

2022 TropiQ Research Symposium

Program

15 November 2022

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MESSAGE FROM THE CHAIR



Professor Andrew Mallett
Director of Clinical Research,
Townsville Hospital and Health Service

As Chair and on behalf of the Organising Committee for the 2022 TropiQ Townsville Research Symposium, I warmly welcome you to enjoy, engage and participate in this year's event. As this is the 21st year of Townsville University Hospital being on the Douglas campus, it is also time for our annual research event to take its next big evolution. We hope that there will be elements that you recognise even though the event has undergone a complete refresh from the name to its scope and scheduling. In recognition of the emerging TropiQ academic health campus, we have embraced this within our name to foster inclusion and integration in how we celebrate and showcase research excellence across the combined hospital and university campus. By focusing on a single day with some concurrent sessions, we are also seeking to improve opportunity to take part and to also see components of interest to any attendee or participant.

Our invited plenary speaker this year is Professor Alan Cass who is an academic and health leader in Northern Australia. Based in Darwin, Professor Cass will challenge our thinking whilst also demonstrating the opportunities inherent in collaboration across our region. I hope that you will all join me in warmly welcoming him!

Now it's time to flick through the program, pull up a seat or load up the virtual interface, and engage in the breadth of research being undertaken locally. Ask questions and challenge yourselves to drive research impact. I and the Organising Committee are thrilled to welcome you to the 2022 TropiQ Townsville Research Symposium.

PROGRAM OVERVIEW

Time	ROBERT DOUGLAS AUDITORIUM	JCU CLINICAL SCHOOL (ROOM TCS102)	STAFF TRAINING ROOM (ROOM EG0.62)
8.30	Welcome		
9:00	Session 1A	Session 2A	
10:15	Morning tea		
10:45	Keynote speaker Associate Professor Stephanie Topp <i>College of Public Health Medical and Veterinary Sciences, James Cook University</i> Title: What did trust ever do for us? Reflections on health system strