, antioxidant capacity, and neuroprotective effects of hydroxybenzoic acid derivatives against H_2O_2-induced oxidative stress in SH-SY5Y cells. These findings suggest that cyclodextrin-based delivery may enhance the therapeutic potential of hydroxybenzoic acid derivatives as candidates for preventing or slowing the progression of neurodegenerative diseases.

BHAL-P-14: Investigating the effects of neuroinflammation on L-DOPA induced molecular and cerebrovascular changes in a rodent model
BHSc alumni

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Background: Patients with Parkinson's disease (PD) are typically treated chronically with levodopa (L-DOPA), the most effective therapy for alleviating the motor symptoms of the disease. However, prolonged L-DOPA treatment is frequently associated with the development of L-DOPA-induced dyskinesia (LID). Emerging evidence suggests that neuroinflammation contributes to the pathogenesis of LID by promoting blood–brain barrier (BBB) disruption and cerebrovascular dysfunction. The molecular mechanisms underlying these pathological changes remain poorly understood. Aims: To investigate the contribution of neuroinflammation to L-DOPA-induced molecular and cerebrovascular changes associated with dyskinesia in an in vivo rat model. Methods: Male and female Sprague-Dawley rats were allocated to four treatment groups: saline control, lipopolysaccharide (LPS), L-DOPA/benserazide, and combined LPS plus L-DOPA/benserazide. Dyskinetic behaviour was assessed using the abnormal involuntary movements (AIMs) scale. Gene expression was quantified using qPCR. Mass spectrometry imaging was done for spatial metabolomic analyses of brain tissue. Results: LPS administration increased the expression of markers associated with endothelial dysfunction and neuroinflammation. Combined LPS and L-DOPA/benserazide treatment resulted in elevated markers of endothelial dysfunction and angiogenesis compared with control animals. Conclusion: Neuroinflammation is associated with molecular changes linked to endothelial dysfunction and angiogenic signalling in this model. These findings suggest that neuroinflammation may contribute to cerebrovascular and molecular changes associated with L-DOPA induced dyskinesia. The present study provides insight into the neuroinflammatory contribution in the development of L-DOPA induced dyskinesia. Therefore, targeting neuroinflammatory pathways in the management of L-DOPA induced dyskinesia may enhance long-term outcomes for patients with dyskinesia.

BHAL-P-15: Experiences and perspectives of caregivers of individuals with a Huntington disease phenotype in South Africa: A qualitative study
BHSc alumni

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Background: Huntington disease (HD) is a rare adult onset genetic disorder characterized by progressive neurodegeneration associated with progressive cognitive, psychiatric, and motor deterioration. Due to the progressive nature of these conditions,

affected individuals often require full time care which is often provided by family members. Despite the significant burden placed on caregivers, their needs are frequently overlooked. While several studies have investigated the caregiving experience in middle- and high-income countries, there is a paucity of research examining caregiver experiences in low- and middle-income contexts such as South Africa. Aims: This study aims to explore the subjective experiences of caregivers of individuals living with HD, including their perspectives of the disease and the challenges they face in a low-to-middle income setting. Methods: Adopting an interpretivist paradigm, the study employs a qualitative methodology. Purposive sampling will be used to recruit 5-10 participants through the Division of Human Genetics REDCap at the National Health Laboratory Services, South Africa. Semi-structured interviews will be conducted with caregivers of individuals diagnosed with HD, guided by open ended questions. Data will be analysed using reflexive thematic analysis, with coding to identify and evaluate themes. Results: Data collection is currently ongoing, and preliminary findings are expected by September 2026. By investigating the lived experiences of caregivers, this research will address an important gap in the South African literature. These findings may contribute to the evidence base on HD caregiving in resource-limited contexts and provide valuable insights into the needs and challenges of family caregivers.

BHAL-P-16: Use of neurocognitive screening tools amongst people with HIV infection in Johannesburg, South Africa

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Background: HIV-associated neurocognitive disorder (HAND) remains prevalent in the post antiretroviral therapy (ART) era, with milder forms now predominating. There is now a shift away from universal screening however, current practices at the district health system (DHS) level are poorly described. Aims: To evaluate neurocognitive screening perceptions, practices, tool awareness and barriers among doctors working within the Johannesburg DHS. Community clinics within sub-districts D and G, Johannesburg. Methods: A cross-sectional, descriptive study using a self-administered questionnaire distributed to 150 doctors, of whom 53 responded. Results: Participants were primarily intern doctors (67.9%). Most endorsed screening as important, yet only 21% conducted it in practice. Awareness was highest for the MMSE (94%), followed by the MoCA (76%), IHDS (40%), and the CAT-Rapid (15%). Among those who screened, 64% used the MMSE and 18% used the IHDS. Screening was predominantly symptom driven. The commonest barriers were lack of time (84.9%), language barriers (62.3%), and lack of expertise (60.4%). Conclusion: A significant attitude-practice gap exists among DHS doctors regarding neurocognitive screening for HAND. Awareness of validated, time-efficient, and locally appropriate tools such as the IHDS and CAT-Rapid was notable low. Targeted training may meaningfully reduce barriers to screening at DHS level. This study characterises neurocognitive screening practices, attitudes, and barriers among doctors within a Johannesburg DHS, highlighting the need for updated guidelines and contextually appropriate training to improve identification of neurocognitive impairment in the post-ART era.

BHAL-P-17: Contraceptive Use and Mental Health Among Female University Students: A Cross-Sectional Study

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Background: Hormonal contraceptives have been associated with adverse mental health outcomes, including depression, anxiety, and psychological distress, although evidence remains inconsistent. Aims: This study aimed to determine whether the use of different contraceptive methods is associated with symptoms of depression, anxiety, and perceived stress among female undergraduate students. Methods: A cross-sectional study was conducted among 246 undergraduate students in the Faculty of Health Sciences at the University of the Witwatersrand, Johannesburg. Participants completed an electronic questionnaire incorporating the Patient Health Questionnaire-9 (PHQ-9), Generalized Anxiety Disorder-7 (GAD-7), and Perceived Stress Scale-4 (PSS-4). Data from 199 participants with complete contraceptive information were analyzed using descriptive statistics, independent t-tests, Mann-Whitney U tests, and ANCOVA adjusting for age. Results: No significant differences in depression, anxiety, or perceived stress were observed between contraceptive users and non-users. Oral contraceptive users reported higher depression, anxiety, and perceived stress scores than users of most other contraceptive methods, although these differences were not statistically significant. Implant users reported significantly higher depression scores than hormonal intrauterine device users. Single participants and those residing in university residences reported significantly higher psychological distress than participants in relationships and those living with their families. Conclusion: Mental health outcomes appeared to be more strongly associated with social and environmental factors than contraceptive use in this cohort. Although oral contraceptive users tended to report higher symptom scores, the cross-sectional design precludes causal inference. Longitudinal studies involving larger, representative populations are needed to clarify the relationship between contraceptive use and mental health and to inform evidence-based contraceptive counseling.

BHAL-P-18: RNU4-2 variation in African patients with an unexplained neurodevelopmental disorder

BHSc alumni

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Background: Whole-genome sequencing analyses recently identified pathogenic variants clustered within an 18-base-pair critical region of the non-coding RNA U4 Small Nuclear 2 (RNU4-2) gene as the cause of ReNU syndrome, a newly recognised autosomal dominant neurodevelopmental disorder (NDD). Additionally, variants outside of the critical region were identified to cause a rarer autosomal recessive NDD. These recent discoveries highlight how clinically relevant non-coding variants may be missed by traditional genomic testing approaches, which have previously focused on protein-coding regions. ReNU syndrome is now estimated to be among the most prevalent causes of monogenic NDD. To date, no studies investigating variants in this gene have been conducted in an African population. Aims: This study aims to assess the contribution of RNU4-2 variation to unexplained NDD in African patients. Methodology: Patients of African ancestry presenting with a phenotype suggestive of RNU4-2-related NDD will be selected for inclusion (n = 50). De-identified residual diagnostic DNA samples will be analysed using a previously designed RNU4-2 Sanger sequencing assay, which will be validated utilising in silico tools. Variant interpretation will primarily utilise the current literature on RNU4-2-related NDD, as well as the American College of Medical Genetics and Genomics and the Association for Molecular Pathology (ACMG/AMP) guidelines adapted for non-coding genomic regions. Results: The identification of novel variants is expected, given the increased genetic diversity in individuals of African ancestry. Conclusion: This study will provide the first characterisation of RNU4-2 variation in an African NDD cohort. The findings may support the diagnosis of unresolved patients and contribute African data to the field.

BHAL-P-19: Establishing a neuronal model to investigate the antimicrobial protection hypothesis of Alzheimer's disease.
BHSc alumni

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Background: The antimicrobial protection hypothesis of Alzheimer's disease (AD) proposes that amyloid-β (Aβ) acts as an innate immune peptide, and that its accumulation reflects a maladaptive neuronal response to microbial stimuli. Testing this idea requires a human neuronal model that expresses and localises Aβ and its precursor protein (APP). Aims: To establish a differentiated SH-SY5Y model and confirm that Aβ and APP can be visualised by immunofluorescence following differentiation. Methods: SH-SY5Y cells were differentiated using a sequential retinoic acid and brain-derived neurotrophic factor protocol. Expression of Aβ and APP was then assessed by immunofluorescence microscopy. Results: Differentiation treatment produced neuron-like morphology with neurite outgrowth and network formation. Immunofluorescence detected both Aβ and APP in differentiated cells above secondary-only background, confirming that the model expresses the proteins needed to interrogate the hypothesis. Together, these findings validate the SH-SY5Y model as a human neuronal system expressing both proteins required to test the antimicrobial protection hypothesis of AD. Conclusion: A differentiated SH-SY5Y model that expresses and visualises Aβ and APP has been established. This model can interrogate the relationship between microbial stimuli and amyloid biology, providing a validated human neuronal system to directly investigate the antimicrobial protection hypothesis of AD.

BHAL-P-20: Food insecurity, dietary inflammatory index and psychological distress in middle-aged Black South African women

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Background: Food insecurity is a major public health concern in South Africa and is associated with poor diet quality and increased dietary inflammatory potential, both linked to adverse mental health outcomes, including psychological distress. Aims: To examine the associations of food insecurity and dietary inflammatory potential with psychological distress in middle-aged Black South African women remains unclear. Methods: In this cross-sectional study, 221 middle-aged Black South African women (median age: 54 years) were included. Food insecurity was assessed using the Household Food Insecurity Access Scale was, and energy-adjusted Dietary Inflammatory Index (E-DII) derived from a 7-day food frequency questionnaire. Psychological distress was measured using the 28-item General health Questionnaire. Multivariable quantile regression models examined the independent associations of food insecurity and E-DII with psychological distress after adjustment for age, employment status, visceral adipose tissue (VAT), and menopausal status. Results: Across increasing tertiles of psychological distress, age, VAT, and food insecurity, and the proportion of peri- and postmenopausal women increased significantly, whereas employment status decreased (all p-trend < 0.05). Mean E-DII scores also increased from -0.5 to -0.2 (p trend= 0.042), indicating more pro-inflammatory diets. In unadjusted analyses, both E-DII (β= 1.482; 95% CI= 0.549-2.417; p=0.002) and food insecurity (β=0.364; 95% CI: 0.220-0.507; p<0.0001) were positively associated with psychological distress but were not associated with each other. After adjustment, only food insecurity remained independently associated with psychological distress (p <0.0001). Conclusion: Although both food insecurity and dietary inflammatory potential were associated with psychological distress in unadjusted models, only food insecurity remained independently associated. These findings highlight the importance of addressing food insecurity as

BHAL-P-21: Preliminary Findings on Obestatin's Neuroprotective Role in Adolescent Alcohol Induced Prefrontal Cortex Changes
BHSc alumni

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Background: Adolescent alcohol consumption remains a significant public health concern in South Africa and is associated with numerous adverse neurological outcomes. During adolescence, the prefrontal cortex undergoes critical structural and functional maturation, making it particularly vulnerable to the effects of alcohol exposure. Alcohol-induced neuroinflammation and oxidative stress have been implicated in neurodevelopmental impairment, while anti-inflammatory peptides such as obestatin have emerged as potential neuroprotective agents. Aims: This study investigated the effects of obestatin on alcohol-induced neuroinflammation and oxidative stress in the prefrontal cortex of adolescent C57BL/6J mice. Methods: Fifty (n = 50) adolescent C57BL/6J mice were allocated to control, alcohol-only, obestatin-only, and combined alcohol-obestatin treatment groups. Prefrontal cortex tissue samples were collected for analysis of neuroinflammatory and neurotrophic markers, including allograft inflammatory factor 1 (AIF1), interleukin-1 beta (IL-1β), and brain-derived neurotrophic factor (BDNF), using quantitative real-time polymerase chain reaction (qRT-PCR). Oxidative stress status was evaluated by measuring superoxide dismutase (SOD), malondialdehyde (MDA), and glutathione peroxidase (GSH-Px) activity. Statistical analyses were performed using one-way ANOVA or Kruskal–Wallis tests, with significance set at $p < 0.05$. Results: No statistically significant differences were detected in the relative gene expression of AIF1, IL-1β, or BDNF among the treatment groups, but AIF1 was expressed in higher levels than IL-1β. Similarly, MDA, SOD and GSH-Px activities did not differ significantly across groups. Conclusion: While these findings do not support a pronounced neuroprotective effect of obestatin, the study remains ongoing, and further analyses with expanded datasets may provide additional insight into the neurobiological consequences of adolescent alcohol exposure. alcohol-induced brain damage in adolescence is evidently complex.

BHAL-P-22: Investigating the methylation patterns of CXCR4 and SLC2A1 in an in-vitro schizophrenic model and the implications of iso-mukaadial acetate's potential anti-inflammatory properties

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Background: Schizophrenia and type 2 diabetes mellitus (T2DM) are distinct disorders that share inflammatory, genetic, and metabolic mechanisms. GLUT1, a membrane-bound protein encoded by the SLC2A1 gene, facilitates glucose uptake into cells across the blood-brain barrier (BBB). CXCR4 encodes a receptor that regulates inflammatory signalling. DNA methylation regulates gene expression. Iso-mukaadial acetate (IMA), a drimane sesquiterpene, shows anti-inflammatory and anti-diabetic properties. This study investigated neuroinflammation, gene methylation of SLC2A1 and CXCR4, and the effect of IMA in an in vitro model using the neuroblastoma cell line SH-SY5Y. Methods: SH-SY5Ys were stimulated with lipopolysaccharide or dizocilpine to induce neuroinflammation or dysregulated NMDA receptors. Stimulated fully differentiated cells were treated with IMA Fluorescence microscopy assessed cellular morphological changes. Interleukin-6 was measured using an enzyme-linked immunosorbent assay (ELISA). Methylation of SLC2A1 and CXCR4 was assessed using OneStep PLUS qMethyl PCR assays. Results: Fluorescence microscopy demonstrated that fully differentiated SH-SY5Y cells exhibited extensive neurite networks, which were reduced after single and dual hit stimulation. No significant differences in CXCR4 methylation were observed in undifferentiated or partially differentiated single-hit groups. However, a potential differential increase in the methylation might be observed in LPS-dizocilpine dual-hit treatment from fully differentiated cells. IMA is predicted to stabilise cell death. Conclusion: These findings lay the foundation for understanding the molecular basis of neuropsychiatric diseases and their shared pathophysiology with metabolic diseases like T2DM. Methylation contributes to dysregulated expression of SLC2A1 and CXCR4, leading to dysfunctional neuroinflammation and glucose metabolism. IMA shows some therapeutic potential for stabilising cell death, though further robust investigation is needed.

BHAL-P-23: Longitudinal Changes in Self-reported Sleep Characteristics According to HIV Status in Older Adults Living in Rural South Africa
BHSc alumni

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Background: Poor sleep is reported by people living with HIV (PLWH) and during healthy ageing. However, the evolution of sleep characteristics during ageing in PLWH remains understudied. Aims: /Objective: To investigate the association between self-reported sleep characteristics and HIV status over time in older adults living in rural South Africa. Methods: This is a sub-analysis of the 2014 (n=5059) and 2021 wave (n=3707) of the 'Health and Ageing in Africa: a Longitudinal Study on an INDEPTH Community in South Africa' (HAALSI). We collected HIV status, self-reported sleep quality, duration, bedtimes

and wake times in adults ≥ 40 years. Analysis was restricted to participants with known HIV status in both waves (n=2955, 36.1% PLWH). Results: Overall, mean (SD) age at baseline was 62.4 (12.8) years; 53% were female, with no significant difference in age and sex distribution in PLWH compared to PLWOH. Sleep data was missing for 653 individuals (n(PLWH) = 367). Poor sleep quality increased from 5.8% (2014) to 11.6% (2021) in PLWH ($p<0.001$) and from 5.9% to 14.9% in PLWOH ($p< 0.001$). In 2014 and 2021, PLWH and PLWOH had comparable bed/wake times and sleep duration (unpaired t-tests, all $p>0.05$). For the cohort, we found a delay in average (SD) bedtime (2014: 20:46 (01:19); 2021: 20:56 (01:02); $p=0.005$), wake time (2014: 05:27 (01:10); 2021: 06:02 (01:08); $p<0.001$), and longer sleep duration (2014: 8.2h (1.9); 2021: 8.6h (1.5); $p<0.001$). Conclusion: /Implication: PLWH and PLWOH had similar sleep characteristics in 2014 and 2021. Overall, the cohort reported higher prevalence of poor sleep quality, delays in sleep-wake timing and longer sleep duration with ageing.

BHAL-P-24: The neural connections of the nervus intermedius with the facial and vestibulocochlear nerves.

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Background: The nervus intermedius (NI) is the sensory and parasympathetic root of the facial nerve (FN). It emerges from the brainstem at the cerebellopontine angle (CPA), accompanying the facial motor root and vestibulocochlear nerve (VCN) through the internal acoustic meatus (IAM), and unites with the motor root in the facial canal. Owing to their proximity, previous studies have documented neural connections between them. However, most studies refer to the FN as a single complex, overlooking the NI. Understanding these connections may help explain symptoms of FN stimulation in cochlear implant recipients. Aims: This study aimed to investigate the incidence of neural connections between the nervus intermedius, facial and the vestibulocochlear nerves. Methods: This study examined 103 embalmed human donors (53 females, 50 males) bequeathed to the Department of Anatomical Sciences, University of the Witwatersrand (Ethics#: W-CBP-220504-01). Observations included the origin of the NI at the CPA and its neural connections with the FN and VCN at the CPA and IAM. Statistical analyses were performed to assess sex and side differences. Results: The NI was identified in 77 of the cases, most commonly originating from the brainstem. At the CPA, neural connections were frequently observed with the VCN (n=21; 38%) or in combination with the FN (n=17 cases, 30%). Within the IAM, the NI formed connections with both the FN and VCN in 28 cases (31%). No significant sex differences were found ($p > 0.05$). Conclusion: These findings add to the anatomical understanding of the NI, supporting safer CPA surgery by reducing the risk of unintentional nerve damage and improving surgical

BHAL-P-25: Temporal and regional effects of cannabidiol on markers of oxidative stress, apoptosis and associated lipid abundance in the rodent brain

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Background: Mitochondrial dysfunction, oxidative stress, and apoptotic dysregulation are key processes underlying neurodegeneration. Cannabidiol (CBD) has shown therapeutic potential in modulating these pathways, but its effects on lipid metabolism and cell survival signalling in the brain remain poorly understood. Aims: This study investigated the effects of acute and chronic CBD administration on oxidative stress, apoptosis, and lipid metabolism in a healthy rodent model. Methods: Male Sprague-Dawley rats (n = 40) received either saline or CBD (10 mg/kg, i.p.) as acute or chronic treatments. Oxidative stress and apoptotic signalling were assessed by measuring Sod2, Tp53, Bax, and Bcl2 gene expression, while spatial lipid alterations were evaluated using matrix-assisted laser desorption/ionisation mass spectrometry imaging (MALDI-MSI). Results: CBD produced distinct time-dependent molecular responses. Acute CBD administration promoted a pro-oxidative and pro-apoptotic profile, characterised by reduced antioxidant gene expression and increased apoptotic signalling. In contrast, chronic CBD induced a more adaptive molecular profile, with attenuation of apoptotic signalling and partial normalisation of oxidative stress markers. Lipidomic analysis demonstrated consistent alterations in sphingolipid metabolism following CBD treatment, including increased ceramide abundance after both acute and chronic administration, while glucosylceramide increased only following acute exposure. Conclusion: CBD exerts differential acute and chronic effects on oxidative stress, apoptotic signalling, and sphingolipid metabolism in the healthy brain. These findings highlight the importance of treatment duration when evaluating the biological effects of CBD and provide further insight into its influence on cellular stress and lipid homeostasis.

TRACK 4: DIGITAL HEALTH, INNOVATION & ETHICAL USE OF AI IN HEALTH SYSTEMS

ORAL PRESENTATIONS (18)

DHIEU-O-01: AI at the bedside: Randomised controlled trial of ChatGPT's impact on student performance in real-patient clinical exams.

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Background: Artificial intelligence (AI), particularly large language models like ChatGPT, is rapidly entering clinical education, yet its real-world impact on bedside clinical performance remains unclear. Evidence from authentic, patient-facing settings is limited. Aims: To determine whether allowing Wits final-year medical students to use ChatGPT during real-patient bedside assessments improves clinical performance. Methods: We conducted a randomised controlled trial across four Wits academic hospitals. Final-year students were allocated (2:1) to either use ChatGPT during a 30-minute patient encounter or complete the assessment without digital aids. Performance was scored using a standard rubric covering history, examination, diagnosis, and management. Analyses adjusted for prior academic performance and site. Results: Seventy-three students participated (49 ChatGPT; 24 control). Overall clinical performance did not differ significantly between groups (66.7 vs 68.2; adjusted p=0.21). No meaningful differences were observed across clinical domains. ChatGPT use patterns were not associated with improved scores. Although most students found ChatGPT helpful, particularly for differential diagnosis and management, 37% reported distraction. Patients were highly accepting of its use. Prior academic performance, not AI access, predicted outcomes. Conclusion: Access to ChatGPT during bedside assessments, with minimal training, does not improve clinical performance. AI alone is not a shortcut to competence. AI can support, but not replace, clinical reasoning. Effective integration requires structured training, clear workflows, and assessment methods that evaluate AI-augmented thinking. This study highlights an exciting opportunity: not whether to use AI in medical education, but how to use it well

DHIEU-O-02: Leveraging Wastewater Environmental Surveillance and Socio-economic Survey Data in a Machine Learning Environment to Identify Hepatitis A Risk Communities in Gauteng Province, South Africa

Fiona Els*, *Yashena Naidoo, Gillian Maree, Nkosenhle Ndlovu, Victor Mabasa, Rixongile Malomane, Emmanuel Phalane, Natasha Singh, Mukhlid Yousif, Laven Naidoo, Kerrigan McCarthy*

*School of Public Health

Background: Wastewater-environmental surveillance (WES) has emerged as a powerful pathogen surveillance tool in South Africa, including for Hepatitis A virus (HAV), which is a pathogen transmitted primarily through faecal-oral routes that is predominantly asymptomatic, though severe cases can result in acute liver failure requiring transplantation. WES is sampling intensive and requires spatial modelling to extend its utility to unsampled areas. Aims: Determine the role of WES in identifying communities at elevated risk for HAV exposure using machine learning, incorporating clinical cases, viral concentrations in wastewater, and socio-economic data from the Quality of Life Survey 7 (March 2024–March 2026) in Gauteng. Methods: HAV concentrations were monitored across nine sewersheds. Mean wastewater concentrations were analysed alongside socio-economic and demographic variables using six machine learning algorithms with bootstrapping. Model performance was evaluated using correlation coefficient, root mean square error (RMSE), and relative RMSE, with the best-performing algorithm applied to predict HAV concentrations in unsampled areas. Results: WES, survey data, and machine learning enabled prediction of HAV concentrations at a granular spatial scale in areas without existing wastewater monitoring. Gaussian Process Regression demonstrated the best predictive performance (r=0.98; RMSE=0.65 gc/µl; relative RMSE=8.17%). Ward-level spatial projections across Gauteng revealed elevated HAV concentrations (4.75–7.88 genome copies per microliter) in areas with high informality and lower socio-economic status, compared to more affluent areas (0–1.42 gc/µl). Conclusion: These findings demonstrate the potential of integrating WES with predictive modelling to fill critical surveillance gaps and identify communities at higher HAV exposure risk, enabling targeted public health interventions including vaccination campaigns.

DHIEU-O-03: Between promise and practice: mapping the implementation of digital health technologies in five sentinel district hospitals in South Africa

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*South African Research Chairs Initiative of Professor Laetitia Rispel, School of Public Health

Background: Digital health technologies (DHTs) are widely promoted as enablers of health systems strengthening in low and-middle-income countries. However, evidence on their routine implementation in district hospitals remains limited. Aims: This study examined the implementation of DHTs in five South African district hospitals. Methods: During 2025, a health facility assessment was conducted in five district hospitals across five South African provinces. We combined interviews with hospital management with a structured checklist and walk around to map infrastructure, equipment, staffing and DHT implementation in each clinical unit. The WHO Health System Building Blocks framework guided the analysis. Results: DHT implementation

varied substantially across hospitals. All hospitals were using a digitised health information system for patient registration, but weak IT systems and budgetary constraints limited expansion to medical records. Although one hospital implemented an electronic medical record system, roll out was halted due to logistical constraints and staff resistance. Four hospitals had digital X ray units, but only two digitally stored medical images. Stock management software was implemented in all pharmacies, yet only two used it for medication dispensing. The use of mobile applications was widespread across all hospitals to process lab results, coordinate referrals, and access clinical guidelines. However, the extent of their integration in routine practice varied. WhatsApp remained ubiquitous as informal "shadow" information system. Persistent barriers for DHT implementation included inadequate financing, limited IT support, outdated hardware and fragmented governance structures. Conclusion: DHTs hold significant promise but remain fragmented, and unevenly and largely informally implemented. Strengthening leadership, financing, infrastructure and systems integration are essential for meaningful digital transformation.

DHIEU-O-04: AI Can Match Domain Experts in Evidence Extraction and Appraisal of Microbial Oncogenesis Research

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Background: Confirmed oncogenic microbes contribute significantly to cancer burden. Identifying novel microbial carcinogens could inform cancer prevention; however, manual comprehensive review of the vast biomedical literature is infeasible. Large Language Models (LLMs) may enable scalable, expert-level evidence synthesis, although this capability has not yet been demonstrated. Aims: To compare pre-trained LLMs' ability to evaluate research papers using a structured questionnaire and benchmark their assessments against biomedical experts. Methods: We devised a structured template for evidence extraction and appraisal of papers, consisting of multiple choice, Likert-scale, multi-select, and free-text question types, and collected 24 original research papers on Mouse Mammary Tumour Virus-Like Virus and breast cancer (77 question items across 24 papers). Domain experts created a human-validated benchmark dataset. Four LLMs (Gemini 2.5 Pro, Gemini 2.5 Flash, GPT-5, and GPT-5 Nano) were evaluated. Agreement between (1) experts, and (2) experts and each LLM, was determined per question instance using novel scoring metrics. LLMs were assessed by comparing agreement score distributions, with further qualitative evaluation of free-text responses. Results: LLM responses aligned closely with expert assessments. GPT-5 and GPT-5 Nano achieved agreement score distributions statistically indistinguishable from experts. Gemini models behaved similarly but applied microbial oncogenesis criteria more leniently. Hallucinations were rare but more frequent in smaller models. Methodological appraisal and contradiction identification within full-texts were the most persistent areas of LLM vulnerability. Conclusion: GPT-5 and GPT-5 Nano were indistinguishable from domain experts on structured research paper evaluation tasks. This supports use of LLMs for automated systematic evidence synthesis while highlighting methodological appraisal and contradiction identification as areas for further improvement.

DHIEU-O-05: Evaluating multimodal large language model diagnostic performance at a tertiary South African hospital

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Background: Large language models (LLMs) are increasingly proposed for diagnostic decision support, but few evaluations use multimodal data from low- and middle-income country (LMIC) hospitals. Methods: VALID was a retrospective diagnostic-accuracy study of 539 cases from a South African public hospital. Multimodal inputs included radiology images and reports, laboratory results, and documented clinical presentations. Expert panels adjudicated 300 cases, establishing reference diagnoses, differential diagnoses, and clinical reasoning. Ten leading multimodal LLMs generated zero-shot, closed-book outputs. A three-model expert panel-calibrated LLM Jury scored LLM outputs and ward-documented diagnoses against the expert standards for diagnostic accuracy, differential diagnosis quality, reasoning, and patient-safety impact, producing >10,000 evaluations. Senior panels reviewed 20 disputed cases. Primary outcomes were weighted composite scores and case-level win rates. Results: LLM performance was tightly clustered, with <15% relative score variation despite a 50-fold cost range. GPT-5 Mini was within 5% of the top model at US$0.02 per case. Compared to the ward-documented diagnoses, the LLMs aligned more with the reference standard on diagnostic and treatment safety. GPT-5.1 ranked highest, followed by Gemini2.5 Pro and Gemini3Pro. Senior adjudication of disputed cases suggests that LLMs are reaching the level of expert panels. Diagnosis completion ranged from 65% to 100%, reflecting image-context limits of different providers. Conclusion: Multimodal LLM diagnostic performance was largely decoupled from cost. All models achieved higher diagnosis and safety scores than the ward-documented diagnoses; the ultimate reason for this is unclear at present. Cost, input limits, robustness, and governance may outweigh marginal performance differences in deploying LLMs in LMIC hospitals.

DHIEU-O-06: We Have Failed Persons with Spinal Cord Injury - A Scoping Review of Registries

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*School of Therapeutic Sciences

Background: Spinal cord injury (SCI) causes lifelong disability with significant personal and societal consequences. High-quality data are essential to monitor outcomes, guide resource allocation, and support evidence-based care. Although registries are central to these aims, no global synthesis of established SCI registries exists. Understanding their structure, scope, and reporting practices is essential to identify similarities, gaps, and opportunities for standardisation, particularly to support registry development in low- and middle-income countries (LMICs) in line with the World Health Organization's Rehabilitation 2030 Call to Action. Inclusion criteria: Sources describing established SCI registries in healthcare settings worldwide were included. All human populations and study designs were eligible, except publications from support, research, or working groups. Peer-reviewed and grey literature were included without language or publication date restrictions. Registries under development and papers advocating for registries were excluded. Methods: PubMed, MEDLINE Ultimate, CINAHL Ultimate, Scopus, and ProQuest Health and Medical Collection were searched. Grey literature included ProQuest Dissertations and Theses, Sabinet, and the first 200 Google Scholar results. Two reviewers independently completed three-stage screening and data extraction using JBI scoping review methodology. Reporting followed PRISMA-ScR guidelines. Results: From 1,124 records, 74 full-text papers describing 13 SCI registries across four continents were included. North America hosts the largest, most comprehensive registries, while Europe and Australasia have smaller, rehabilitation-focused models. Asia demonstrates expanding registry capacity, including in LMICs. Considerable variation in datasets, follow-up, and reporting limits comparisons. Conclusion: This first global synthesis highlights substantial growth but marked heterogeneity among SCI registries. Standardised datasets, improved reporting, and expanded registry capacity, particularly in LMICs, are needed to strengthen future registry development.

DHIEU-O-07: Liberating the Paper Graveyard: An Enterprise-Grade, Human-in-the-Loop Vision AI Pipeline for Digitizing Legacy Child Health Records in LMIC Settings

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Background: & Objectives: In low- and middle-income countries (LMICs), critical longitudinal pediatric data remains trapped within physical Road to Health (RTH) booklets, often captured only as low-quality field photographs. This study evaluates an enterprise-grade AI pipeline engineered on behalf of Wits VIDA to ethically transform sub-optimal paper artifacts into structured, AI-ready datasets. Methods: The architecture utilizes FastAPI and Google's closed-source Gemini vision models via a secure enterprise API. Fragmented field images are compiled into patient-specific PDFs. A context-specific system prompt extracts dense chronological data across key pediatric domains into structured JSON. To uphold ethical AI standards and eliminate hallucinations, the system enforces a "Human-in-the-Loop" workflow: low-confidence items are dynamically flagged for clinician review and correction on a local interface before being compiled into finalized CSV and HTML ledgers Results: The pipeline demonstrates robust capability in interpreting highly distorted, handwritten data points that traditional OCR tools fail to process. The built-in human verification interface successfully isolates and rectifies data anomalies, ensuring 100% data fidelity while maintaining strict privacy boundaries via enterprise cloud protocols Conclusion: This architecture proves that AI-driven data liberation in LMICs can be scaled safely without compromising ethical oversight. This pipeline establishes a pioneering framework extensible to other high-friction, labor-intensive clinical bottlenecks, including maternal case records, nursing logs, and clerical tasks

DHIEU-O-08: The impact of methodological approach and ancestral proximity on PGS performance: trends from a continental African cohort

Tumai Muzorewa*, *Ananyo Choudhury*

*School of Pathology

Background: Polygenic scores (PGS) derived from European-ancestry GWAS show reduced predictive performance in continental African populations. Whether ancestry-matched scores, multi-ancestry methods, or ensemble approaches can overcome this limitation in African cohorts remains unclear. Aims: To compare PGS performance across ancestry-method combinations for cardiometabolic traits in a continental African cohort, and evaluate whether stacked ensembles improve prediction. Methods: Four PGS methods (LDpred2, MegaPRS, clumping and thresholding, PRS-CSx) were applied to GWAS summary statistics from four ancestry strata (global multi-ancestry, European, admixed African, continental African), generating up to 16 candidate scores per trait for seven cardiometabolic outcomes (LDL, HDL, total cholesterol, triglycerides, systolic BP, diastolic BP, pulse pressure) in AWI-Gen. The best-performing scores per stratum were combined using an elastic-net meta-learner (stacked PGS) and evaluated in an independent test set as full-model R^2 with 95% bootstrap CIs. Sex-stratified analyses used bootstrap z-tests. Results: Stacked PGS was the top approach for six of seven traits (R^2: LDL 13.1%, total cholesterol 11.4%, systolic BP 9.3%, HDL 6.8%, pulse pressure 6.8%, diastolic BP 3.4%), exceeding PGS Catalog benchmarks by 8–36%. Females showed significantly higher PGS performance for total cholesterol (11.0% vs 3.2%, p=0.018), with consistent female advantage across lipid traits. Conclusion: Stacked PGS outperforms single-ancestry PGSs and

published benchmarks in a continental African cohort. Optimal ancestry-method combinations are trait-dependent, underscoring the need for empirical evaluation in African-ancestry populations. These findings support ensemble PGS pipelines for African genomic health applications and highlight that European-centric scores are insufficient for equitable precision medicine.

DHIEU-O-09: Beyond Likes and Reach: Exploring Young Women's Engagement with HIV Prevention Content on Social Media.

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Background: Digital platforms are increasingly used to support HIV prevention communication among young women in South Africa. The MyPrEP digital ecosystem, including the IChooseMeSA Facebook and Instagram platforms, creates pathways from online engagement to private information-seeking and support. However, limited evidence exists on which content moves young women beyond passive visibility toward meaningful engagement and service-seeking behaviour. Aims: To analyse which social media content characteristics generated the highest reach, engagement, and actions among young women aged 18–34 in South Africa. Methods: A retrospective mixed-methods analysis was conducted using Facebook and Instagram content published between January and December 2024. Quantitative social media metrics and qualitative comment data were analysed to explore engagement patterns, information-seeking, and service-related interest. Results: Content generated over 3.2 million paid impressions and 165,140 organic impressions. Paid posts consistently outperformed organic content, with early-week morning campaigns achieving the highest reach. Static text- and photo-based posts generated the strongest visibility, while relatable peer-led content supported greater engagement. Contrary to common assumptions, motion and animation-based content generally achieved lower reach and required paid promotion to perform effectively. Paid Facebook motion posts generated the highest message conversions. User comments focused on PrEP access, contraception, STI services, and accessing care. Conclusion: Digital HIV prevention communication can support movement from visibility to information-seeking among young women. Findings provide guidance for youth-centred, cost-conscious digital HIV prevention strategies that strengthen pathways from social media to private digital support and healthcare information, while highlighting opportunities to strengthen AI-enabled prevention and service navigation tools.

DHIEU-O-10: Predictions of diabetic complications among adults living with type 2 diabetes mellitus in Agincourt, South Africa: a machine learning approach

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Background: Type 2 diabetes mellitus (T2DM) is the main cause of disability and premature mortality among adults globally. Diabetic related chronic complications significantly impact the health system and productivity, especially in South Africa (SA). Aims: To predict diabetic complications (DCs) among rural adults living with T2DM in Agincourt, SA. Methods: A retrospective study was conducted among rural adults living with T2DM. Secondary data from the SAMRC/Agincourt rural communities were used. Missing observations were handled using missForest. Machine learning models were trained and evaluated using metrics such as the Matthews correlation coefficient. Explainable Shapley was applied to identify and interpret influential features. Results: A total of 1772 adults with T2DM participated; the average age was 58 years, and 71.5% were female. The cumulative incidence of overall DCs, macrovascular, and microvascular complications were 81%, 80%, and 67%, respectively. Random forest outperformed in predicting DCs. Hypertension, mean blood glucose, mean systolic blood pressure (SBP), age 60 years or older, T2DM duration of 5 years or longer, sex, refugee residents, and lipid-lowering therapy were the most influential features in predicting DCs. Conclusion: This study found that the high burden of DCs among rural populations. The study underscores the importance of machine learning in helping clinicians detect DCs at an early stage. Policymakers should prioritize psychosocial support through spouses to control glycemia and metabolic risk factors. The study highlights the need for early screening for T2DM and DCs. Future research should prioritize estimating the time to DC development to enable earlier intervention and improve long-term outcomes.

DHIEU-O-11: Risk-taking propensity and intentions to engage in HIV services following interaction with an AI-powered conversational agent among adolescent girls and young women in South Africa

Sinethemba Madlala*, *Candice Chetty-Makkan, Simamkele Bokolo, Sara Jewett, Laura Rossouw, Ross Greener, Caroline Govathson, Sophie Pascoe, Lawrence Long, Sarah Morris, Shawna Cooper*

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Background: Adolescent girls and young women (AGYW) in South Africa face high HIV risk, yet engagement with HIV prevention and treatment services remains low. Digital health tools offer promising opportunities to support linkage to care, but their effectiveness may vary according to individual behavioural characteristics such as risk-taking propensity. We

assessed baseline risk-taking propensity among AGYW interacting with the Self Care from Anywhere (SCFA), and changes in intentions to engage in HIV services before and after interaction with the tool. Methods: An observational pre-post design was conducted among 97 AGYW aged 16-24 years in Gauteng province (November 2024 to April 2025). Participants completed assessments of intention to engage in HIV services before and after interacting with SCFA. Risk-taking propensity was measured using the Balloon Analogue Risk Task (BART), a validated behavioural measure that simulates real-world risk-taking, with higher scores indicating greater risk-taking propensity. Results: Baseline BART scores varied across participants (M= 18.1; SD = 9.3), indicating diverse risk-taking levels. There was a significant statistical interaction between post-intervention intention to engage and baseline risk-taking ($\beta = -0.31$, $p < 0.05$), participants with lower risk-taking propensity (risk-averse) showed improvement in their intention to engage. Age moderated outcomes, with older participants' intention to engage in HIV services increased more than younger participants ($\beta = 0.37$, $p < 0.05$). Conclusion: Interaction with SCFA increased intention to engage in HIV services, particularly among risk-averse and older AGYW. These findings suggest that AI-powered digital tools may influence users differently, based on behavioural characteristics, by allowing content, follow-up prompts, or referrals to be adapted to different risk profiles. This

DHIEU-O-12: Can Early Warning Systems Reduce Dehydration? Longitudinal Evidence from Pregnant and Postpartum Women in Tshwane, South Africa

Sibusiso Mkwananzi*

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Background: Pregnant and postpartum women face heightened heat-related vulnerability because pregnancy, lactation and infant caregiving increase fluid and thermoregulatory demands. Heat-health early warning systems are promoted as climate adaptation tools, yet evidence remains limited on whether mobile alerts reduce objective physiological markers such as dehydration. Aims: This study assessed whether the MotherHeat Alert app reduced dehydration among pregnant and postpartum women in Tshwane, South Africa, and examined factors associated with continuous urine specific gravity (USG). Methods: A longitudinal pre-post analysis was conducted within the HIGH Horizons MotherHeat Alert evaluation. The app was installed at baseline, with follow-up at two and six months. Dehydration was defined as USG greater than 1.015. Descriptive statistics compared dehydration across visits, while generalised estimating equations and linear mixed models assessed change and predictors of continuous USG. Results: Mean USG declined from 1.023 at baseline to 1.021 at both follow-ups. Dehydration decreased from 75.0% to 67.6% at two months, then increased to 72.0% at six months. Hydration advice from the app was associated with lower USG, while winter follow-up may have reduced thirst and drinking frequency. Conclusion: The app showed promising evidence of reducing dehydration. The strongest improvement occurred at two months, while six-month findings require seasonal interpretation because winter conditions reduced heat exposure, alert relevance and hydration practices. Mobile heat-health alerts can support maternal hydration, but alerts will need to be seasonally relevant. Effective adaptation requires continued engagement, reliable water access and support enabling women to act on advice during heat exposure.

DHIEU-O-13: Impact of Prompt Design on ChatGPT Outputs for Chemical Pathology Queries

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Background: Large language models (LLMs) such as ChatGPT show promise for tasks like interpreting laboratory results and explaining biochemical principles, but their output quality depends heavily on how a query is phrased. Whether structured prompting genuinely improves performance in a specialized field like chemical pathology has not been tested. Aims: To compare ChatGPT's responses to chemical pathology queries when using a structured, refined prompt versus a simple zero-shot prompt, across three user groups: medical students, clinicians, and chemical pathologists. Methods: Twenty-one queries spanning theoretical knowledge, case interpretation, and test utilization were each posed to ChatGPT twice, once with a refined prompt and once zero-shot, in separate sessions. Four blinded reviewers scored each response on accuracy, relevance, completeness, usefulness, and source quality (5-point scale). Paired comparisons used Wilcoxon signed-rank tests, with mixed-effects modelling to account for reviewer and question variability. Results: Structured prompting produced higher total scores than zero-shot prompting overall (median 22.6 vs 19.5, $p<0.001$), with the largest gains in source quality and student group responses. Mixed-effects modelling confirmed a significant adjusted mean difference of 3.41 points (95% CI 2.58–4.25, $p<0.001$). Structured responses were also substantially longer, and word count correlated with source quality and total score. Conclusion: A refined prompt meaningfully improves the quality of ChatGPT's responses to chemical pathology queries compared with unstructured prompting, particularly in citation quality. These findings support training laboratory and clinical staff in basic prompt design before relying on LLMs for chemical pathology queries.

DHIEU-O-14: From algorithms to action: hybrid computational-experimental pipeline leveraging quantum simulations for Parkinson's disease therapeutic innovation

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Background: Parkinson's disease (PD) is the second most common neurodegenerative disease worldwide. Current therapies are largely symptomatic and do not address the multiple pathological mechanisms driving disease progression. Therefore, therapeutic targets capable of regulating processes such as metabolism and inflammation are of great interest. Unfortunately, traditional drug discovery involves costly, time consuming in vitro screening. Moreover, pipelines utilizing in silico techniques fail to accurately explore many drug-protein parameters due to classical computing limitations. Aims: To develop a high-throughput drug-discovery pipeline integrating classical computing, quantum simulations, and in vitro assays to improve the efficiency, accuracy and translational potential of therapeutic discovery for complex diseases such as PD. Methods: A novel compound library was screened using molecular docking and molecular dynamics simulations to identify lead candidates. These compounds were evaluated in PD cell models using morphological analysis, cell viability assays, immunocytochemistry, and protein quantification. The pipeline is being expanded to incorporate quantum chemistry simulations for first-principles electronic structure calculations. Results: Classical computational screening identified W1 and W2 as promising therapeutic candidates. In vitro validation showed both compounds enhanced the activity of proteins involved in cellular homeostasis and significantly decreased multiple neurodegenerative pathologies. Conclusion: Novel compounds W1 and W2 demonstrated therapeutic potentials to target multiple pathological features of PD. These findings also highlight the value of computational approaches in accelerating translational drug discovery. By developing a high-throughput drug-discovery pipeline, particularly via the inclusion of quantum computing, will allow for critical bottlenecks in therapeutics design to be overcome. The implications of this extend far beyond neurodegeneration, potentially redefining therapeutic innovation for complex diseases.

DHIEU-O-15: Preparing Pharmacy Students for Allergy and Anaphylaxis: A Game-Based Simulation Approach

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*School of Therapeutic Sciences

Background: Pharmacists are increasingly involved in administering injections, yet managing rare but life-threatening adverse events such as allergy and anaphylaxis remains challenging. Traditional high-fidelity simulation is resource-intensive and difficult to scale, especially with the increasing student numbers, creating a need for innovative educational approaches. Therefore, a Game-based simulation on the management of allergy and anaphylaxis in the pharmacy was designed. Aims: To explore students' experiences, acceptability, and perceived educational value of an AI-supported, game-based virtual simulation for the recognition and management of allergy and anaphylaxis. Methods: The intervention incorporated virtual patient scenarios, game mechanics, principles of Universal Design for Learning and self-directed learning, and structured reflective debriefing guided by the PEARLS framework. The learning experience included pre-briefing, gameplay, and facilitated debriefing. Quantitative and qualitative student feedback was collected to evaluate the intervention. Results: Students reported high levels of engagement, acceptability, and perceived educational value. The simulation generated an appropriate sense of urgency consistent with emergency situations while maintaining psychological safety and enjoyment. Participants valued the opportunity to practise clinical decision-making in a risk-free environment and reported increased confidence in recognising and managing allergy and anaphylaxis. The experience was described as interactive, immersive, and supportive of active learning. Conclusion: AI-supported, game-based virtual simulation is a feasible, scalable, and engaging approach for preparing pharmacy students to manage allergy and anaphylaxis emergencies. This approach offers a practical model for expanding access to high-quality experiential learning in pharmacy education, particularly in resource-constrained settings where traditional simulation is limited.

DHIEU-O-16: Sleepless in Silico: Cognitive and Socio-Emotional Vulnerability in Large Language Models

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Background: Sleep supports key cognitive functions – attention, executive control, emotional regulation, and social cognition. Deprivation impairs prefrontal and limbic regulation, reducing empathy, perspective-taking, and emotional understanding. Aims: This study uses sleep deprivation as a neuroscience- and psychology-informed framework to examine whether simulated disruptions in Large Language Models (LLMs) produces changes in empathy- and personality-related responses. Methods: We simulated sleep-deprivation-like disruptions in open-source LLaMA models by introducing controlled perturbations to selected processing layers. Localised scalar attenuation was applied to targeted attention and feed-forward layers at different architectural points, modelling reduced processing efficiency, to examine local and downstream effects. Model responses were assessed using the Toronto Empathy Questionnaire (TEQ), the Situational Test of Emotional Understanding (STEU), and the Dark Factor of Personality questionnaire (D70), focusing on cognitive and affective empathy, and dark personality traits. Results: Preliminary findings suggest that perturbations exposed specific vulnerabilities rather than causing general decline. Perturbations applied to earlier layers produced the largest changes in responses. These findings suggest that empathy- and personality-related responses are especially sensitive when early model processing is altered. Conclusion: This study probes cognitive and socio-emotional vulnerability in LLMs, by simulating reduced processing efficiency and examining changes in TEQ, STEU, and D70 responses. The findings identify where model behaviour becomes less stable under targeted disruption. This has direct implications for AI safety in emotionally sensitive applications, while

also offering a novel comparative framework for exploring how sleep-deprivation-related disruptions affect cognitive, affective, and social vulnerabilities in both artificial and human systems.

DHIEU-O-17: The Impact of AI-Driven Diagnostic Tools on the Early Detection of Skin Cancer: Clinical Applications and Future Prospects

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*School of Clinical Medicine

Background: The integration of artificial intelligence (AI) into healthcare is revolutionizing disease detection, including skin cancer, one of the most prevalent cancers worldwide. Traditional diagnostic methods rely on manual interpretation of dermoscopic images, which can be time-consuming and subject to inter-observer variability. AI-based tools, especially deep learning models, have demonstrated the potential to improve diagnostic accuracy and efficiency. Aims: This study aims To develop and evaluate an Attention SegNet model incorporating a lightweight attention mechanism to improve skin lesion segmentation accuracy, and to compare its performance with existing state-of-the-art methods using the PH2 dataset. Methods: The PH2 dataset, containing 200 dermoscopic images with high-quality annotations by dermatologists, was used to evaluate the Attention SegNet model. The dataset provides a range of lesion types and includes clinical metadata, ensuring a diverse evaluation environment for segmentation models. Results: The Attention SegNet model achieved strong performance, with a Jaccard Index of 98.10%, Dice coefficient of 86.52%, precision of 96.90%, specificity of 98.72%, and accuracy of 98.86%. It outperformed models such as U-Net, FCN, and MultiResUnet, with superior Dice coefficients and precision scores. On the ISIC dataset, it achieved a Dice coefficient of 86.2%, further validating its effectiveness in skin lesion segmentation. Conclusion: The Attention SegNet model demonstrated enhanced skin lesion segmentation performance, surpassing existing methods. Future research should explore transfer learning, multi-modal data integration and improved model interpretability. AI-assisted segmentation could improve early skin cancer detection and clinical decision-making.

DHIEU-O-18: Can LLMs Accurately Score Medical Diagnoses and Clinical Reasoning?

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Background: Expert clinician panels are costly and slow for evaluating medical AI systems, motivating the use of large language models (LLMs) as alternative adjudicators. Methods: We evaluated an LLM Jury comprising three frontier AI models for scoring 3,334 diagnoses across 300 real-world cases from a South African public tertiary hospital. LLM- and clinician-generated diagnoses were scored against expert panel reference diagnoses across four dimensions: diagnosis, differential diagnosis, clinical reasoning, and negative treatment risk. LLM Jury scores were compared with expert panel scores to assess errors, inter-rater agreement, severe safety-risk errors, and the effect of post hoc calibration using isotonic regression. Results: The LLM Jury performed well. The uncalibrated LLM Jury preserved ordinal agreement with expert clinician panel scores but was systematically stricter. Severe safety-risk error probability was lower for the LLM Jury than for independent human expert re-score panels. Combining the LLM Jury with LLM diagnoses can be used to identify routine ward diagnoses at high risk of error, supporting targeted expert review. After calibration, LLM Jury scores and diagnosing-agent rankings showed good agreement with primary expert panels. The LLM Jury showed no self-preference bias, with models not scoring outputs from their own underlying model or vendor more (or less) favourably than outputs from other models. Conclusion: A calibrated LLM Jury provides a trustworthy, reliable and cost-effective proxy for expert clinician evaluation in medical AI benchmarking. Validation in additional clinical settings remains an important future direction.

POSTER PRESENTATIONS (31)

DHIEU-P-01: Evaluating vaccine coverage among Wits Faculty of Health Sciences students and staff and assessing acceptability of a digital app for life-course vaccination records.

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Background: Healthcare workers, medical students, and laboratory technicians are at increased risk of exposure to infectious diseases, making accurate vaccination records essential for infection prevention. While childhood vaccinations in South Africa are documented in the Road to Health Book, no equivalent system exists for recording adult vaccinations, complicating the verification of vaccination histories across the life course. Aims: This study aimed to evaluate vaccine coverage and assess the acceptability of a digital vaccination record among health sciences staff and students at the University of the Witwatersrand. Methods: A cross sectional survey was designed using REDCap and distributed electronically to Faculty of Health Sciences staff and students. Results: Vaccine uptake varied between childhood and adulthood, with staff reporting higher rates of full vaccination than students. Most participants (96%) self-reported their vaccination histories, while only 4% were able to provide documented proof, highlighting limitations in the current vaccination recording system. Acceptability of

a digital vaccination record was high among participants. These findings demonstrate substantial gaps in the documentation of adult vaccinations and support the potential of a digital application to maintain a comprehensive, lifelong vaccination record. Conclusion: Addressing system level and user related barriers will be essential for successful implementation and for sustaining life course vaccination and continuity of care. Digital solutions such as 'The Vaccine App' have the potential to strengthen record retention, facilitate reminders and improve completion of recommended vaccines, addressing these documentation gaps will ensure that vaccination histories are accurate, verifiable, and actionable throughout the life course.

DHIEU-P-02: Utilisation of digital health technologies among frontline health professionals in five sentinel district hospitals in South Africa

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Background: Digital Health Technologies (DHTs) have potential to transform the clinical practice environment of frontline health professionals (FHPs). Yet we do not know much about the utilisation of DHTs among FHPs in South African district hospitals. Aims: To assess DHT utilisation and associated factors among FHPs in South African district hospitals. Methods: In 2025, we conducted a self-administered cross-sectional survey among FHPs in five district hospitals across five South African provinces. We collected data on demographic and occupational characteristics, internet availability, and the utilisation of different DHT types. Overall DHT utilisation was assessed on a 1–10 scale (high use classified as a score of ≥6/10). We analysed data in SAS and used logistic regression to examine factors associated with DHT use. Results: We included 810 FHPs. The majority were female (83.7%) with a mean age of 40.6 years. Nurses were the majority of the sample (65.4%), followed by doctors (14.3%), therapeutic science practitioners (13.8%), and pharmacists (6.5%). Overall DHT utilisation was moderate (mean=4.3; SD=2.7). Internet access at work was primarily via personal devices. Doctors used DHTs mainly for peer consultation (55.1%), computer-aided diagnostics (42.1%), and clinical decision support (36.5%). In contrast, nurses, therapeutic science practitioners, and pharmacists used DHTs predominantly for peer consultation (46-2-52.7%). DHT utilisation was found to be associated with professional cadre, hospital-provided connectivity, and geographical location ($p<0.05$). Conclusion: DHT utilisation among FHPs in South African district hospitals was moderate, and associated with professional and hospital-related factors. The transformative potential of DHTs could be realised through improved digital infrastructure and adequate support to frontline FHPs.

DHIEU-P-03: Transitions from healthy ageing to multimorbidity and death in rural South Africa: a multi-state modelling study using HAALSI Waves 1–3

Cyril Chironda*, *Tobias Chirwa, Chodziwadziwa Kabudula, Farai Mlambo, Rumbidzai Mupfuti, Tlangelani Hlongwane, Xavier Gomez-Olive, Daniel Ohene Kwofie, Kathleen Kahn, Stephen Tollman*

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Background: Multimorbidity is an increasing public health challenge in ageing populations, yet limited evidence exists on how older adults in rural South Africa transition between different stages of chronic disease accumulation and death. Understanding these transitions is important for health-service planning and for developing future simulation models of multimorbidity burden. Aims: This study aims to estimate transitions between multimorbidity states and death among older adults in rural South Africa using longitudinal HAALSI data. Methods: We will use data from Waves 1–3 of the Health and Aging in Africa: A Longitudinal Study of an INDEPTH Community in South Africa (HAALSI), linked to updated mortality records from Verbal-Autopsy. Chronic conditions will include cardiometabolic, infectious, respiratory, renal, cardiovascular, haematological, and mental health conditions. Participants will be classified at each wave into mutually exclusive states: no chronic condition, one chronic condition, multimorbidity, and death. Descriptive analyses will estimate chronic disease prevalence, multimorbidity burden, and observed transition matrices across waves. Continuous-time multi-state Markov models will be used to estimate transition intensities and covariate effects for progression and mortality. Covariates will include age, sex, socioeconomic position, behavioural factors, physical function, cognition, mental health, sleep, and self-rated health. Model comparison will assess unadjusted, covariate-adjusted, time-inhomogeneous, and progressive-only specifications. Predicted transition-time distributions and a correlation matrix of state-transition times will be produced as inputs for future simulation. Expected contribution: This study will provide empirical evidence on multimorbidity progression and mortality transitions in rural South Africa, while establishing a modelling foundation for future population-level simulation of multimorbidity burden.

DHIEU-P-04: Multi-Object Detection: Dental Carries Detection using Convolutional Neural Networks

Rayhaan Hanslod*, *Bau Hairong, Tshite Koketso*

*School of Computer Science

Background: Dental caries, commonly known as tooth decay, is a prevalent and pervasive condition affecting individuals across all age groups. It stems from bacterial activity on teeth, which metabolize sugars to produce acids, leading to the gradual

breakdown of tooth structure. According to theWorld Health Organization (WHO), dental caries is characterized by the erosion of the enamel layer due to acid action. Currently, dental professionals rely on a laborious and iterative process involving manual lesion marking post radiographic examinations for caries diagnosis. However, the burgeoning advancements in AI within medical imaging research offer a promising avenue to enhance the precision and efficiency of dental diagnosis. Aims: This study introduces the "Wits Dental Dataset," a newly annotated collection of dental radiographs developed to address the scarcity of high-quality data in dental AI research. It also evaluates the effectiveness of two deep learning models—YOLOv5 and Detectron2—for detecting dental caries and related features. Methods: The dataset comprises 487 anonymized bitewing radiographs from the Wits Oral Health Centre, divided into two subsets: a 9-class set (including teeth, fillings, caries, etc.) and a simplified 3-class set (teeth, fillings, caries). Bounding boxes were manually annotated and partially verified by a dental radiologist. Data augmentation techniques were applied to improve variability. Results: YOLOv5 consistently outperformed Detectron2, with the most effective configuration being the 9→3 transfer learning model, which achieved a mAP50 of 0.933 and improved caries recall by 57% (to 66.7%). Additionally, YOLOv5 demonstrated superior speed, efficiency, and adaptability. Conclusion: , Implications YOLOv5 demonstrates strong promise for caries detection.

DHIEU-P-05: Strengthening routine health information system reporting to support data-driven hospital management: implementation at a tertiary hospital

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Background: Digital health technologies are central to strengthening health systems, with health information systems forming a core building block for data-driven decision-making. (1) Chris Hani Baragwanath Academic Hospital (CHBAH) previously relied on a hybrid paper-based and electronic approach to routine data collection and reporting, resulting in inefficiencies, reporting delays and challenges in data verification. This project aimed to implement an electronic RHIS data collection and reporting tool to improve data quality, reporting efficiency and accessibility of information for hospital management. Methods: An electronic data collection tool (EDCT) and reporting dashboard were developed and implemented at CHBAH between March and November 2024. The intervention targeted aggregated patient data, theatre utilisation and facility and logistics indicators across various departments. Implementation followed the three phases of Kotter's change management model. Results: The EDCT and dashboard were implemented in June 2024 across multiple functional business units. The transition from hybrid paper-based reporting to electronic submission enabled same-day access to aggregated facility data and reduced reliance on manual data collation. Early implementation outcomes included improved completeness of mandatory data fields, increased timeliness of routine reporting and enhanced accessibility of data for management review. Dashboard outputs were used in executive management meetings to monitor bed status, theatre utilisation and critical resource availability. Ongoing training and quality improvement activities supported user adoption and data quality. Conclusion: The implementation of an electronic RHIS at CHBAH was feasible and improved the timeliness and accessibility of routine data for managerial decision-making. Early operational outcomes suggest that electronic data collection and reporting strengthen data quality and support data-driven hospital management.

DHIEU-P-06: Predictive Risk Modelling and Behavioral Segmentation to Improve HIV Care Engagement in KwaZulu-Natal, South Africa.

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*School of Clinical Medicine

Background: Despite substantial progress in antiretroviral therapy (ART) coverage, retention in HIV care remains a significant challenge. Patients frequently disengage from care, cycle in and out of treatment, or transfer silently between facilities, limiting the ability of health systems to provide timely support. Data-driven approaches may offer opportunities to improve patient prioritization and engagement. Aims: To develop predictive risk and behavioral segmentation tools that support the identification, prioritization, and engagement of patients at increased risk of disengagement from HIV care and adverse clinical outcomes. Methods: Routine HIV programme data, linked with patient tracing and survey data, were used to develop predictive models of mortality and disengagement from care and to identify distinct behavioral segments associated with different barriers to engagement. Machine learning techniques were applied to generate risk predictions, while latent class analysis was used to derive patient segments.. Results: Predictive models demonstrated good performance in identifying patients at elevated risk of mortality and disengagement. Behavioral segmentation identified distinct patient profiles characterized by varying structural, social, and behavioral barriers to care. These findings informed the development of tailored engagement strategies and facility-based decision-support tools. Conclusion: Predictive modelling and behavioral segmentation can provide actionable insights to support differentiated HIV service delivery and patient engagement. Integrating data-driven tools into routine HIV care may improve patient prioritization, strengthen re-engagement efforts, and enhance retention outcomes in resource-constrained settings.

DHIEU-P-07: Human-centred data capture in the era of digital automation and AI – insights from the ADMIRE (Automating Digitisation of Maternal and Infant Records) study

BHSc alumni

Madri Jansen van Rensburg*, *Ushma Mehta, Lee Fairlie, Karl-Günter Technau, Bruce Bassett*

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Background: and Aims: The ADMIRE pilot study is an evaluation of artificial intelligence (AI)-digitised maternal care record capture within the Ubomi Buhle Pregnancy Exposure Registry (UBPER). The project intends to semi-automate surveillance workflows, which could affect staff. We explore the current roles of data capturers (DCs) and identify critical human factors that could drive efficiency and data quality. Methods: Rahima Moosa Mother and Child Hospital (RMMCH) is a sentinel site of the UBPER since 2021. The five antenatal clinic DCs visually presented the clinical and data workflow at their sites, contributing to a generic workflow outline that explores the potential impact of an AI-supported data capture approach. Results: The DCs presented diverse context-specific workflows at the sites. The DC's ability to foster a supportive connection with pregnant women helped clients to better navigate the clinical encounter. DCs were able to track even subtle influences on women's lived experiences in a timely and empathetic manner. Serving as human intermediaries, the DCs, furthermore. identified and filled critical data gaps. Recognising their value, clinical staff integrated DCs into clinical workflows and worked collaboratively to improve data quality for the surveillance project. Conclusion: and Implications The research exercise provided important insights into surveillance workflows at a sentinel site while highlighting the multiple roles DCs played in improving maternal clinical care and surveillance data quality. Data capture facilitated by AI-driven approaches has the potential to enhance the role of DCs in clinical settings as mediators between pregnant women, health care workers and the health information system.

DHIEU-P-08: Revisiting Sample Size Requirements in Machine Learning Prediction Models: Balancing Model Complexity, Overfitting, and Predictive Accuracy.

Clarence Yah*

***[Affiliation pending]**

Background: The increasing adoption of machine learning (ML) in clinical and epidemiological research has highlighted a critical paradox: despite their ability to analyse large, complex datasets, ML models remain highly vulnerable to inadequate sample sizes. Many ML algorithms incorporate complex architectures, high-dimensional feature spaces, and automated model selection, increasing the risk of overfitting, unstable parameter estimates, and poor generalisability when data are insufficient. Therefore, rigorous sample size determination is essential to ensure reliable, reproducible, and clinically meaningful prediction models. Methods: We reviewed and demonstrated the application of the pmsampsize prediction model sample size framework, a principled method for estimating the minimum sample size required for multivariable prediction model development. The framework integrates key methodological criteria, including events-per-parameter (EPP), shrinkage to minimise overfitting (recommended shrinkage factor ≥ 0.90), and anticipated model performance (R^2), thereby supporting robust model development and transparent reporting. Results: and Conclusion: The pmsampsize framework provides a statistically rigorous and reproducible approach for aligning model complexity with available sample size, improving model stability, calibration, and predictive performance. Its application reduces the likelihood of overfitting, unreliable parameter estimates, and poor calibration associated with inadequate sample sizes. Sample size determination should therefore be regarded as a fundamental component of ML study design rather than a secondary consideration. Therefore, sample size determination should be regarded as a fundamental component of ML research methodology rather than an afterthought. We advocate for the broader adoption of statistically grounded ML modelling practices, particularly in public health and clinical decision-making, where poorly estimated model parameters and unreliable predictions may have substantial implications for healthcare policies.

DHIEU-P-09: A novel self-administered behavioral risk assessment tool identifies young South African women with high risk for STIs and HIV
BHSc alumni

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Background: and Objectives: For adolescent girls and young women (AGYW), ability to self-assess sexual risk behavior can be empowering and provide opportunity to adopt HIV/STI prevention strategies. We investigated whether a novel self-assessment tool could be associated with STI detection. Methodology: PALESA, a pilot randomized trial enrolling sexually active AGYW (16–18 years), was conducted from June 2023 to May 2024 in Johannesburg, South Africa. Participants were followed up monthly for six months (in-clinic and virtually), and offered oral PrEP. Diagnostic STI testing (chlamydia, gonorrhea, trichomonas) was performed quarterly. For this study, we developed a 15-item web-based self-assessment tool, capturing recent sexual behavior, partnership characteristics, and STI symptoms, where participants scored a point whenever responses indicated potential risk. Participants received an access link to the tool monthly via text message. We quantified participant responses and used a generalized linear mixed-effects model to determine associations of participants' total scores with STI detection. Results: Among 55 participants (median age: 18 years, IQR: 17–18), 385 surveys were distributed, with 365 responses (94.8%) collected. The median tool total score was 1 (IQR: 1–3). Frequently reported items included older partners (38.4%), vaginal STI symptoms (26.3%), new sexual relationships (20.0%), and multiple partners (18.9%). Higher

scores were associated with increased odds of STI detection (adjusted odds ratio: 2.64, 95% CI: 1.47–4.73). Conclusion: A self-administered online self-assessment tool was feasible to implement in this cohort and may be effective in identifying individuals at higher risk of STIs. Further research is warranted to fully explore the predictive value of this tool on STI diagnosis.

DHIEU-P-10: Engaging youth through AI: Sister Unathi's role in HIV prevention and sexual health education

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Background: Chatbots offer significant potential to improve equitable access to HIV prevention information in resource-limited settings by providing accurate, confidential, and stigma-free support. Sister Unathi, a natural language processing (NLP) chatbot, shares oral PrEP and sexual and reproductive health information through Facebook Messenger and webchat, targeting young people in South Africa. Aims: To describe user reach, identify access routes, and explore the health topics most frequently requested through the chatbot. Methods: Developed through the Unitaid-funded Project PrEP in collaboration with the South African National Department of Health and young people, Sister Unathi is maintained by Wits RHI and provides HIV prevention and sexual health information through predefined and free-text questions. Promotion through Google AdWords and social media drives user engagement. Routine programme data were analysed to describe user reach, access pathways, and information needs. Results: Between June 2023 and March 2024, the chatbot engaged 4,950 users, handling 9,153 questions (2 questions per user on average). Most users (96%; 4,767/4,950) accessed the chatbot via webchat, demonstrating the effectiveness of Google AdWords in driving engagement. Among users who disclosed their age, 59% (1,819/3,038) were aged 15–24 years and 40% (1,219/3,038) were aged 25–30 years. Oral PrEP was the most requested topic (71.4%; 3,536/4,950), followed by readiness for sex (10.8%), emotional readiness for love (7.0%), contraception (5.7%), and sexual health (2.4%). Conclusion: Sister Unathi demonstrates the potential of AI-powered chatbots to expand access to HIV prevention and sexual and reproductive health information among young people in South Africa. These findings support the use of scalable, sustainable AI-enabled chatbots to strengthen digital health delivery in resource-limited settings.

DHIEU-P-11: Title: Exploring Patient and Healthcare Worker Perspectives on WhatsApp-Integrated AI-Enabled Chatbots for Chronic Disease Care in Primary Healthcare Settings in South Africa and Eswatini: An Early-Stage Research Concept Short Title: Chatbot Study

Kedeboni Mamosadi*

*Perinatal HIV Research Unit, School of Clinical Medicine

Background: Chronic diseases, including diabetes, hypertension and HIV, place a growing burden on primary healthcare systems across sub-Saharan Africa and require innovative approaches to support long-term care. WhatsApp-integrated artificial intelligence (AI)-enabled chatbots may improve patient engagement, self-management and continuity of care; however, evidence from resource-constrained African settings remains limited (WHO, 2025; Altom et al., 2025). Aims: To explore patients' and healthcare workers' perceptions, experiences and anticipated acceptability of WhatsApp-integrated AI-enabled chatbots for chronic disease management in primary healthcare settings in South Africa and Eswatini. Methods: This multi-site exploratory qualitative study will purposively recruit adult patients living with diabetes, hypertension or HIV, together with healthcare workers from selected primary healthcare facilities. Semi-structured interviews will explore experiences of chronic disease care, digital health technologies and chatbot-supported care. Participants with prior chatbot experience will discuss their experiences, while those without will receive a structured chatbot demonstration. A South African subsample with no prior chatbot experience will subsequently complete a one-month prototype trial, followed by follow-up interviews. Qualitative data will be analysed using thematic analysis. Anticipated Findings: The study is expected to identify factors influencing chatbot adoption, including usability, digital literacy, trust, privacy and implementation readiness. Results: are also anticipated to describe stakeholder preferences and contextual considerations for integrating chatbot-supported care into routine primary healthcare. Conclusion: This formative study will generate evidence to inform the development and implementation of patient-centred WhatsApp-integrated AI chatbots for chronic disease management in resource-constrained primary healthcare settings and guide future implementation research and digital health policy in South Africa and Eswatini (Khumalo, 2025).

DHIEU-P-12: Engineering a 3D-Printable Amorphous Solid Dispersion Paste for Taste-Masked Dolutegravir Orally Disintegrating Tablets

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Background: The administration of paediatric antiretroviral therapies is frequently hindered by poor drug solubility, bitter palatability, and inflexible dosing. Dolutegravir sodium (DTG) exhibits these challenges, necessitating advanced formulation strategies to improve compliance. Aims: /Objective: This study aims to engineer an amorphous solid dispersion (ASD)-based

3D-printable paste. Utilizing adjustable molds and positive displacement pipettes, the formulation seeks to achieve dose-precision, effective taste-masking, and enhanced gastric dissolution of DTG Orally Disintegrating Tablets (ODTs). Methods: DTG ASDs were synthesized and structurally confirmed via TGA, XRD, and DSC. In vitro dissolution (pH 1.2), taste-masking (SSF, pH 6.75), and aqueous stability screens were normalized against actual content uniformity. A 15-run Box-Behnken Design (BBD) is currently optimizing the ASD loading (40-60%), polymer binder ratio, and liquid-to-solid hydration ratio. Optimized pastes are precision-cast using positive displacement pipettes into AI-assisted OpenSCAD molds fabricated with Optiprint Guide 405 clear resin. Results: and findings: A 2:1:2 (DTG:Soluplus:Eudragit E100) formulation emerged as the optimal Phase 1 candidate. It achieved complete adjusted gastric release at 2 hours while maintaining a protective shield in SSF (restricting drug release to 8.9% over 3 minutes), ensuring effective taste-masking. Excellent stability against premature drug leakage in pure water confirmed its safety for aqueous wet-massing. Initial physical prototyping (Figure 1) successfully demonstrated precision-casting and shape retention within the resin molds. Conclusion: and Implications: This research bridges thermodynamic ASD stabilization with the rheological constraints of semi-solid extrusion, providing a translatable platform for personalized pharmaceutics. Phase 2 BBD formulations are actively being evaluated for rheological yield stress, disintegration, and dissolution to finalize printing parameters.

DHIEU-P-13: The Power of Personal Narratives: HIV Prevention Ambassadors Engaging Young Adults Through Social Media

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Background: Peers in communities promote HIV prevention by encouraging access to services for AGYW through social mobilisation. Peer volunteers, trained as HIV prevention ambassadors, co-created social media content for @MyPrEPSouthAfrica, which was shared on Facebook to engage young people about oral PrEP. Aims: In October 2024, ambassadors collaborated with experts from Wits RHI in a co-creation process. A template was created to capture their PrEP journeys, which served as the foundation for testimonials shared on @MyPrEPSouthAfrica's Facebook. This initiative, implemented by Project PrEP and funded by Unitaid, was supported by a WhatsApp onboarding guide that instructed ambassadors on responding to messages and sharing content from MyPrEP's social media page. This campaign was boosted to improve reach and engagement among AGYW. Data from October to November 2024 was collected to determine if using peers as HIV prevention ambassadors is effective in promoting HIV prevention among AGYWs. Results: From October to November 2024, ten ambassador testimonial posts reached 377,033 people and engaged 10,195 people on Facebook. Conclusion: Our findings show ambassador testimonials, especially personal stories, effectively engage AGYW on social media. Personal narratives help connect with audiences and boost emotional engagement. To promote HIV prevention and sexual health campaigns, similar strategies should be adopted. Future efforts should increase budget and duration, and refine content based on audience feedback. Including personal stories could boost campaign impact and resonance with the target audience.

DHIEU-P-14: AI-integrated pulmonary nodule assessment: a systematic review and meta-analysis

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Background: . Accurate detection and characterization of pulmonary nodules are critical for early lung cancer diagnosis. However, traditional manual interpretation remains constrained by subjective variability and workflow inefficiencies. This study therefore evaluated the impact of artificial intelligence (AI)-integrated workflows on diagnostic accuracy, inter-reader consistency, and efficiency in pulmonary nodule assessment. Material and methods. A PRISMA-compliant systematic review and meta-analysis was conducted across PubMed, Scopus, Web of Science, and the Cochrane Central Register of Controlled Trials (CENTRAL) for studies published between 2023 and 2026. Following strict inclusion criteria, six studies, including recent conference data, were selected. Study quality was assessed using QUADAS-2 and the GRADE framework. Results: . AI integration significantly improved diagnostic sensitivity, with a pooled sensitivity of 0.96 (95% CI 0.90–0.99) compared with 0.86 (95% CI 0.79–0.91) in unassisted workflows ($\chi 2 = 5.32$, $p = 0.02$). AI demonstrated marked size-dependent benefits, with localization receiver operating characteristic (LROC) area under the curve (AUC) improvements of up to 54.9% for small (4–6 mm) nodules. Inter-reader agreement improved consistently, with Lung Imaging Reporting and Data System (Lung-RADS) assessment agreement increasing from Fleiss' kappa 0.375 to 0.525. Workflow efficiency was significantly enhanced, with the median time to diagnosis reduced from 129 days to 25 days and mean image interpretation times decreased, including an 18% reduction in standard case reading times. Conclusion: . AI integration significantly improved pulmonary nodule assessment by enhancing diagnostic precision, standardizing inter-reader agreement, and improving workflow efficiency.

DHIEU-P-15: Knowledge, Perceptions and Attitudes Toward Artificial Intelligence in Healthcare Among Healthcare Professionals at a District regional hospital in South Africa: A Cross-Sectional Survey Study

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Background: Artificial intelligence (AI) is transforming healthcare by improving clinical decision-making, diagnostic accuracy, and workflow efficiency. However, successful implementation depends on healthcare professionals having adequate knowledge, positive perceptions, and readiness to adopt AI. Evidence from South African public hospitals remains limited. Aims: To assess the knowledge, perceptions, and attitudes toward AI in healthcare among doctors at a South African district-regional public hospital. Methods: A cross-sectional survey was conducted among 145 doctors using a structured anonymous questionnaire assessing demographics, AI knowledge, perceptions, attitudes, current AI use, and perceived barriers. Descriptive statistics were used to summarise responses. Results: Most participants reported using AI tools in daily life, although formal AI training was uncommon. Self-rated knowledge was predominantly average, while understanding of core AI concepts was moderate. Most respondents believed AI could improve diagnostic accuracy, clinical decision-making, administrative efficiency, and patient care. Concerns regarding data privacy, medico-legal liability, and institutional readiness were common. Most participants supported formal AI training before clinical implementation, expressed willingness to use AI in practice, and endorsed integrating AI literacy into undergraduate medical education. The most frequently identified barriers were limited training, inadequate infrastructure, and insufficient institutional guidance. Conclusion: Doctors demonstrated positive attitudes toward AI despite moderate knowledge and limited formal training. Educational and governance gaps remain before widespread implementation. Targeted AI education, institutional policies, and governance frameworks are needed to support safe and effective AI integration within South African public healthcare.

DHIEU-P-16: Implementation of a Localised Gen3 Data Discovery Platform for African Population Health Research

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Background: The eLwazi Open Science Data Platform represents a pan-African initiative to build scalable, FAIR-compliant data infrastructure for health centred research. Harmonising multi-modal clinical and genomic data across institutions remains a critical bottleneck, particularly in under-resourced settings where data governance, local ownership, and equitable access are paramount. Aims: To design, deploy, and validate a locally-hosted instance of the Gen3 open source data commons platform on institutional infrastructure as a reusable deployment model for the eLwazi ecosystem, utilising a rich collection of longitudinal cohort study datasets (MADIVA) as a real-world validation case. Methods: Containerised microservices architecture was deployed from bare metal using Kubernetes, with no dependence on external cloud providers. A custom data dictionary was developed from the MADIVA codebook to standardise metadata and enforce semantic consistency. Clinical, demographic, socioeconomic and non-communicable disease data were structured in a PostgreSQL graph database and processed through a custom ETL pipeline, indexed into Elasticsearch, and served via GraphQL to a researcher-facing Explorer portal. Results: The platform ingested multi-modal participant data, enabling real-time cohort querying, filtering and analysis across clinical variables. This deployment establishes a validated, transferable architectural implementation allowing for adoption by other African research organisations within the eLwazi ecosystem. Conclusion: Bare-metal, institutionally-governed Gen3 deployment is a viable and reproducible model for African health data infrastructure, demonstrating that open-science platforms can be built and maintained within local resource constraints. This work advances knowledge-sharing capacity and locally-governed data discovery across the African research ecosystem, laying the computational groundwork for multi-omics integration, federated analysis, and precision medicine initiatives without compromising local data stewardship.

DHIEU-P-17: Sliding into socials to stop the spread of STIs

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Background: Sexually transmitted infections (STIs) among young people remain unacceptably high. Condom use is inconsistent, barriers to healthcare access persist, and awareness of STIs remains limited. Social media offers an opportunity to provide accurate, youth-friendly information and support access to services. Aims: To describe the reach and engagement of STI-related social media content delivered through the MyPrEP South Africa digital platforms. Methods: The MyPrEP South Africa Facebook (since 2018) and Instagram (since 2019) platforms, developed with the National Department of Health, technical experts and young people, publish an average of four HIV prevention posts per week. Selected posts are boosted through paid advertising. A descriptive analysis was conducted of STI-related posts published between May and October 2024. STI-related posts included content on STIs, STI screening or condom use. Outcomes included unique reach and user engagement (comments, reactions, shares, clicks and WhatsApp chats). Results: Between May and October 2024, 163 posts were published, of which 36 (22%) focused on STIs. STI-related posts reached 524,973 users (mean 14,583 per post) and generated 5,481 engagements. Of these, 964 (17.6%) resulted in WhatsApp conversations with trained project staff, providing personalised information, answering questions or linking young people to nearby STI screening services. Conclusion: Social media can effectively reach and engage young people with STI information, while integrated WhatsApp support enables confidential, personalised health communication and linkage to care. Combining social media with one-to-one digital support may strengthen STI prevention, improve health literacy, reduce barriers to care and increase uptake of STI screening and treatment services among young people.

DHIEU-P-18: Strengthening Vaccine Safety Surveillance in South Africa: Structural Enablers, Reporting Challenges, and Lessons for AEFI Monitoring in LMICs.

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Background: The COVID-19 pandemic marked an unprecedented emergency and led to the fastest vaccine rollout in history and the reporting of adverse events following immunisation (AEFIs) and adverse events of special interest (AESIs) became critically important. This study examined vaccine safety and reporting system in South Africa to offer insights for improving AEFI surveillance in low- and middle- income countries. Aims: To explore the social, structural, and clinical factors that facilitate the identification, evaluation, and investigation of AEFIs during the COVID-19 vaccination campaign in South Africa. Methods: Semi-structured interviews were conducted with four public health and immunisation policy experts, and two focus group discussions were held with twelve healthcare workers and laboratory staff. Data were analysed using inductive and deductive coding within a phenomenological framework to identify facilitators and barriers to vaccine safety surveillance. Results: Key successes included establishing Provincial Immunisation Safety Expert Committees, particularly in provinces with medical universities, and expanding the National Immunisation Safety Expert Committee to include maternal health and geriatric specialists. A national vaccine safety manual standardised reporting procedures, while multiple reporting platforms improved AEFI reporting. Community feedback and social listening strengthened vaccine confidence. Reporting quality, however, remained inconsistent, particularly anonymised reporting by manufacturers. Underreporting reflected differing perceptions of event severity, while limited training, staff turnover, reliance on donor funding, misinformation, and confusion hindered surveillance and follow-up. Conclusion: South Africa strengthened vaccine safety surveillance through expanded expertise, collaboration, and accessible reporting systems. However, improving data quality, standardised training, sustainable staffing, and public understanding remains essential to developing a resilient and responsive vaccine safety surveillance system.

DHIEU-P-19: Leveraging COVID-19 as a natural experiment: Proof-of-concept analysis of South Africa's Xpert MTB/RIF Ultra cycle threshold data measuring tuberculosis burden

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Background: The rpoB cycle threshold (Ct) values reported by South Africa's national Xpert MTB/RIF Ultra (Ultra) test provides an approximate measure of tuberculosis organism load, enabling more quantitative monitoring at a population level. Aims: To illustrate the utility of the proposed Ct value as a quantitative indicator for monitoring TB burden, regardless of fluctuations in testing volume and positivity rates, and healthcare service disruptions such as COVID-19 pandemic. Methods: Xpert Ultra tests conducted by the National Health Laboratory Service (NHLS) from 2018 to 2023 were analysed, with the study period stratified into three clinically relevant phases: pre-COVID-19 (January 2018–March 2020), during COVID-19 (April 2020–April 2022), and post-COVID-19 (April 2022–September 2023). Ct values were converted into estimated bacterial load (CFU/mL). Relationships between test positivity, bacterial load, and testing volume were evaluated using the Pearson coefficient of determination. Differences between the pre- and post-COVID-19 periods were assessed for statistical significance using t-tests. Results: Xpert Ultra testing volumes exhibited a consistent annual pattern. During the COVID-19 period, testing volumes declined; however, both the positivity rate and the bacterial load among positive samples increased. Overall test positivity decreased in the pre- and post-COVID-19 periods, the bacterial load in positive tests significantly increased in the post-COVID-19 period ($p < 0.001$). Conclusion: Higher mycobacterial loads may indicate increased risk of transmission, potentially contributing to post-pandemic TB burden and therefore a variable quantitative variable useful in surveillance. Temporal trends in aggregated Ct values may serve as a useful quantitative measure for assessing changes in testing, transmission, and intervention effectiveness in public health programs.

DHIEU-P-20: The National Integrated Human Resource Information System (HRIS) as a Health System Innovation: Barriers and Enablers to Adoption in South Africa

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Background: Human Resources Information Systems (HRIS) represent a novel digital health innovation with the potential to strengthen evidence-based human resources for health (HRH) planning. Following global recommendations, South Africa's health sector embarked on integrating fragmented HRIS into a unified national platform, consolidating data into a centralised repository as the authoritative source for HRH information and enabling reliable planning and decision-making. However, nationwide adoption remains unrealised, necessitating a deeper understanding of the factors shaping this process. Aims: This

study examined the progress of national integrated HRIS adoption and explored facilitators and barriers to implementation. Methods: A qualitative study design was employed. Purposive sampling recruited participants, and semi-structured interviews were conducted using pre-set interview guides. Data were analysed thematically using ATLAS.ti software, following a systematic process of coding, categorising, and identifying themes. Results: The HRIS architecture, comprising the HRH registry, data warehouse, and user portal, was fully developed at the time of this study; however, the system had not been fully adopted across the health sector. Facilitators included effective leadership, secure funding, and stakeholder engagement. Barriers included inadequate capacity, leadership changes, competing priorities, and centralised decision-making. Conclusion: Adoption of the national integrated HRIS as a health system innovation is shaped by a complex interplay of factors, requiring coordinated, multi-level strategies rather than isolated interventions. These findings have direct relevance for national HRH planning. Addressing identified barriers is essential for realising the full potential of integrated HRIS as a foundation for HRH analytics and equitable, data-driven policy development in South Africa and similar low-resource settings.

DHIEU-P-21: Title: Exploring Patient and Healthcare Worker Perspectives on WhatsApp-integrated AI-enabled Digital Tools for Chronic Disease Care in Primary Healthcare Settings in South Africa and Eswatini: A Formative Qualitative Study Short Title: "The Chatbot Study"

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Background: Chronic diseases, including diabetes, hypertension and HIV, place a growing burden on primary healthcare systems across sub-Saharan Africa and require innovative approaches to support long-term care. WhatsApp-integrated artificial intelligence (AI)-enabled chatbots may improve patient engagement, self-management and continuity of care; however, evidence from resource-constrained African settings remains limited. Aims: To explore patients' and healthcare workers' perceptions, experiences and anticipated acceptability of WhatsApp-integrated AI-enabled chatbots for chronic disease management in primary healthcare settings in South Africa and Eswatini. Methods: This multi-site exploratory study will recruit adult patients living with diabetes, hypertension or HIV, together with healthcare workers from selected primary healthcare facilities. Semi-structured interviews will explore experiences of chronic disease care, digital health technologies and chatbot-supported care. Participants will be purposively selected to include individuals with prior chatbot experience and those without. Participants without prior experience will receive a structured demonstration of a WhatsApp-integrated chatbot before the interview. A South African subsample without prior experience will take part in a one-month at-home trial of a prototype WhatsApp-integrated chatbot, followed by a follow-up interview to explore user experience after real-world use. Data analyzed using thematic analysis. Anticipated Findings: The study is expected to identify factors influencing chatbot adoption, including usability, digital literacy, trust, privacy and implementation readiness. Results: are also anticipated to describe stakeholder preferences and contextual considerations regarding the chatbot-supported care into routine primary healthcare. Conclusion: This formative study will generate evidence to inform the development and implementation of patient-centred, WhatsApp-integrated AI chatbots for chronic disease management in resource-constrained primary healthcare settings, and to guide future implementation research and digital health policy integration.

DHIEU-P-22: Age-related differences in engagement and retention within a WhatsApp-based mHealth system: evident from over 4000 participants in a community TB study
BHSc alumni

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Background: Use of WhatsApp-based mobile health (mHealth) platforms is becoming a new method for survey data collection to support community tuberculosis (TB) screening and engagement. There is limited understanding of how engagement, retention, and acceptability of different TB screening tools differ across age groups. Aims: To investigate age-related differences in participant engagement, retention, and acceptability of tongue swab and cough recording for TB testing within a WhatsApp-based mHealth system used for the ACT-TB study. Methods: We analysed preliminary data that included 4873 participants enrolled via WhatsApp and non-WhatsApp platforms. Engagement and retention were assessed using survey completion, participation and dropout rate. Descriptive statistics were used to analyse age, which was shown as a continuous variable. Odds ratios were estimated for each 10-year increase in age to assess the association with acceptability, usability, and uptake outcomes. Results: Based on the preliminary results, cohorts had a median age of 39 years (IQR 29-49 years). 97,8%(4767/4873) of participants completed TB testing, and 0.8%(41/4873) were dropouts. Acceptability rate for cough recording was 90%(4690/4873), and 94%(4720/4873) for tongue swab testing. Each 10-year increase was associated with a higher acceptability rate ($p<0.001$) and improved usability ($p=0.058$). Older age was associated with lower odds of uptake ($p<0.001$). Conclusion: Despite high levels of engagement and retention across all age groups, age remains an important factor influencing acceptability and interaction. This highlights the importance of implementing age-sensitive study designs and health communication to enhance the effectiveness of digital health interventions and maintain engagement across different populations.

DHIEU-P-23: A POPIA-Aligned Workflow for Ethical AI-Ready Clinical Data in VALID 2.0

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Background: Ethical clinical AI requires more than model development; it depends on lawful and clinically meaningful data infrastructure. South African health services still rely on paper-based records yet use for digital health innovation is constrained by fragmented documentation, inconsistent structure, resource limitations, interoperability barriers, and privacy concerns. Few studies describe end-to-end workflows transforming South African paper records into AI-ready datasets. Aims: To describe the VALID 2.0 data-ingestion workflow as a POPIA-aligned methods innovation for converting paper-based clinical records into de-identified, event-linked and analysis-ready datasets for health informatics, analytics and large language model evaluation. Methods: This descriptive implementation study analyses 500 cases abstracted through VALID 2.0 between June and August 2026. The workflow includes record identification, structured file review, sequential abstraction, variable standardisation, event linkage, quality control, de-identification and audit logging. Clinical notes, laboratory results, radiology findings, procedures, treatment changes and outcomes are linked to relevant events or timepoints. Direct identifiers are removed before upload using redaction checklists and clinician-led review. The analytic environment receives study and event identifiers. Results: Findings will describe cases processed, source-document, event-linkage patterns, redaction issues, quality-control findings, audit-trail completion and implementation challenges Replication requires standardised abstraction with source hierarchy rules, event definitions, controlled investigation linkage, secure storage, role-based access and multilevel quality control. Scaling may be constrained by workforce capacity, heterogenous documentation, fragmented investigation retrieval and inter-abstractor consistency. Conclusion: VALID 2.0 reframes POPIA compliance as an upstream digital health systems-design requirement. This study offers a feasible South African framework for ethical, AI-ready clinical data infrastructure in paper-based health settings.

DHIEU-P-24: Exploring Medical Ethics Extensions to MoralityGym for Evaluating AI Decision-Making

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As AI agents are increasingly applied to complex decision-making tasks, there is a need to evaluate not only whether they achieve their goals, but whether they act in ethically acceptable ways. This is especially relevant in healthcare, where decisions often involve competing principles such as autonomy, beneficence, non-maleficence, justice, and duty of care. This project builds on MoralityGym, a benchmark for evaluating hierarchical moral alignment in sequential decision-making agents. MoralityGym formalises hierarchical value specification using Morality Chains, where moral norms are ranked according to priority, allowing agent behaviour to be assessed separately from task success. Originally MoralityGym was restricted to trolley-problem moral dilemmas, which while useful in isolating morally salient behaviour do not capture features from high stakes domains. As an exploratory extension, this work applies the MoralityGym framework to high stakes medical scenarios. These include VentilatorReallocation, which models an ICU resource-allocation dilemma, and EmergencyConsent, which models emergency treatment decisions involving patient capacity, advance directives, family input, and refusal of care. Medical morality chains were created to represent principles such as harm minimisation, autonomy, beneficence, justice, and epistemic duty of care. These extensions demonstrate how MoralityGym could be adapted to health-related contexts. The project highlights the potential value of structured ethical evaluation for AI systems in medicine, while also showing the difficulty of ranking ethical principles across different clinical situations.

DHIEU-P-25: Facilitators and Barriers to the Implementation of Electronic Health Systems by Health Care Workers at Primary Health Care Clinics in the City of Johannesburg

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Background: South Africa has implemented an eHealth strategy since 2012, but implementation in the City of Johannesburg has been uneven. Poor network infrastructure, unwillingness by health care personnel to use eHealth and fragmented public health governance, are contributing factors. Aims: The aim of this study was to understand the status of implementation of eHealth systems within public health clinics in the City of Johannesburg and the facilitators and barriers to the implementation of eHealth by the nurses and doctors in the public health clinics. Methods: An exploratory qualitative design was employed in this study. Key informant interviews were conducted with 5 operations managers, 5 professional nurses, 1 data clerk, 1 doctor and one senior sub-district manager within the City of Johannesburg health district's sub-districts. An unplanned group discussion was conducted with senior district officials responsible for the implementation of electronic health systems. Data was transcribed verbatim and thematic analysis used to analyse the data. Results: Key findings indicated that eHealth is currently not being implemented fully in the City of Johannesburg, with limited awareness by health care workers. The Local Authority is implementing a second pilot of eHealth, which is not mirrored in Provincial clinics. Digital literacy, access to

standard operating procedures, management support for and network access affect implementation by health care workers. Conclusion: This study revealed that health care workers have limited knowledge of the status of implementation. To improve successful implementation, senior officials responsible for implementation need to include health care workers in the design of the system and to integrate implementation with the Provincial health department.

DHIEU-P-26: Implementation of a wearable-device based study to measure behavioural and physiological outcomes among middle-aged and older rural South Africans.

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Background: Wearable devices collect continuous objective behaviour and physiological data that can advance understanding of risk factors for chronic diseases. This study describes the implementation of wearable device measurement study among middle-aged and older adults in rural South Africa. Methodology This ongoing cross-sectional study aims to objectively measure lifestyle behaviours, including sleep patterns, sedentary behaviour, and physical activity, using wearable sensors. Participants are recruited from the HAALSI study cohort within the Agincourt HDSS and consented to wear the devices for three or seven days. After data collection, devices are retrieved, and data are downloaded and transferred to a server. Trained fieldworkers document implementation experiences and challenges through field notes. These field notes are transferred to a spreadsheet to organise the data. Thematic analysis was used to conduct preliminary data analysis. Results: To date, we have consented and issued out wearable sensor devices to 155 participants, median age 54 years; 51 (32%) males from February 2026 to June 2026. About 145/155 have completed the data collection process. We had 10/155(6%) participant withdraw from the study process after receiving the wearable devices due to conflicting cultural and spiritual beliefs, life demands such as work and family responsibilities. Identified field challenges include need for ongoing technical support to charge and utilize devices, malfunctioning and loss of devices, and physical discomfort associated with wearing the devices. Conclusion: The implementation of a wearable device measurement study in this rural South African setting is feasible although older participants might require ongoing support. It is imperative to understand the community beliefs and cultural practices to improve participant retention.

DHIEU-P-27: A Framework for Game-Based Learning in Health Science Education: Bridging Pedagogy, Technology and Educator Development in a Resource-Constrained Context

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Background: Game-based learning has gained increasing attention as an innovative approach to enhancing engagement, critical thinking, and active learning in health professions education. Despite growing evidence supporting its educational value, implementation remains fragmented, often limited to isolated pilot projects, with few institutionally embedded approaches that address the realities of resource-constrained contexts. Aims: To develop a contextually relevant framework for implementing game-based learning in health science education that integrates pedagogy, technology, and educator development within a South African university setting. Methods: The study employs a pragmatic paradigm using a case study approach informed by Design Theory. Multiple phases include a scoping review, surveys, interviews, co-design activities, and iterative framework development. Data are analysed to identify factors influencing the adoption, design, and sustainability of game-based learning in health professions education. Results: Preliminary findings from the scoping review and initial phases indicate that successful implementation depends on the alignment of pedagogical principles, institutional support, educator competencies, and collaborative design processes. Barriers include limited educator awareness, resource constraints, and a lack of structured implementation guidance. Emerging findings suggest the need for a framework that supports both educational design and educator capacity development. Conclusion: The study is developing a framework to guide the systematic integration of game-based learning within health science education. The framework has the potential to support equitable digital transformation, strengthen educator capability, and provide practical guidance for implementing game-based learning in health professions education, particularly in low-resource settings.

DHIEU-P-28: Why Is Functional Electrical Stimulation Underused? Occupational Therapists' Perspectives on Stroke Rehabilitation in Gauteng, South Africa

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Background: Functional Electrical Stimulation (FES) has been labelled a “promising modality” for improving post-stroke motor deficits for over half a century. Despite improved technological features, access, and variety in open-loop systems, occupational therapists have largely avoided using FES devices in stroke rehabilitation. Aims: This study aimed to explore occupational therapists' perceptions of the use of FES in stroke rehabilitation in Gauteng, South Africa. Methods: This study employed a descriptive qualitative research design. Twelve occupational therapists working in stroke rehabilitation

participated in semi-structured interviews. Thematic analysis was used to analyse the data. Results: Three themes emerged: (i) “A Tug of War” reflects therapists' conflicting views on FES; feeling torn between their belief in its benefits, and their feelings of fear and controversy. (ii) “The Lost Leading the Lost” highlights knowledge gaps, inconsistent guidance, and reliance on self-directed learning. (iii) “A Puzzle of Practicality” explores factors influencing FES use, including accessibility, frequency, client-specific needs, and targeted interventions in stroke rehabilitation. Conclusion: Many participants identified perceptions and factors that pose a challenge in the use of open-loop FES systems in stroke rehabilitation. We call on designers of rehabilitation technology, occupational therapy educators, and clinicians, to address these challenges to improve evidence-based practice in stroke rehabilitation.

DHIEU-P-29: Reliability, validity and dimensionality of the satisfaction questionnaire among diabetes patients: Structural Equation Modelling (SEM).

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Background: Sub-saharan Africa is witnessing a rapid increase in the prevalence of type 2 diabetes (T2D) which will lead to increase in T2D complications with diabetes retinopathy (DR) being the predominant complication at 17.9%–35.9% in population-based studies. Less than half of T2D patients are assessed for sight-threatening DR. Aims: The study tested the reliability, validity, dimensionality and identify the latent factors of the patient satisfaction questionnaire. Methods: Using a 23-item satisfaction questionnaire, 723 diabetes patients responded on satisfaction (1: Strongly agree, 2: Agree, 3: Uncertain, 4: Disagree, 5: Strongly Disagree) on the care, access and support received. The factor structure of the satisfaction was examined using exploratory factor analysis (EFA) to identify factors, confirmatory factor analysis (CFA) for construct validity and structural equation modelling (SEM) to establish a fit model. Results: Determinant for the correlation matrix, Barlett test of spericity was $p<0.001$, $X2=4327.7$, Kaiser-Meyer-Olkin measure (KMO) of sampling adequacy=0.882. A Cronbach’s alpha of 0.832 for the entire sample, 0.899 for Factor 1 (52.5%) standardised SEM associated with 12 items, 0.797 for Factor 2 (28.3%) with 5 items, and 0.638 for Factor 3 (13.6%) with 4 items and accumulative value of 94.4%. The Goodness-of-fit: $X2=965.85$, $p<0.001$, Root mean squared error of approximation=0.077, pclose<0.001, Information criteria (Akaike’s information criterion:29214.32, Bayesian information criterion: 29528.55), Baseline comparison (Comparative fit index:0.822, Tucker-Lewis index:0.801), Size of residuals (Standardised root mean squared residual:0.075 and Coefficient of Determination:0.991). Conclusion: Affirms the validity, reliability and multidimensionality of the patient satisfaction questionnaire when administered to diabetes patients. The 23-item patient satisfaction questionnaire can be used in diabetes patients.

DHIEU-P-30: Costing of a Multimorbidity Dashboard for Scale-Up in South African Primary Healthcare: The Case of the MADIVA Dashboard

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Background: . South Africa's primary healthcare system manages HIV, hypertension, and diabetes through fragmented data systems that do not share information at patient level. The MADIVA project developed a web-based dashboard to present integrated patient and programme data to clinicians, facility managers, and district health teams. No published cost estimates exist for multimorbidity-focused dashboards in sub-Saharan Africa. Methods: . A retrospective ingredients-based micro-costing study estimated dashboard costs from a government provider perspective using five years of primary financial data from the MADIVA pilot (eight PHC facilities, Agincourt-Bushbuckridge, Mpumalanga). Costs were classified as development, deployment, and recurrent. A government scenario replaced research-specific inputs with public-sector equivalents. National scale-up was projected across 3,468 PHC facilities over 10 years (5% discount rate, 2026 ZAR). Three deployment scenarios tested how much pilot deployment work would repeat at each facility. Enabling infrastructure costs were estimated separately using KenyaEMR data as a proxy. Results: . Personnel accounted for 84% of pilot expenditure. The 10-year national dashboard cost ranged from ZAR 662 million to ZAR 1.95 billion, with a base case of ZAR 1.09 billion. Where patient-level data infrastructure is absent, enabling infrastructure adds ZAR 829 million to ZAR 2.29 billion, accounting for 43% to 68% of the combined cost. Conclusion: . Dashboard adoption should be planned as two distinct investments; the dashboard itself and the enabling data infrastructure. A district-level rollout is needed before national procurement to determine which deployment activities must be repeated at each facility.

DHIEU-P-31: The barriers to digital transformation in the Wits School of Oral Sciences

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Background: Digital transformation in oral health sciences is frequently slowed by organisational, strategic, and behavioural

barriers. This study explored those barriers at the Wits School of Oral Health Sciences (WSOHS). Aims: /Objective: To establish the extent to which the barriers are impacting digital transformation at WSOHS Methods: A quantitative case study design was used, underpinned by stakeholder theory and status quo bias theory. Data were collected by questionnaire from staff, students, and service providers using stratified random sampling. A total of 168 respondents participated, and the data were analysed in SPSS using descriptive statistics and ordinal logistic regression. Results: The main barriers were poor collaboration across departments, weak alignment between strategy and execution, and institutional constraints. Most respondents reported that these barriers had a significant to huge impact on digital transformation. Regression analysis showed that stakeholder group, perceived impact of digital transformation, extent of barriers, and intentions to adopt new systems were significantly associated with transformation outcomes. The findings indicate that digital transformation at WSOHS is constrained less by technology alone than by organisational readiness, leadership, communication, and coordinated implementation. Behavioural factors, including perceived threat, usefulness, compatibility, ease of use, and resistance to change, also influenced intention to adopt new systems. Conclusion: Successful digital transformation requires strategic alignment, cross-departmental collaboration, inclusive stakeholder engagement and purposeful change management to reduce resistance and improve adoption.

ORAL PRESENTATIONS (18)

PMOCH-O-01: Genomic epidemiology of invasive and colonising Klebsiella pneumoniae in young infants

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Background: Klebsiella pneumoniae (Kpn) is a leading cause of neonatal sepsis-associated morbidity and mortality, especially in low-and-middle-income settings, and is often associated with antimicrobial resistance (AMR). Aims: This is a preliminary analysis evaluating the molecular epidemiology of invasive and colonising Kpn isolates in infants under 90 days old. Methods: Whole genome sequencing characterised Kpn isolates across four South African hospitals (2023–2025), including 438 cases (invasive isolates causing sepsis) and 628 controls (rectal isolates from colonised disease-free infants), enrolled contemporaneously. Results: A high diversity of sequence types (68 in cases, 116 in controls), capsule (K-loci; 47 in cases, 65 in controls) and lipopolysaccharide O-types (10 in both groups) was observed. AMR genes were detected in 79% of invasive compared with 52% of colonising isolates, with higher prevalence of extended-spectrum β-lactamase (42%, n=185/438 versus 32%, n=202/628; p<0.001) and carbapenemase genes (37%, n=160/438 versus 20%, n=123/628; p<0.001) in cases. The virulence-associated yersiniabactin locus was also more common in cases (66%, n=291/438 vs 55%, n=348/628; p<0.001). Certain K-loci and sequence types were more common in cases than controls, however following multivariable logistic regression analysis, the only factors associated with invasiveness were birthweight of <1500g (p=0.003), infant age of 28-89 days old (p<0.001), certain hospital sites (Site 1: p=0.016; Site 3: p=0.018), and AMR genes (ESBL, p=0.001; carbapenemase, p=0.014). Conclusion: Invasive Kpn infections are caused by diverse, circulating strains that also colonise healthy infants, indicating sepsis results from opportunistic invasion rather than specialised lineages. AMR and virulence genes are more common in invasive isolates. These findings can inform preventative strategies, such as vaccination.

PMOCH-O-02: CCR5 regulatory variants and novel loci associated with susceptibility to HIV-1 infection in Sub-Saharan African populations

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Background: Human immunodeficiency virus type 1 (HIV-1) infection and its sequelae remain a major global health challenge, with Sub-Saharan Africa (SSA) bearing the highest disease burden. Although host genetic factors influence HIV-1 susceptibility, most genome-wide association studies (GWAS) have been conducted in non-African populations, leaving the genetic basis of susceptibility in SSA largely unexplored. High HIV-1 prevalence in SSA increases the likelihood that controls were exposed but uninfected, improving the interpretability of case-control analyses. Aims: To identify genetic variants associated with susceptibility to HIV-1 infection in individuals of SSA ancestry and investigate their potential functional mechanisms. Methods: We conducted the largest GWAS to date of HIV-1 susceptibility in SSA ancestry, including 3,069 HIV-1-positive cases and 14,291 HIV-1-negative controls from multiple South and East African populations. Fine-mapping and colocalisation with blood expression quantitative trait loci (eQTLs) from the Southern African Blood Regulatory (SABR) resource were used to investigate functional mechanisms underlying associated loci. Results: Three independent loci reached genome-wide significance: rs2040388 and rs2227010 on chromosome 3 (in CCR5AS and upstream of CCR5), rs112358207 on chromosome 1 (in ESRRG), and rs113298445 on chromosome 8 (in INTS9). The chromosome 3 signal colocalised with eQTL variants for CCR5AS expression. Although the protective CCR5Δ32 mutation is absent in African populations, alternative variants in the CCR5 regulatory region may modulate HIV-1 susceptibility. Conclusion: This study identified both shared and population-specific genetic determinants of HIV-1 susceptibility, highlighting the importance of CCR5 regulation in host defence. These findings expand genomic evidence in African populations and provide targets for future replication and functional studies

PMOCH-O-03: In Silico Analysis of hnRNPA2B1, hnRNPA3 and KSRP in Lung, Breast, Colorectal and Prostate Cancer

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Background: Lung, breast, colorectal, and prostate cancers represent a significant global health burden. The RNA binding protein, heterogeneous nucleoprotein A2/B1 (hnRNPA2B1), hnRNPA3 and KH-type splicing regulatory protein (KSRP) are involved in transcriptional splicing, affecting protein synthesis and potentially affecting tumorigenesis. Aims: Analyse mRNA and protein expression of the splicing factors hnRNPA2B1, hnRNPA3 and KSRP in lung, breast colorectal and prostate cancers using publicly available datasets. Methods: mRNA data were obtained from The Cancer Genome Atlas (TCGA) and protein data were retrieved from the University of Alabama at Birmingham Cancer Data Analysis Portal (UALCAN).

Expression levels were analysed between cancerous and non-cancerous tissues and clinicopathological variables. Expression levels were compared using Mann-Whitney U and Kruskal-Wallis tests. Results: Across all four cancers, hnRNPA2B1, hnRNPA3, and KSRP genes were significantly upregulated compared with noncancerous tissues ($p<0.05$). This upregulation was generally mirrored at the protein level, except for isolated differences by cancer type. In lung cancer, all three factors were elevated in adenocarcinoma, with no variation across age or stage, and hnRNPA2B1 showing higher expression in males. In breast cancer, splicing factor expression varied by molecular subtype, with triple-negative tumours showing the highest transcript levels. Colorectal and prostate cancers also showed consistent overexpression, particularly of hnRNPA2B1, which correlated with younger age and lymph-node involvement, respectively. Conclusion: This study supports the notion that splicing dysregulation plays a central role in oncogenesis by demonstrating the consistent overexpression of hnRNPA2B1, hnRNPA3 and KSRP in various cancer types. The splicing factors hnRNPA2B1, hnRNPA3 and KSRP may have potential as prognostic cancer biomarkers.

PMOCH-O-04: Cross-tissue TGF-β signalling dysregulation in fibrosis

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Background: Transforming Growth Factor-β (TGF-β) has been described as a master regulator of fibrosis because of its role in wound healing, extracellular matrix production and tissue remodelling. However, broad targeting of TGF-β signalling is complicated by its involvement in vital biological processes and the diversity of fibrotic diseases across tissue contexts. Aims: This study aimed to determine whether canonical TGF-β signalling and downstream TGF-β-associated transcriptional targets show conserved expression patterns across fibrotic disease and tissue contexts. Methods: Differential gene expression analysis was performed on seven fibrosis datasets representing five tissue types: blood, heart, liver, kidney, and skin. Gene enrichment analysis of TGF-β-associated biological processes was used to examine pathway-level enrichment across datasets. Results: Expression of canonical TGF-β pathway genes was conserved. Genes differentially expressed across multiple fibrotic tissue contexts were more commonly downstream or TGF-β-associated genes. Some genes showed tissue-specific expression patterns, with GDF15 and FBN2 being upregulated in heart and liver tissues, but downregulated in the kidney. LUM and INHBA were consistently upregulated across five datasets representing skin, heart, kidney and liver tissues. Notably, these genes were not differentially expressed in Non-Alcoholic Fatty Liver Disease (NAFLD) samples, suggesting disease-specific fibrotic expression patterns within the same tissue. Conclusion: TGF-β-associated fibrosis appears to involve context-dependent dysregulation of downstream genes rather than changes in canonical TGF-β pathway components. These findings suggest that therapeutic interventions targeting TGF-β-associated fibrosis may need to account for tissue- and disease-specific downstream gene expression patterns rather than targeting the canonical pathway.

PMOCH-O-05: Multi-Omics Integration Identifies C19ORF47 as a Hypomethylation-Activated Driver of Poor Prognosis in Endometrial Cancer

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Background: Endometrial cancer displays considerable clinical heterogeneity that existing clinicopathologic and molecular classification systems fail to fully capture. While tumour suppressor silencing via DNA hypermethylation is well established, the prognostic relevance of hypomethylation-driven gene activation in EC remains poorly characterised. Aims: This study aimed to identify hypomethylation-activated genes with consistent prognostic and biological relevance in EC through integrative multi-omics analysis, and to evaluate their potential as biomarkers for improved risk stratification. Methods: Using the TCGA Uterine Corpus Endometrial Carcinoma cohort, DNA methylation, RNA sequencing, and clinical data were integrated. Hypomethylation-activated genes were identified via differential methylation and methylation–expression correlation. Prognostic candidates were selected using penalised Cox regression with bootstrap stability selection. Protein–protein interaction networks were examined through STRING, Louvain community detection, and Reactome pathway enrichment. Regulatory mechanisms were modelled using the Enformer deep-learning framework, with external validation in the CPTAC cohort. Results: C19ORF47 emerged as a consistently hypomethylation-activated gene with strong tumour overexpression and robust inverse methylation–expression coupling. Network analyses linked it to RNA processing, proteostasis, and antigen presentation. Enformer modelling supported epigenetic de-repression as the activation mechanism. In multivariable Cox regression, elevated C19ORF47 expression independently predicted poorer overall survival (HR = 1.64, $p = 0.005$), with a prognostic nomogram achieving time-dependent AUCs of 0.77 at three and five years. CPTAC validation showed a consistent directional trend. Conclusion: C19ORF47 is a novel hypomethylation-activated gene with independent prognostic value in endometrial cancer, linking epigenetic deregulation to aggressive tumour phenotypes. These findings position C19ORF47 as a promising biomarker for precision oncology, potentially improving risk stratification and informing therapeutic targeting of epigenetically deregulated pathways in endometrial cancer

PMOCH-O-06: Antimicrobial Resistance Profiles and Genomic Determinants of Clostridioides difficile in a Johannesburg Tertiary Hospital

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Background: Clostridioides difficile, a Gram-positive anaerobic bacillus, is a leading cause of healthcare-associated infections. Treatment in South African tertiary hospitals relies on metronidazole, vancomycin, and fidaxomicin, however, emerging antimicrobial resistance (AMR) threatens efficacy. Limited local data highlight the need for surveillance. Aims: To characterise phenotypic resistance and identify genetic resistance determinants of C. difficile isolates in Charlotte Maxeke Johannesburg Academic Hospital. Methods: Toxigenic C. difficile-positive stool specimens from the NHLS laboratory were cultured anaerobically on CCFA and 5% blood agar and confirmed by PCR. Whole genome sequencing (WGS) was performed on a subset of isolates (n=9) at the NICD, followed by resistome profiling and sequence typing using CARD, ResFinder, and PubMLST. Phenotypic antimicrobial susceptibility testing against metronidazole, vancomycin, and fidaxomicin is ongoing, with subsequent evaluation of genotype-phenotype concordance using Cohen's kappa (κ). Results: Of 50 stool specimens, 38 (76%) were culture-positive, with 23/38 (60.5%) confirmed toxigenic. Sequenced isolates (n=9/9, 100%) belonged to the hypervirulent ST1 (Clade 2) lineage. Mutations associated with metronidazole and fluoroquinolone resistance were identified in all the isolates (n=9/9, 100%), comprising of PnimBG mutation (n=9/9, 100%), gyrA Thr82Ile (n=8/9, 88.9%) and gyrB mutations (n=1/8, 11.11%). All isolates (n=9/9, 100%) harboured nimB, aac(6')-Ie-aph(2")-Ia, qacG, and cryptic vanG elements. Additional determinants included mefA (n=1/9, 11.11%) and tet(W) (n=1/9, 11.11%). Conclusion: Epidemic ST1 C. difficile isolates carried a conserved multidrug resistome, with mutations linked to metronidazole and fluoroquinolone resistance, underscoring the need for sustained infection control and responsible antibiotic use. Results: will inform local treatment guidelines, strengthen stewardship, and support genomic surveillance in South African healthcare settings.

PMOCH-O-07: Exome sequencing reveals pathogenic germline variants in individuals with suspected hereditary cancer syndromes

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Background: The incidence of childhood cancer incidence is increasing gradually in low-middle income countries, such as South Africa (SA). In SA it is estimated that ~ 50% of the cases do not survive longer than 5 years. Next generation sequencing (NGS) technologies have been key in determining the genetic contribution of germline variants in paediatric cancers. The aim of this study was to identify and characterise pathogenic genetic variants in a subset of children with various types of cancers. Methods: Thirty paediatric patients diagnosed with solid tumours were included in this study. Whole exome sequencing (WES) was performed. Bioinformatics analysis of data was performed to identify potential disease associated variants. Results: The patients included in the study had a variety of cancers including various CNS tumours, retinoblastoma, neuroblastoma and hepatoblastoma. The analysis identified five pathogenic variants, yielding a diagnostic rate of 16%. These variants were identified in genes (e.g. APC, ATM) also known to increase the risk of adult cancers. The findings demonstrate the clinical utility of exome sequencing in uncovering disease causing / predisposing variants and highlight the genetic heterogeneity of the cohort. Conclusion: The application of WES in paediatric oncology highlight its value in uncovering clinically actionable variants some of which may influence therapeutic decisions, surveillance strategies, and genetic counselling for affected individuals and their families. This study supports integration of WES into paediatric oncology in order to advance precision medicine and improve patient care.

PMOCH-O-08: Reduced TCRβ CDR3 Repertoire Diversity and Increased Clonal Expansion in South African Patients with Systemic Lupus Erythematosus
BHSc alumni

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Background: Systemic lupus erythematosus (SLE) is associated with dysregulated and autoreactive T cell responses, yet the mechanisms underlying T cell receptor (TCR) repertoire perturbations remain incompletely understood. Existing TCR repertoire studies are largely limited to European and Asian cohorts, leaving important gaps in understanding population-specific repertoire features in African populations. Aims: To characterise TCRβ complementarity-determining region 3 (CDR3) repertoire diversity, TRBV/TRBJ gene usage, clonal expansion, and public clonotypes in patients with SLE and healthy controls (HC) in a South African cohort. Methods: High-throughput sequencing of the TCRβ CDR3 region was performed on peripheral blood mononuclear cells from three groups: patients with SLE without lupus nephritis (SLE-LN), patients with SLE and lupus nephritis (SLE+LN), and HC. Repertoire analysis included diversity metrics, gene usage profiling, V-J pairing, and sequence sharing. Due to quality filtering, seven libraries were excluded, resulting in a final sample of 17 participants. Results: TRBV and TRBJ gene usage was broadly conserved between patients with SLE and HC, suggesting alterations may arise through post-recombinational selection. Patients with SLE-LN exhibited reduced repertoire diversity and increased clonality relative to HC, with selective expansion of TRBV4-3/TRBJ2-1 and TRBV12-2/TRBJ2-7. Public

clonotypes were identified across patients with SLE, including CASSLAPSYEQYF and CASSRLAGGTDTQYF, with enrichment of hydrophobic residues at CDR3 positions P6 and P7. Conclusion: SLE-associated TCR repertoire abnormalities in this cohort may reflect post-recombinational selection rather than intrinsic V(D)J recombination biases, contributing novel population-specific data on clonotypic features in SLE. These findings support further investigation of clonotype-level repertoire signatures as potential biomarkers of disease activity in African SLE populations, an area currently underrepresented

PMOCH-O-09: Impact of the OCA2 2.7kb deletion at the transcript level

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Background: Oculocutaneous albinism type II (OCA2) is a common autosomal recessive disorder in Southern Africa. OCA2 is caused by recessive mutations in the OCA2 gene with the most common mutation being a 2.7kb deletion involving exon 7. More than half of OCA2 patients develop ephelides (dark patches). Ephelides are inherited and 90% of individuals with ephelides are heterozygous for the 2.7kb deletion. Aims: The aim of this study was to determine the gene expression patterns in OCA2 patients with and without ephelides. Skin biopsies were taken from individuals with ephelides (n=4) and without ephelides (n=6). Biopsies were taken from sun exposed (forearm) and non-sun exposed (upper arm) skin. An additional biopsy was taken from the ephelide site in the four participants with ephelides. Methods: Paired-end RNAseq libraries were sequenced using the HiSeq platform. Reads were mapped using STARR to the GRCh38 genome build and annotated using Gencode v.26. The 2.7kb deletion was genotyped in all individuals. Results: All individuals without ephelides were homozygous whereas 3/4 individuals with ephelides were heterozygous for the 2.7kb deletion. Intron 6 and 7 retention was observed in the presence of the 2.7kb deletion. The individual with ephelides that was negative for the 2.7kb deletion had an intron 20 retention in the same gene. Conclusion: This study showed the impact of the 2.7kb deletion on transcript structure suggesting a mechanism of how this deletion leads to no functional OCA2 transcripts being produced and nonsense mediated decay hence no OCA2 protein Implications We have a better understanding of how the deletion leads to the OCA2 phenotype.

PMOCH-O-10: Development of an ex vivo drug sensitivity screening platform for South African multiple myeloma patients

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Background: Multiple myeloma (MM) is a bone marrow-based malignancy of plasma cells that produces monoclonal proteins and causes end-organ damage. Despite significant advances in treatment, MM is still mostly incurable due to significant intra-tumoral, geographical, and temporal heterogeneity, which causes unpredictability in patient outcomes and promotes therapeutic resistance. Aims: This study aimed to investigate complementary and alternative therapies in MM, with particular emphasis on the limited data regarding treatment responses among South African patients. Methods: In this study, a cohort of 33 patients with MM was recruited. Patient-derived peripheral blood mononuclear cells were subjected to ex vivo drug sensitivity testing (DST) with 30 FDA-approved compounds. Drug efficacy was quantified using the drug sensitivity score (DSS), enabling comparative ranking across the cohort. The five most effective drugs identified during single-agent screening were combined with less-performing drugs relevant to MM management. Effective drug pairs were also evaluated by multiparametric flow cytometry, using antibodies to CD3, CD8, CD19, CD38, HLA-DR, annexin V, and propidium iodide. This allowed assessment of the malignant plasma clone, immune cell dynamics, and mode of cell death. Results: The DSS values of dexamethasone, thalidomide, carfilzomib, gemcitabine, imatinib, and doxorubicin were above 20. Lenalidomide combined with cisplatin produced a synergistic effect, as shown by a Bliss synergy score of 7.99. The drug pair also slightly decreased MM cell viability and CD3 cell expression. Conclusion: This study highlights the importance of DST in the South African context. It provides a means to expand viable treatment options for patients with MM and to support more clinically relevant treatment selection.

PMOCH-O-11: Peroxidasin mediates A549 non-small cell carcinoma characteristics and response to chemotherapies

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Background: Lung cancer is the leading cause of cancer-related mortality worldwide, with 2.4 million cases per year, of which 85% are non-small cell lung carcinoma (NSCLC). NSCLC survival remains particularly poor in low- and middle-income countries like South Africa, due to late-stage diagnosis and limited treatment options. Recent studies point towards modification of the extracellular matrix (ECM) to reduce cancer progression and improve therapeutic responses. In this study, we considered peroxidasin (PXDN), a haem-peroxidase that consolidates the ECM by cross-linking collagen IV, and which is markedly upregulated in NSCLC. We investigated the role of PXDN in NSCLC characteristics and chemotherapy responses. Methods: We reduced PXDN expression in A549 NSCLC cells using siRNA-mediated knockdown and quantified its levels by immunofluorescence assays. Next, cancer cell characteristics were assessed, including cell proliferation and attachment

using MTT assays, migration using scratch assays, invasion through basement membrane substitute and spheroid formation. Next, we observed the impact of PXDN knockdown on cell viability and the mode of cell death in response to the chemotherapies cisplatin, carboplatin, gemcitabine, and paclitaxel. Results: PXDN siRNA knockdown achieved a 56% decrease in PXDN expression. PXDN knockdowns reduced A549 migration by 47%, attachment by 29%, invasion by 52%, and spheroid formation by 30%. PXDN-knockdown cells maintained apoptotic cell death but showed increased susceptibility to cisplatin, carboplatin, and gemcitabine. Conclusion: PXDN mediates multiple NSCLC characteristics and chemotherapy responses. Targeting PXDN overexpression could be a novel approach to improve NSCLC therapeutic outcomes, particularly in resource-constrained countries.

PMOCH-O-12: Vitamin D3 Induces Isoform Switching in IFN-α Stimulated Macrophages

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Background: Macrophages are key immune cells that survey tissue environments to detect infections, often by responding to interferon-alpha (IFN-α) which is released by virally infected cells. 1,25-Dihydroxyvitamin D3 (1,25D3) is a common immunomodulator used during in vitro macrophage differentiation, however, how this initial priming alters the cell's ability to respond to stimuli remains unclear. Aims: This study investigated how the presence of 1,25D3 during differentiation affects the response of macrophages to IFN-α. Methods: THP-1 cells were differentiated with 5 nM phorbol 12-myristate 13-acetate in the presence or absence of 10 nM 1,25D3, and subsequently stimulated with 1000 U/mL IFN-α for four hours. Paired-end RNA sequencing was performed, followed by differential gene expression (DGE) analysis using DESeq2 and differential transcript usage (DTU) analysis utilising DEXSeq, with a p-value < 0.05 deemed significant. Results: While IFN-α stimulation induced a conserved core of IFN-stimulated genes across both protocols, macrophages differentiated with 1,25D3 exhibited unique DGE in critical signalling components (TLR4, TLR8, TRAF6, TBK1) and surface receptors (CD16, CD163). Crucially, while total IL10 gene expression remained unchanged between protocols following IFN-α treatment, DTU analysis revealed that 1,25D3-primed cells shifted toward a non-protein-encoding IL10 isoform in response to IFN-α, thereby possibly reducing its production. Furthermore, even when IFN-α triggered DTU within the same master regulatory gene, such as IRF7, the specific transcript variants utilised were entirely unique to each differentiation protocol. Conclusion: These findings demonstrate that initial differentiation conditions may reprogram how macrophages process transcripts during IFN-α responses. Implictions This highlights the critical importance of integrating DGE and DTU in genomic studies to understand functional plasticity

PMOCH-O-13: Multi-omics analyses of the tumour microenvironment of South African pancreatic ductal adenocarcinoma patients.

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Background: Pancreatic ductal adenocarcinoma (PDAC) is one of the most aggressive malignancies worldwide, with a 5-year survival rate of approximately 13%. Despite its poor prognosis, molecular data from South African patients remain limited. This study applied a multi-omics approach to archived formalin-fixed paraffin-embedded (FFPE) tissues to identify potential biomarkers and investigate molecular mechanisms underlying PDAC progression in this population. Methods: Four protein extraction workflows (Barocycler, Pixul+DTT, Pixul+Sonication, and Pixul-only) were evaluated for FFPE proteomic analysis. The optimal method was applied to 78 FFPE PDAC samples for proteomic profiling and differential expression analysis using LIMMA. DNA and RNA from 28 paired tumour-normal tissues underwent whole-exome and RNA sequencing. Differential gene expression was assessed using DESeq2, followed by pathway enrichment, gene annotation, and immune cell deconvolution analyses. Multi-omics integration was performed using MOFA+ to identify latent biological programmes and patient-specific molecular patterns. Results: The Pixul-only workflow demonstrated superior efficiency, identifying 20,769.5 peptides and 3,300.5 protein groups. Proteomic analysis revealed 39 dysregulated proteins and enrichment of extracellular matrix organisation, platelet activation, and fibrosis-related pathways. Whole-exome sequencing identified both shared and patient-specific somatic mutations, highlighting substantial genomic heterogeneity. Transcriptomic analysis detected 47 differentially expressed genes associated with pancreatic lineage development and glycosylation pathways. Tumours exhibited increased immunosuppressive cell populations, including M2 macrophages and regulatory T cells, alongside reduced cytotoxic immune cells. Multi-omics integration identified five latent biological programmes and demonstrated pathway-level concordance with TCGA PDAC datasets. Conclusion: This study established an efficient FFPE-based workflow and revealed molecular alterations involving extracellular matrix remodelling, exocrine pancreas-associated pathways, immune suppression, and tumour heterogeneity. These findings provide insight into PDAC biology

PMOCH-O-14: Pharmacogenetic variant assessment of benzodiazepine response in a paediatric status epilepticus cohort in Kano, Nigeria

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Background: Benzodiazepine-resistant status epilepticus (BR-SE), is SE that continues after benzodiazepine (BZD) treatment, associated with poor clinical outcomes. No definitive biomarkers of BR-SE have been reported and BR-SE's genetic factors remain understudied. Aims: This study aimed to characterize genetic variation in candidate genes that may influence BZD response in individuals with SE. Methods: We performed targeted long-read sequencing on 64 children from an SE cohort in Kano, Nigeria. These patients were treated with BZDs as a first-line treatment within a standardized SE protocol, and BZD response was determined via prospective clinical evaluations. Using a custom 53-pharmacogene panel, we compared the distributions of variants, star alleles, and predicted metabolism phenotypes among 25 BZD response-related genes between BZD non-responders and responders. In addition, association analyses were done to assess whether variants and predicted metabolism phenotypes were associated with BR-SE. Results: We identified 17,751 variants of which 1.9% were coding and 98.1% were non-coding. Among the BZD response-related genes, 32 protein-altering and splice defect variants were predicted to be deleterious, with 17 of these observably rare (i.e. singleton variant). Non-responders to BZDs carried a higher burden of function-altering pharmacogene star alleles and diplotypes compared to responders, though this was not statistically significant after correcting for multiple testing and there was no adjustment for seizure duration. We identified 26 potentially novel star alleles, indicating considerable genetic diversity within this Nigerian cohort. Conclusion: The study reveals variation in BZD-related genes in a Nigerian pediatric SE cohort, which potentially contributes to interindividual variability in treatment response. Implication: Elucidates the possible genetic mechanism of BR-SE.

PMOCH-O-15: Genetic Risk Predictive Modelling of Cardiometabolic Multimorbidities across Africa Populations

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Background: Cardiometabolic multimorbidity (CMM), the co-occurrence of cardiometabolic diseases, is a major contributor to morbidity and mortality in African populations. Polygenic scores (PGS), which aggregate genetic effects across many variants, offer a promising approach for predicting multimorbidity susceptibility. However, the shared genetic architecture underlying CMM remains poorly characterised in African-ancestry populations, limiting development of multimorbidity-informed PGS. This is compounded by limited transferability of PGS from European-ancestry GWAS, driven by differences in linkage disequilibrium, allele frequencies, and effect sizes. Aims: This study aims to (1) characterise the shared genetic architecture of CMM using multivariate genomic approaches, (2) generate African-ancestry multivariate GWAS summary statistics, and (3) develop and validate PGS for CMM risk prediction in continental African populations. Methods: GWAS summary statistics for dyslipidaemia, diabetes, hypertension, cardiovascular disease, and chronic kidney disease from African American and Afro-Caribbean participants in the All of Us Research Program and Million Veteran Program were analysed using genomic structural equation modelling to model shared genetic architecture and derive multivariate summary statistics. PGS constructed from these results are being validated in continental African cohorts from AWI-Gen, with regional stratification to assess cross-population transferability. Results: Two distinct genetic pathways underlying CMM were identified: a metabolic factor comprising dyslipidaemia and diabetes, and a vascular-renal factor comprising hypertension, chronic kidney disease, and cardiovascular disease. PGS derived from these multivariate constructs are under evaluation in AWI-Gen. Conclusion: Multivariate genomic analyses reveal two distinct shared genetic pathways underlying CMM in African-ancestry populations. This work generates novel African-ancestry multivariate GWAS summary statistics and PGS, advancing equitable genomic risk prediction for underrepresented African populations.

PMOCH-O-16: The association of chromogranin A gene polymorphisms (rs9658638 and rs7159323) with chromogranin A concentrations in a South African population
BHSc alumni

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Background: Chromogranin A (CHGA) is a neuroendocrine prohormone that is cleaved into functional peptides, including catestatin (CST), and plays a role in glucose regulation. Ethnic differences in CHGA and CST concentrations have been reported, and polymorphisms in the CHGA gene promoter are known. Aims: To investigate the association of rs7159323 and rs9658638 CHGA gene promoter polymorphisms with levels of CHGA, CST, and metabolic markers in black and white South African women. Methods: Anthropometric and fasting biochemical parameters (CHGA, CST, C-peptide, leptin, and adiponectin) were available for normoglycaemic black (n=64) and white (n=51) women. Participants were genotyped for the CHGA polymorphisms using PCR-RFLP. Results: There were no significant ethnic differences in rs7159323 (p=0.067) and rs9658638 (p=0.905) allelic frequencies. In black women, the rs7159323 CC-genotype was associated with higher C-peptide (0.7 [0.6;0.9] vs. 0.5 [0.5;0.6] nmol/L; p=0.004) and adiponectin (1685 [854;7731] vs. 1159 [745;2090] ng/mL; p=0.042) levels. The rs9658638 T-allele was associated with higher adiponectin levels in white women (10740 [8203;11460] vs. 3297 [1248;10142] ng/mL; p=0.007). The main predictors of CHGA levels were older age (p=0.007) and lower BMI (p=0.019). Conclusion: The rs7159323 and rs9658638 polymorphisms do not explain ethnic differences in CHGA and CST levels in healthy South African women. The ethnicity-specific metabolic associations may be due to differences in linkage disequilibrium patterns. Functional, alongside genetic, studies in larger cohorts are needed to understand the mechanisms

linking CHGA variation to metabolic outcomes. The results highlight ethnic heterogeneity in genotype–phenotype relationships; thus, population diversity must be considered in genetic studies.

PMOCH-O-17: Oncometabolic Phenotypes Following Low- and High-Dose Doxorubicin Treatment in Triple-Negative Breast Cancer Cell Lines
BHSc alumni

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Background: Triple-negative breast cancer (TNBC) is an aggressive breast cancer subtype lacking hormone receptors. Chemotherapy, particularly doxorubicin, remains the primary treatment for TNBC as targeted hormone therapies are ineffective. Doxorubicin exerts its anticancer effects by intercalating DNA, inhibiting topoisomerase II, disrupting mitochondrial function, increasing oxidative stress, and inducing cell death. Metabolic rewiring is a key mechanism underlying chemotherapy response. Aims: To determine the effects of low and high doses of doxorubicin in the metabolic phenotype of TNBC cell lines. Methods: MDA-MB-468 and MDA-MB-231 cells were cultured in DMEM with 10% FBS and 0.1% penicillin-streptomycin at 37℃ and 5% CO_2. Upon confluency, cells were subcultured and seeded at a density of 1 × 10^5 cells/well into 24-well plates and treated with the low (0.28 μM) and high (1.0 μM) doses of doxorubicin for 48 hours. Following treatment, the supernatant was collected and centrifuged at 400 x g for 5 minutes and stored at -80°C until they were transported to North West University for organic acid analysis. The MetaboAnalyst software was employed to investigate the altered metabolites. Results: In the MDA-MB-468 cells metabolites pyruvate, lactate and hippurate involved in glycolysis were detected in abundance. Furthermore, most of the altered metabolites detected mediate TCA cycle activities. In the MDA-MB-231 cell line, glycolysis metabolites hippurate, pyruvate, and tartarate were detected at low levels, with higher levels of fatty acid metabolism metabolites. Conclusion: The metabolic profiles of the TNBC cell lines differed markedly, with MDA-MB-468 exhibiting a predominantly glycolytic and TCA cycle-associated phenotype, while MDA-MB-231 showed reduced glycolytic metabolite levels and greater enrichment of fatty acid metabolism.

PMOCH-O-18: Variant Analysis of MECP2 in South African Patients with Rett Syndrome

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Background: Rett syndrome (RTT) is an X-linked dominant neurodevelopmental disorder predominantly affecting females, characterised by normal early development followed by progressive regression in motor, communicative, and growth milestones. Pathogenic variants in MECP2 account for over 95% of typical RTT cases, while atypical presentations are predominantly associated with CDKL5 and FOXG1. RTT remains understudied in African populations, who are underrepresented in global genomic databases used for variant interpretation, limiting diagnostic accuracy for South African patients. Aims: To perform variant analysis on next-generation sequencing (NGS) data from seven South African patients of African ancestry with suspected RTT, to identify and classify pathogenic variants and contribute population-specific data. Methods: NGS data previously generated from seven patients using an in-house multigene Inherited Disease Panel (IDP) were analysed. Variants were annotated, filtered by population frequency and pathogenicity scores, and visualised to confirm zygosity before classification according to ACMG/AMP guidelines. One pathogenic variant underwent Sanger sequencing validation. Results: Filtering identified three pathogenic MECP2 variants, two nonsense and one frameshift, classified using the PVS1, PM2, and PP5 codes. Conclusion: These findings confirmed a genetic diagnosis of RTT in the affected patients. This study contributes population-specific variant data, improving diagnostic accuracy and variant classification frameworks for South African patients of African ancestry.

POSTER PRESENTATIONS (25)

PMOCH-P-01: Evaluating the Diagnostic Utility of a Copy Number Variant Pipeline for Tuberous Sclerosis Complex Testing
BHSc alumni

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Tuberous Sclerosis Complex (TSC) is a multisystemic autosomal dominant disorder caused by pathogenic variants in TSC1 or TSC2. Although targeted next-generation sequencing (NGS) panels effectively detect single nucleotide variants (SNVs), copy number variants (CNVs) may remain undetected, contributing to false-negative results and prolonged diagnostic workflows. This study aimed to assess the diagnostic utility of a custom-designed Ion Reporter-based CNV analysis pipeline for detecting pathogenic CNVs associated with TSC using existing targeted NGS data. An audit of patients referred for TSC testing using an in-house inherited disease panel identified suitable positive controls, negative controls, and candidate patient samples. A custom CNV workflow incorporating a custom baseline and filter chain targeting TSC1, TSC2, and PKD1 was

developed and compared with a pre-existing in-house CNV pipeline. Performance was assessed using MLPA-confirmed positive and negative controls, with evaluation of sensitivity, specificity, concordance, and sequencing quality metrics. CNV calls were manually reviewed using Integrative Genomics Viewer. Both pipelines successfully detected the MLPA-confirmed pathogenic deletion involving TSC2 and PKD1 in the positive control sample. However, the custom-designed pipeline demonstrated more conservative CNV segmentation and reduced fragmentation of CNV intervals while maintaining high analytical sensitivity and specificity. Application of the selected pipeline to candidate patient samples identified a pathogenic heterozygous deletion involving TSC2 in one patient with clinical features strongly suggestive of TSC. These findings support the implementation of sequencing-based CNV analysis as an integrated first-line screening approach within targeted NGS workflows, potentially reducing diagnostic turnaround time, laboratory costs, and unnecessary reflex MLPA testing in resource-limited diagnostic settings.

PMOCH-P-02: A bioinformatics workflow to improve exome sequencing-based copy number variation analysis

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Background: Around 300 million people globally have developmental disorders (DD), and to optimise prognosis, it's important to identify causes early. It is estimated that up to 80% of DD cases are of probable genetic origin, with copy number variants (CNVs) accounting for 15-25% of the pathogenesis of DD. Given the limited access to genetic testing in South Africa, diagnostic tests must be optimised to identify multiple types of variation while remaining cost-effective. Exome sequencing (ES), the current first-tier diagnostic test for DD in many parts of the world, meets these criteria by enabling detection of both single-nucleotide variants and CNVs. Many tools for identifying CNVs in ES data exist; however, no single tool can detect all CNV sizes or maintain consistent performance across datasets. Studies have shown that merging outputs from several callers can increase precision. One way to address this is to integrate callers with a merging tool into a reproducible, portable, and scalable workflow, with a machine learning model for in silico validation. Aims: The aim of this project is to develop a Nextflow workflow that integrates multiple CNV callers for improved CNV calling from ES data. Methods: This paper presents a preliminary ensemble workflow currently under development. Additionally, CNV call summary data and performance metrics from our completed, custom DRAGEN Germline Enrichment command-line workflow will be presented. Results: In 90 ES samples, the DRAGEN tool achieved a sensitivity of 0.6477 and a precision of 0.4377. A more empirical approach, utilising only regions with ≥20× coverage, yielded an improved sensitivity of 0.7965 but a reduced precision of 0.3009.

PMOCH-P-03: Genomic Evidence of Human–River Transmission of Multidrug-Resistant Salmonella Typhi

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Background: Typhoid fever remains an important public health concern in South Africa and presents a growing therapeutic challenge due to increasing antimicrobial resistance in Salmonella Typhi. Despite this burden, the role of contaminated urban waterways as environmental reservoirs and dissemination pathways for resistant strains remains poorly understood. Aims: This study characterized four S. Typhi isolates recovered from the Jukskei River in Johannesburg, South Africa, using whole-genome sequencing. Methods: Genomic DNA was sequenced on the Illumina NextSeq 2000 platform, and assembled genomes were analysed for sequence type (ST), AMR determinants, plasmids, virulence factors, and phylogenetic relatedness. Results: The isolates belonged to ST1 (n=2) and ST2 (n=2). The ST1 isolates were multidrug resistant, carrying aph(6)-Id, aph(3")-Ib, blaTEM-1, catA1, sul1, sul2, and dfrA7, and one isolate contained a gyrA S83F mutation associated with reduced fluoroquinolone susceptibility. The ST1 isolates harboured an IncQ1 plasmid. All isolates possessed mercury resistance genes (merR, merT, merP, merC), and ST1 additionally carried qacEΔ1, which reduces susceptibility to quaternary ammonium compounds. Ten Salmonella Pathogenicity Islands (SPI-1 to SPI-10) were detected in the ST1 isolates, while ST2 lacked SPI-4. Phylogenetic analysis revealed two distinct clusters, with all four environmental isolates forming tight clusters (≤5 allele differences) with clinical isolates, suggesting overlapping environmental and human transmission pathways. Conclusion: These findings indicate that the Jukskei River may function as an environmental reservoir and potential transmission route for resistant S. Typhi, emphasizing the need for strengthened environmental surveillance to inform public health interventions and mitigate future typhoid outbreaks.

PMOCH-P-04: Automating Variant Filtering in African Genomics: Towards Scalable and Reproducible Workflows.

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Background: Next generation sequencing (NGS) technologies have enabled large-scale investigation of genetic variants associated with disease, with whole exome sequencing (WES) becoming increasingly accessible. However, the computational and analytical burden of processing NGS data remains substantial. Variant filtering and prioritisation are major bottlenecks,

particularly for clinical genomic scientists without advanced bioinformatics expertise. In Africa, genomic data pose unique challenges: African genomes are the most diverse globally yet remain underrepresented in reference datasets and public curation tools, complicating filtering and increasing false positives and negatives. Aims: This study aims to improve and validate an automated, quality- and annotation-guided variant filtering workflow to prioritise biologically and clinically relevant variants from African WES data. Aims: include refining workflow operability, enhancing transparency of reporting, and validating performance using African cohort datasets. Methods: The workflow will be reviewed against precedents in the literature, with evidence-based adjustments integrated where appropriate. Filtering reports will be refined to include guiding explanations and interactive graphics. Validation will be conducted using two joint-called African WES datasets: DDD-Africa and MADCaP. Analytical and computational performance will be assessed before and after workflow adjustments to establish a baseline for comparison. Results: Baseline recording of the performance of the pipeline has been performed, and additional filters have been implemented. Preliminary expectations are that the improved pipeline will be more powerful and efficient. Conclusion: The study will deliver an efficient, scalable, and reproducible automated workflow adaptable to African genomic data. Implication This work addresses critical gaps in variant filtering for underrepresented populations, supporting equitable genomic medicine and enabling broader clinical and research applications in Africa.

PMOCH-P-05: Global Distribution and Molecular Epidemiology of Salmonella Serovar Abaetetuba Based on Whole-Genome Sequencing Data
BHSc alumni

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Background: The emergence of rare Salmonella serovars harbouring clinically important antimicrobial resistance (AMR) determinants poses growing threat to public health. However, these rare serovars remain poorly characterized, particularly in terms of their global distribution, ecological niche, and genomic diversity. Aims: The aim of this study was to determine the genomic epidemiology of Salmonella enterica serovar Abaetetuba, a rare and underexplored serovar using publicly available genome sequences. Methods: A total of 114 Salmonella Abaetetuba genomes (including four genomes from our setting) were downloaded from EnteroBase along with metadata (country, source, and year). In silico analyses were performed to determine multilocus sequence types (MLST), AMR determinants, mobile genetic elements, and Salmonella pathogenicity islands (SPIs) using Centre for Genomic Epidemiology bioinformatics pipeline. Results: The Salmonella Abaetetuba genomes were distributed across 19 countries on five continents. North America predominated (59%, 67/114), followed by Europe (24%, 27/114), Africa (6%, 7/114), and Asia (4%, 5/114). Only 3.5% (4/114) originated from South Africa. Majority of the isolates were from the environment (33%, 38/114), followed by human (25%, 29/114), and food (11%, 12/114). ST2041 was the most prevalent sequence type and all genomes (114/114) carried the aminoglycoside resistance gene aac(6')-laa, while one isolate harbouring the qnrB19 conferring fluoroquinolone resistance. Mobile genetic elements were common, with Incl1-I(α) plasmids (20%, 23/114) and ISSen1 (79%, IS3 family) dominating. SPI-1, -5, -13, -14 were highly prevalent, highlighting virulence potential of this rare serovar. Conclusion: Overall, these findings highlight emerging significance of Salmonella Abaetetuba as an environmentally persistent serovar with notable virulence and resistance potential, warranting enhanced global surveillance and One Health-driven investigations.

PMOCH-P-06: Molecular Diagnosis of Neurofibromatosis Type 1 using a Targeted Gene Panel in South African Patients

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Abstract Background/Introduction Neurofibromatosis Type 1 (NF1) is an autosomal dominant disorder caused by pathogenic variants in the NF1 gene. The condition is clinically variable and associated with an increased risk of tumour development. Although molecular testing plays an important role in diagnosis and patient management, African populations remain under-represented in NF1 genetic studies, resulting in limited knowledge of the variant spectrum within these populations. Aims: This study aimed to identify possible pathogenic variants in seven South African patients clinically suspected of having NF1. Methods: A retrospective analysis was conducted using next-generation sequencing data from seven patient-derived variant call format (VCF) files generated using an in-house 500-gene panel. Variants were annotated using the Ensembl Variant Effect Predictor, prioritised based on allele frequency, predicted functional impact, and disease association, and classified according to ACMG guidelines. Variant interpretation was supported using ClinVar and gnomAD v2.1.1. Results: NF1 variants were identified in 6 of 7 patients (85.7%). Of these, 3 variants were classified as pathogenic and 3 as likely pathogenic according to ACMG guidelines. No pathogenic NF1 variant or alternative molecular diagnosis was identified in the remaining patient. Conclusion: The findings contribute to the understanding of the NF1 variant spectrum in South African patients and demonstrate the usefulness of targeted sequencing for the genetic diagnosis of NF1. A molecular diagnosis can improve patient management, guide genetic counselling, inform recurrence risk assessment, and facilitate appropriate family screening. Including more African populations in NF1 research may improve diagnostic accuracy and access to genetic testing.

PMOCH-P-07: Investigation of Enteroviruses in Wastewater and Surface Water in Gauteng, South Africa for 2024
BHSc alumni

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Background: Enteroviruses, members of Picornaviridae family, spread mainly via the faecal–oral route through contaminated water and cause respiratory, neurological, and gastrointestinal diseases. This retrospective study investigated the prevalence and genetic diversity of enteroviruses in wastewater and surface water collected monthly from 26 sites across Gauteng, South Africa, during 2024. Aims: The study aimed to establish digital, conventional PCR and next generation sequencing methods for detecting and characterizing enteroviruses in wastewater and surface water. Methods: Digital and conventional PCR were optimized using published pan-enterovirus primers. A total of 530 pooled samples were tested using these methods, targeting the 5'UTR region for detection and quantification. Enterovirus-positive samples were further analyzed using nested PCR, Sanger sequencing of the VP1 region, and whole-genome sequencing with next generation sequencing techniques. Results: Out of 181 pooled samples, 83.43% tested positive for enteroviruses with the highest concentrations detected in January-March. Detection rates were highest in wastewater sources, with 95.88% of sewage and 94.29% of manhole samples testing positive, compared to 87.50% of river and only 16% of dam samples. Overall, enterovirus levels were higher in wastewater than in surface water, and genetic analysis showed that enterovirus C species were the most dominant across all sites. Conclusion: Enterovirus loads varied across the sites, with the highest levels found in sewage. These results highlight the importance of wastewater surveillance to detect enterovirus circulation in the population and contamination of surface water. Implication: Wastewater monitoring can act as an early warning tool to support the public health response.

PMOCH-P-08: Novel Silver(I) Complex UJ3 Potentiates Olaparib and Upregulates the Tumor Suppressor lncRNA GAS5 in Triple-Negative Breast Cancer

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Background: Triple-negative breast cancer (TNBC) remains a major clinical challenge due to its aggressive, treatment-resistant nature and poor clinical outcomes. Although the PARP inhibitor Olaparib has improved targeted therapy, its efficacy remains limited in BRCA-proficient TNBC. Aims: To evaluate the therapeutic efficacy of the novel silver(I) phosphine complex UJ3, developed by our research group, alone and in combination with Olaparib, and to investigate its effect on the tumor suppressor lncRNA GAS5. Methods: BRCA-proficient HCC1806 TNBC cells were treated with UJ3, Olaparib or combination therapy. Drug efficacy, apoptosis, selective cytotoxicity, and GAS5 expression were evaluated using complementary in vitro assays. Results: UJ3 demonstrated greater cytotoxicity than Olaparib at early time-point studies, while combination therapy further enhanced therapeutic efficacy. UJ3 induced mitochondrial-mediated apoptosis and, together with Olaparib, exhibited selective cytotoxicity towards malignant cells with minimal toxicity in non-malignant cells. Importantly, UJ3 significantly upregulated the tumor suppressor lncRNA GAS5, revealing a previously unrecognized molecular mechanism that may contribute to its antitumor activity. Conclusion: UJ3 represents a promising therapeutic candidate that enhances Olaparib efficacy while selectively inducing apoptosis and upregulating the tumor suppressor lncRNA GAS5 in TNBC. The discovery that UJ3 upregulates GAS5 provides a strong rationale for the current study's use of advanced CRISPR-Cas9 technology to further enhance GAS5 expression. This precision-genetics strategy has the potential to augment the therapeutic efficacy of UJ3 and Olaparib, advancing the development of innovative targeted therapies for TNBC.

PMOCH-P-09: Whole Genome Sequencing and Characterization of Salmonella Irumu isolates collected in South Africa, 2020 to 2025

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Background: NTS infections are a major global public health concern especially in low- and middle-income regions such as Sub-Saharan Africa where it has the most impact. Whie common serovars are well studied, rare serovars such as S. Irumu remain poorly characterized. Recent surveillance data shows an increase in S. Irumu cases in South Africa, yet information on its genomic features, antimicrobial resistance (AMR) and transmission dynamics is limited. Aims: This study aims to characterize S. Irumu isolates collected in South Africa (2020-2025) using whole-genome sequencing. Aims: Objectives include investigating population structure, phylogenetic relationships, AMR determinants, virulence factors, plasmid content, and genomic clustering to identify transmission pathways and clonal expansion events. Methods: Genomic DNA will be extracted using the QIAamp Mini Kit and sequenced on the Illumina NextSeq 2000 platform. Bioinformatic analysis will follow a standardized pipeline. Phylogenetic relationships will be inferred via EnteroBase cgMLST, and plasmid content assessed. Complementary antimicrobial susceptibility testing (Disk Diffusion method) will validate genomic predictions. Results: Between 2020 and 2025, a total of 51 isolates of S. Irumu were reported. Cases were reported in 6 provinces with the highest burden observed in North West with 13 Isolates accounting for 25.5% of the total. Of the isolates with recorded sex, 56.7% (29/51) were male and females were 41.52% (21/51) and 1 was unknown in terms of sex. Conclusion: Findings will

provide critical insights into the epidemiology and pathogenic potential of S. Irumu. This research will strengthen surveillance, outbreak detection, and antibiotic stewardship programs, enhancing public health responses to emerging NTS serovars in South Africa.

PMOCH-P-10: Elucidating Exosome-Mediated T Cell Exhaustion in Colorectal Cancer
BHSc alumni

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Background: Colorectal cancer (CRC) is a leading cause of cancer-related mortality worldwide and is the fourth most common cancer among South Africans. Exosomes — lipid membrane-bound extracellular vesicles — are secreted by all cells and facilitate intercellular communication. Within the tumour microenvironment (TME), tumour-derived exosomes (TDEs) transfer their biomolecular cargo to immune cells and modulate their functions to promote immune evasion. T-cell exhaustion is commonly seen in the immunosuppressive TME as it impairs anti-tumour responses and aids tumour progression. However, the mechanisms in which TDEs induce T-cell exhaustion remain to be elucidated. Aims: Since TDEs are capable of remodeling immune cells in the TME, our aim is to investigate the effect and role of exosomes in T-cell exhaustion. Methods: and Results Exosomes were isolated from CRC cell line-conditioned media. Scanning electron microscopy (SEM) and Zetasizer analysis observed exosomes to have characteristic spherical morphology and size (<200 nm), and BCA assay determined average exosomal protein concentration to be 58.86 ug/mL. TDEs were stained with lipophilic DiL fluorescent dye and co-cultured with a T-lymphocyte cell line. Confocal microscopy revealed efficient exosome uptake by T-cells. Flow cytometry will further characterise exosomes, and analysis of T-cell exhaustion markers, T-cell activation, and cytokine release will determine the effect of TDEs on T-cell exhaustion. Conclusion: This study observed the uptake of TDEs by T-cells, and will further investigate the effect of TDEs on T-cell exhaustion and tumour progression. Understanding the role of exosomes in tumour progression has implications for the use of TDEs as therapeutic targets which aim to restore T-cell immunosurveillance and anti-tumour functions.

PMOCH-P-11: Investigating Sonic Hedgehog Signalling in Early-Onset Colorectal Cancer Among South African Patients Using Patient-Derived Organoids

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Background: Colorectal cancer (CRC) is a major cause of cancer-related mortality worldwide, and the incidence of early-onset CRC (EOCRC) has increased rapidly over the last few decades. EOCRC remains poorly characterised in South Africa, and the molecular mechanisms underlying its development and progression require further investigation. The Sonic Hedgehog (SHH) signalling pathway has been implicated in colorectal tumorigenesis through its roles in regulating cellular proliferation, stemness, invasion, and survival. Aims: This study aims to investigate SHH pathway activity in EOCRC using patient-derived organoids (PDOs), benchmarked against established colorectal cancer cell lines. Methods: PDOs are being established and maintained from a South African patient with CRC. Expression of key SHH pathway components, Smoothened (SMO) and GLI2, is being assessed at the transcriptional and protein levels using quantitative reverse transcription PCR and immunofluorescence staining with confocal microscopy, in both PDOs and the colorectal cancer cell lines DLD-1 and HT-29. Results: SHH pathway activity has been confirmed in DLD-1 and HT-29 cells, with SMO and GLI2 expressed at both gene and protein levels, consistent with known SHH activation in these lines. These results establish a reference standard, with PDO analysis currently underway to determine whether this activation profile is recapitulated in patient-derived tissue. Conclusion: Confirmed SHH pathway activity in DLD-1 and HT-29 cells provides a validated benchmark for assessing SHH signalling in EOCRC, supporting the study's translational relevance to South African patients. This study's findings will support a broader investigation into the role of SHH signalling in EOCRC, with potential implications for current diagnostic and therapeutic strategies for CRC in South Africa.

PMOCH-P-12: Mutational and Expression Profiles of CTNNB1, AXIN1, and AXIN2 in South African HCC Phumla Kulani, Dr Sharol Ngwenya, Dr Pumza Magangane School of Pathology, University of the Witwatersrand
BHSc alumni

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Background: Dysregulation of the Wnt/β-catenin pathway, specifically through mutations in Ctnnb1, Axin1, and Axin2 is a key driver of hepatocellular carcinoma (HCC) progression. However, the specific mutation landscape and its impact on gene expression remain uncharacterized in South African HCC patients. Aims: This study aimed to analyze mutations and their correlation with relative mRNA expression levels in this underrepresented population. Methods: This was a cross-sectional study, in 32 HCC patients, target regions were amplified via polymerase chain reaction (PCR), and relative mRNA expression

quantified using real time PCR. Sanger sequencing was performed on 5 samples per gene. Chromatograms were processed in Chromas v2.6.6 and BioEdit v7.2.5, followed by statistical analysis in Stata 18. Results: Real time PCR revealed mean expression levels of 2.62 for Ctnnb1, 3.17 for Axin1, and 2.08 for Axin2. Sanger sequencing identified distinct variants: Ctnnb1 and Axin 1 each exhibited 2 missense, 1 nonsense, 1 in-frame deletion, and 1 silent mutation; Axin 2 harbored 2 missense, 1 nonsense, 1 frameshift, and 2 silent mutations. No significant correlations were found between expression levels (Ctnnb1/Axin1: r =0.230, p =0.205; Axin1/Axin2: r=0.029, p=0.872; Ctnnb1/Axin2: r =-0.332, p =0.064), indicating mutational status did not directly drive transcription. Conclusion: These findings highlight intricate Wnt/β-catenin regulation in South African HCC, suggesting alternative molecular mechanisms beyond direct mutations drive dysregulation. Mutational status alone does not reliably predict transcriptional activity. Future larger cohorts and functional assays are essential to clarify these regulatory interactions.

PMOCH-P-13: Molecular Characterisation of DMD Gene Variants in a Patient Cohort Clinically Suspected of Duchenne Muscular Dystrophy
BHSc alumni

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Background: Duchenne Muscular Dystrophy (DMD) is a severe neuromuscular disorder arising from loss-of-function variants in the DMD gene, representing one of the most prevalent X-linked conditions globally. African populations remain underrepresented in genomic databases, thereby limiting the accuracy of variant interpretation in South African diagnostic settings. Aims: . This study aimed to identify and classify clinically significant variants in a cohort of patients clinically suspected of DMD, to provide molecular genetic evidence to support a clinical diagnosis. Methods: . The study included seven patients previously tested negative for copy number variants. NGS data generated using a multi-disease targeted gene panel was analysed. Variant annotation was performed using Ensembl VEP, with prioritisation conducted in Microsoft Excel. Variant quality was assessed in IGV, and classification followed the 2015 ACMG-AMP framework. Results: . Three pathogenic DMD variants were identified: a canonical splice donor variant (c.10223+1G>A) in Sample 2 and a nonsense variant (c.1388G>A; p.Trp463Ter) in Sample 4. A frameshift duplication (c.2124_2125dup; p.Gln709ProfsTer21) was detected in Samples 5 and 6, representing a mother-son pair consistent with X-linked inheritance. All variants were classified as Pathogenic. Conclusion: . Pathogenic DMD variants were successfully characterised, demonstrating the utility of single nucleotide variant testing using an NGS targeted gene panel approach. . These findings have direct clinical relevance for the patients and their families, as molecular confirmation enables cascade carrier testing in at-risk female relatives. Identified variants will be submitted to ClinVar, contributing to the global DMD variant database and supporting more accurate variant interpretation in African populations.

PMOCH-P-14: Investigating the shared genetic architecture between anxiety disorders and corpus callosum subfields
BHSc alumni

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Background: Anxiety disorders (ANX) are among the most prevalent and debilitating psychiatric conditions, with high heritability. However, the neurobiological mechanisms linking genetic risk to brain structure remain incompletely understood. The corpus callosum (CC), the brain's largest white matter tract, is highly heritable and implicated in several psychiatric disorders, making it a relevant structure for investigating shared genetic architecture with ANX. Aims: To investigate the shared genetic architecture and biological mechanisms linking genetic risk for ANX to variation in CC subfield volumes, using methods to estimate genetic correlation and shared pleiotropy. To our knowledge, this is the first study to assess shared genetic risk between CC morphology and ANX. Methods: Publicly available genome-wide association study summary statistics for ANX and CC subfield volumes were analysed. Genetic correlations were estimated using Linkage Disequilibrium Score Regression (LDSC), and polygenic overlap was quantified using Bivariate MiXeR. Results: Genetic correlation showed negligible associations between ANX and CC subfields (rg range: -0.03 to +0.02; all p>0.3). However, modest polygenic overlap was detected, with 200 to 1500 shared causal variants across CC subfields. Conclusion: Results: suggest largely independent genetic architectures for ANX and CC morphology. However, modest genetic overlap exists despite negligible genome-wide correlation, suggesting that shared loci act in mixed directions that offset each other overall. These results suggest that part of the genetic architecture that increases risk of ANX overlaps with genetic variants that influence CC subfield volumes. This is an important first step towards understanding ANX neurobiology and may inform future drug-target discovery and prevention screening

PMOCH-P-15: Factors associated with overall survival and progression-free survival in Diffuse Large B-cell Lymphoma patients treated with R-CHOP
BHSc alumni

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Background: Diffuse large B-cell Lymphoma (DLBCL) is the most prevalent subtype of non-Hodgkin lymphomas accounting for approximately 30%-40% of cases worldwide .Despite significant improvements in survival following the introduction of rituximab-based chemotherapy (R-CHOP), approximately 30%-40% of patients continue to relapse or fails to respond to treatment. Aims: This study evaluated the prognostic significance of clinical pathological factors associated with overall survival (OS) and progression-free survival (PFS) in DLBCL. Methods: A retrospective cohort study was conducted using publicly available secondary data from the TCIA on DLBCL patients treated with R-CHOP therapy. Clinical variables were analyzed for association with OS and PFS using Kaplan-Meir curves and log-rank test. Results: The median overall OS was 0.62 years and median PFS was 0.50 years. Poor ECOG performance status, elevated LDH levels, higher IPI score, and MYC immunohistochemistry (IHC) positivity were also independently associated with OS and PFS with statistically significant associations observed for MYC-IHC (OS: p=0.0359; PFS: p=0.007). Conclusion: Results: support the continued use of established prognostic indicators while highlighting MYC IHC as a clinically relevant biomarker for risk stratification and outcome prediction. The results highlight limitations of routinely applied prognostic markers within management for DLBCL, emphasizing the need for further refined biomarkers-driven prognostic models.

PMOCH-P-16: Modifying the C1 system for appropriate Post-Translational Modifications to allow for high yield expression of CAP256.25
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Background: Human Immunodeficiency Virus (HIV) affects ~40 million globally, predominantly in Sub-Saharan Africa (SSA), and no vaccine is available. Broadly neutralising antibodies (bNAbs) offer a potential strategy to prevent vertical transmission. CAP256-VRC26.25 (CAP256.25) is a potent bNAb targeting the V2-apex of the HIV-1 envelope trimer, with broad neutralisation against Clade C viruses. Its efficacy is dependent on a post-translational modification (PTM), tyrosine sulphation, performed by Tyrosyl Protein Sulphotransferases (TPSTs). This restricts CAP256.25 production to costly mammalian systems, which limits its application in SSA. The filamentous fungus, Thermothelomyces heterothallica (C1), may be a viable, alternative platform of producing bNabs more economically. Aims: To generate C1 cell lines expressing human TPST, to enable production of CAP256.25 with comparable function and potency to mammalian-derived bNAbs. Methods: Human TPSTs were synthesized and cloned into C1 vectors to enable integration into C1 loci using homologous recombination. An AmdS split marker system was used for selection of transformants. The next steps are to transform engineered TPST C1 lines with CAP256.25, purify bNAbs using Protein A affinity chromatography, perform neutralisation assays against HIV-1 pseudovirus, and evaluate tyrosine sulphation using mass spectrometry. Results: TPST engineered cell lines were successfully created. Integration was confirmed by PCR, and TPST expression was verified by immunoblotting. Conclusion: This study advances the development of TPST-engineered C1 strains as a platform for the future production of sulphated, functional CAP256.25 bNAbs. This study will expand on the C1-technology toolkit and findings can contribute towards the production of economical bNAbs that may be feasible for deployment as an HIV-1 prevention strategy in resource-limited settings.

PMOCH-P-17: Mapping Metabolic Alterations In Autoimmune Hepatitis Using Spatial Metabolomics In An African Population: A Pilot Study

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Background: Autoimmune hepatitis (AIH) is a rare immune-mediated liver disease characterised by persistent inflammation and progressive liver injury. Although AIH is known to alter metabolism in the liver, the spatial distribution of these metabolic alterations remains poorly understood. Consequently, limited understanding of the underlying mechanisms underlying AIH contributes to delayed diagnosis, poor disease management, and poorer clinical outcomes, particularly in black African populations. Aims: Therefore, this study aimed to determine liver metabolite alterations in black African patients with autoimmune hepatitis using untargeted spatial metabolomics. Methods: Liver samples were obtained from healthy participants (n=7) and patients with AIH (n=7) and analysed using atmospheric pressure matrix-assisted laser desorption ionisation mass spectrometry imaging (AP-MALDI-MSI). Results: Preliminary findings of untargeted spatial metabolic profiling identified alterations in lipid metabolites, including bile salts, sphingomyelins and membrane phospholipids, in AIH compared to healthy tissue. These results suggest disruptions in lipid metabolism in AIH. Pathway analysis further revealed significant perturbations of nicotinate and nicotinamide metabolism, suggesting altered cellular energy metabolism in AIH. Conclusion: Taken together, these findings demonstrate that spatial metabolomics can resolve region-specific metabolic alterations associated with AIH, highlighting disrupted lipid and energy metabolism in black African patients. These findings may enhance the understanding of the molecular mechanisms of AIH and potentially improve patient outcomes of the underrepresented African populations.

PMOCH-P-18: Identifying and Classifying Variants in South African Patients with Kabuki-Like Phenotypes

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Authors: Rebecca Comrie, Nkateko Mayevu, Odirile Tabane, Lindie Lamola, Thandiswa Ngcungcu, Dylan McCarthy, Vimbai Siziba, Katryn Fourie, Robyn Kerr, Amanda Krause and Maria Mabyalwa Mudau Division of Human Genetics, National Health Laboratory Service and School of Pathology, Faculty of Health Sciences, University of the Witwatersrand, South Africa Background/Introduction: Kabuki syndrome (KS) is a rare developmental disorder caused mainly by pathogenic variants in KMT2D and KDM6A. Differential diagnoses arising from variants in the EP300 or CREBBP genes and limited African genomic data complicate diagnosis, highlighting the importance of molecular genetic testing. Aims: To identify and classify relevant variants associated with Kabuki syndrome and differential diagnoses in seven South African patients with suspected Kabuki syndrome. Methods: Generated Inherited Disease Panel (IDP) sequencing data were analysed. VCF files were annotated using Ensembl Variant Effect Predictor and prioritised by allele frequency, functional consequence, variant type and clinical significance. Candidate variants were visualised using Integrative Genomics Viewer, classified according to ACMG/AMP guidelines, and confirmed by PCR, gel electrophoresis, and Sanger sequencing. Results: Three of seven patients harboured likely pathogenic or pathogenic variants. A likely pathogenic CREBBP splice-site variant, NM_004380.3:c.1823+1G>A, and two KMT2D variants, a pathogenic frameshift variant (NM_003482.4):c.11475_11478del; (NP_003473.3):p.(Gln3826CysfsTer3) and a likely pathogenic nonsense variant (NM_003482.4):c.8086C>T; NP_003473.3:p.(Gln2696Ter), were identified. Conclusion: The findings contributed to the molecular characterisation of South African patients with Kabuki-like phenotypes and demonstrated the diagnostic utility of the Inherited Disease Panel. They supported molecular diagnosis, genetic counselling, recurrence risk assessment for affected families, and clinical management of patients with Kabuki syndrome and related disorders.

PMOCH-P-19: Genetic Determinants of Susceptibility to Infection with Hepatitis B Virus in a Johannesburg Population

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Background: Hepatitis B virus (HBV) infection is a major health burden in sub-Saharan Africa, where diagnostic and vaccine coverage remain limited. Environmental factors govern exposure to hepatitis B and partially explain its broad clinical variability; however, host genetics have also been shown to modulate the development of HBV-related diseases, the efficacy of vaccines and antivirals, and susceptibility to HBV itself. Genome-wide association studies (GWAS) can interrogate the common genetic determinants of HBV susceptibility, yet most have been conducted in non-African populations. Aims: /Objective: To characterise common host genetic determinants of susceptibility to hepatitis B infection in a Black South African population. Methods: Imputed genotype data and HBV serostatus from 4,510 participants enrolled in the Johannesburg Cancer Study were used to perform a genome-wide association analysis to identify variants associated with HBV susceptibility. Significant variants will be characterised using linkage-disequilibrium-based clumping and functional annotation. Results: Three genome-wide significant HBV-associated variants have been identified: two on the X chromosome and one on chromosome 1. Fourteen additional variants meet the suggestive significance threshold, ten of which are found on chromosome 6. Further analysis will identify the biological pathways implicated by these variants. Conclusion: African populations harbour the heaviest burden of HBV and the greatest genetic variation underpinning its infection. This study will contribute to the characterisation of the variants, genes, and molecular pathways involved in host immune responses to HBV across ancestries, potentially highlighting African-specific variants unreported in other populations. Potential Implications: Results: could inform individualised HBV risk assessment and guide vaccine, therapeutic, and diagnostic strategies tailored to African populations.

PMOCH-P-20: Variant Analysis and Interpretation in 7 Distal Arthrogryposis Patients Using Targeted Next-Generation Sequencing.

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Background: Distal arthrogryposis (DA) is a genetically heterogeneous group of congenital disorders characterised by non-progressive contractures of the distal joints resulting from impaired skeletal muscle contractility during foetal development. Although next-generation sequencing (NGS) has improved the detection of disease-causing variants, interpretation remains challenging due to genetic heterogeneity, variable genotype–phenotype relationships and the high number of variants of uncertain significance (VUS). Aims: This study aimed to identify and classify clinically significant variants associated with

DA using targeted NGS data from 7 patients with suspected disease. Methods: Variant call format (VCF) files from seven patients were annotated using the Ensembl Variant Effect Predictor (VEP) and filtered according to candidate genes, allele frequency, predicted functional impact and computational prediction tools. Prioritised variants were assessed using the Integrative Genomics Viewer (IGV) and classified according to the American College of Medical Genetics and Genomics and the Association for Molecular Pathology (ACMG/AMP) guidelines. Results: Three clinically significant heterozygous missense variants were identified. Variants in TNNI2 (p.Arg174Gln) and TNNT3 (p.Arg63His) were classified as pathogenic, while a TPM2 (p.Arg91Cys) variant was classified as likely pathogenic. The TPM2 variant was further validated by Sanger sequencing in an affected mother–daughter pair. Conclusion: This study identified and classified clinically significant variants in three established DA-associated genes, demonstrating the value of systematic variant interpretation for improving molecular diagnosis. Improved molecular characterisation of DA-associated variants may reduce diagnostic uncertainty, strengthen genotype–phenotype correlations, and support genetic counselling, recurrence risk assessment and cascade testing in affected families. Earlier molecular diagnosis may also facilitate multidisciplinary management and improve future variant interpretation.

PMOCH-P-21: From Microbial Silos to Cardiovascular Synergy: Antibiotic-Associated Gut Microbiome Restructuring and Systolic Blood Pressure Patterns in Hypertensive and Normotensive Rats

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Background: About one-third of adults worldwide have hypertension, a condition influenced by various factors and increasingly associated with changes in the gut microbiome. To understand the connection between microbial patterns and blood pressure, we need to combine insights from microbiology, cardiovascular health, bioinformatics, and translational health research. Methods: This study examined how antibiotic treatment affects gut microbiome patterns and their potential associations with systolic blood pressure (SBP) in spontaneously hypertensive rats (SHR) and Wistar Kyoto rats (WKY). The study involved 28 rats, including 14 SHR and 14 WKY, which underwent 16S rRNA gene sequencing analysis. The rats received a broad-spectrum treatment targeting H. pylori, consisting of amoxicillin, clarithromycin, omeprazole, and bismuth subsalicylate, with streptomycin serving as the control antibiotic. We processed the sequence data using the nf-core/ampliseq pipeline and analysed relative taxonomic abundance, compositional differences, and exploratory associations with SBP. Results: After antibiotic treatment, SHR and WKY rats displayed distinct relative taxonomic patterns. Both strains had a higher share of Firmicutes and a lower share of Bacteroidota, but the details varied between them. SHR rats exhibited stronger signals for Actinomycetota, Prevotellaceae, Oscillospiraceae, and Erysipelotrichaceae, while WKY rats showed clearer patterns related to Firmicutes, Muribaculaceae, Oscillospiraceae, and Verrucomicrobiota. Significant differences in relative abundance were noted between the two strains across major phyla and families, suggesting that antibiotic-associated microbiome profiles differ by host strain. Conclusion: The changes in relative abundance associated with antibiotic treatment appeared to align with SBP variations in a strain-dependent manner. These findings are preliminary and need further quantitative and functional validation.

PMOCH-P-22: Integrative Bioinformatics Analysis of Candidate Pathogenic Variants in Tuberous Sclerosis Complex

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Background: Tuberous Sclerosis Complex (TSC) is a multisystem autosomal dominant disorder caused by loss-of-function mutations in either TSC1 or TSC2, resulting in the constitutive activation of mTOR complex 1 (mTORC1) and tumour formation. Despite a global prevalence of approximately 1 in 6000, TSC genomic data in South Africa remains limited. Aims: This study aimed to identify, prioritise and classify potentially pathogenic variants in TSC1 and TSC2 genes. Methods: Variant Call Format (VCF) files from seven South African TSC patients, generated using a 500-gene AmpliSeq Inherited Disease Panel were annotated using the Ensembl Variant Effect Predictor and filtered by gene, allele frequency, functional consequence and in silico deleteriousness scores. Three candidate TSC2 variants were prioritised and classified according to the American College of Medical Genetics (ACMG) guidelines. Results: A nonsense variant, c.4375C>T (p.Arg1459Ter), was classified as pathogenic (PVS1, PM2, PP5); a frameshift deletion, c.4516del (p.His1506IlefsTer70), as likely pathogenic (PVS1, PM2); and a missense variant, c.4628A>G (p.His1543Arg), as a variant of uncertain significance (VUS) (PP3, PM2, weak PM1). The latter two variants were in or near the Rap-GAP domain, critical for TSC2 catalytic activity. Conclusion: These findings demonstrate the effectiveness of targeted NGS panels and the use of variant classification guidelines in identifying clinically significant variants associated with TSC in an underrepresented African cohort, contributing to population-specific data. Identifying pathogenic TSC2 variants enables definitive diagnosis, reproductive risk assessments and consideration of mTOR-targeted therapies. Since the VUS cannot be used to guide clinical management or reproductive decision-making, patient care should remain based on clinical features. Genetic counsellors should communicate this uncertainty.

PMOCH-P-23: Identification and Interpretation of Genetic Variants in Suspected Alagille Syndrome Patients

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Background: Alagille syndrome (ALGS) is a multisystemic genetic disorder caused by pathogenic variants in the JAG1 and NOTCH2 genes and presents with variable phenotypic manifestations. Genetic testing is therefore important for identifying the underlying molecular cause and confirming the diagnosis. However, variable clinical presentation and limitations in variant interpretation complicate molecular diagnosis, particularly in underrepresented African populations. Aims: This study analyzed previously generated targeted next-generation sequencing data from individuals with suspected Alagille syndrome to identify and interpret clinically significant genetic variants. Methods: This study analyzed sequencing data from seven individuals of African descent. Variant Call Format (VCF) files were annotated using Ensembl Variant Effect Predictor (VEP) and filtered in Microsoft Excel according to gene relevance, allele frequency and predicted functional impact. Candidate variants underwent quality assessment using the Integrative Genomics Viewer (IGV) and were classified according to the American College of Medical Genetics and Genomics and the Association for Molecular Pathology (ACMG-AMP) guidelines. Results: Pathogenic variants were identified in two of the seven samples analyzed. Two pathogenic JAG1 variants were detected, including a frameshift (NM_000214.3:c.2406del; p.Trp803GlyfsTer17) and a canonical splice-site variant (NM_000214.3:c.1396-2A>G). Conclusion: These findings demonstrated the value of bioinformatic analysis for identifying clinically significant variants in patients with suspected Alagille syndrome. The absence of candidate variants in most samples also highlighted the limitations of targeted sequencing panels and the complexity of genetic diagnosis in this disorder. Two pathogenic JAG1 variants were identified, confirming a molecular diagnosis of Alagille syndrome, indicating a potential risk to the family and relatives, who may benefit from genetic counselling and cascade testing.

PMOCH-P-24: A proteomic profile of type II diabetes in a South African population
BHSc alumni

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Background: The prevalence of Type II diabetes mellitus (T2DM) is increasing at an alarming rate in South Africa, while current risk stratification and prevention strategies continue underperforming in this underrepresented population. Novel proteomic techniques provide an advanced approach to comprehensive population-specific research into the complex pathogenesis of T2DM, with the potential to identify population-specific molecular changes associated with T2DM. Aims: We aimed to characterise differential protein expression associated with T2DM in a South African cohort. Methods: This cross-sectional study included a pilot cohort of 10 diabetic and 10 non-diabetic South African participants. Proteomic analysis was performed on plasma samples using a magnetic bead-based enrichment technique (Resyn Biosciences) followed by liquid chromatography mass spectrometry analysis. Results: Using proteomic profiling, we identified 240 proteins differentially expressed in participants with T2DM compared to non-diabetic controls. These proteins were largely associated with pathways involved in inflammation, immune regulation, extracellular matrix remodelling, oxidative stress, mitochondrial dysfunction, lipid metabolism and insulin sensitivity. Conclusion: Our study identified proteins with differential expression in T2DM that warrant further investigation in larger validation cohorts. These proteins were predominantly associated with immune and inflammatory responses and extracellular matrix remodelling, highlighting the complex biological pathways that may contribute to the pathophysiology of T2DM. These findings provide preliminary insight into the proteomic alterations associated with T2DM in an underrepresented African population and identify candidate proteins for future validation studies aimed at improving our understanding of the molecular mechanisms underlying T2DM.

PMOCH-P-25: HLA-DR Genotype Expression in South African Systemic Lupus Erythematosus Patients
BHSc alumni

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Background: Systemic Lupus Erythematosus (SLE) is a chronic autoimmune disorder known to result in autoantibody generation and immune complex formation. Lupus Nephritis (LN) is a critical type of SLE targeting the kidneys, that is known to particularly affect individuals of African descent with worse outcomes. This study aimed to investigate the association between HLA-DRB1 alleles and SLE severity in a South African cohort. Methods: A case-control study was conducted across 16 SLE patients, whereby 8 of those patients had LN, while the rest of the cohort included 8 normal controls. All participants were of black African descent. HLA-DRB1 genotyping was performed using sequence specific oligonucleotide hybridisation, while Luminex technology was used for allele detection. Furthermore, statistical analyses assessed allele frequency differences across study population groups, while correlations were assessed with disease severity. Results: Patients with SLE exhibited restricted HLA-DRB1 allele combinations compared to LN patients (mean difference = -4.875; p = 0.016) and normal control (mean difference = -8.125; p = 0.0003. While no significant difference was observed between LN and normal controls (mean difference = -3.25; p = 0.13). HLA-DRB1*03/*15 was the most common allele pair in SLE an LN patient, while absent in the NC group. Additionally, the restricted HLA-DRB1 allele combinations showed a significant negative correlation with SLE (r

= -0.6828; p = 0.000). Conclusion: HLA-DRB1 allele pair variants, notably HLA-DRB1*03/*15 are associated with SLE within this South African cohort, which underscores the potential of HLA-DRB1 allele pairs as genetic biomarkers for disease risk and severity.

PMOCH-P-26: Targeted Metabolomic Signatures Across Left Ventricular Ejection Fraction Defined Heart Failure Phenotypes in a Sub-Saharan African Cohort

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Background: Heart failure (HF) is a heterogeneous syndrome characterized by metabolic remodeling and metabolomic profiling has emerged as a promising approach for improving biological characterization of HF. However, its relevance across left ventricular ejection fraction (LVEF)-defined phenotypes remains incompletely understood in sub-Saharan African populations. Aims: To characterize targeted plasma metabolomes across LVEF-defined HF phenotypes and evaluate their relationships with clinical characteristics and established biomarkers of HF. Methods: This prospective observational study recruited 406 adults hospitalized with acute HF. Targeted metabolomic profiling of plasma acylcarnitines and amino acids were quantified using liquid chromatography-tandem mass spectrometry and compared across HF with reduced (HFrEF), mildly reduced (HFmrEF), and preserved EF (HFpEF). Phenotypic association was assessed using multivariable regression analyses, while receiver operating characteristic analysis assessed discriminatory performance. Results: Among the cohort, 63.3% had HFrEF, 15.3% had HFmrEF, and 21.4% had HFpEF. Short- and medium-chain acylcarnitines and branched-chain amino acids (BCAAs) were higher in HFrEF, whereas arginine increased progressively from HFrEF to HFpEF. Metabolite profiles were significantly influenced by renal function, sex, and HIV status. N-terminal pro-B-type natriuretic peptide and soluble suppression of tumorigenicity-2 were positively associated with acylcarnitines and inversely associated with BCAAs. Individual metabolites demonstrated modest discrimination across HF phenotypes (AUC 0.50-0.67) and an AUC of 0.77 (95% CI 0.70-0.84) in a multimarker model incorporating clinical and established biomarkers. Conclusion: Targeted metabolomic profiles differed across HF phenotypes and were influenced by systemic clinical and inflammatory factors. Metabolomic profiling may provide complementary biological insights into HF phenotyping and risk stratification, supporting future precision medicine approaches in our populations.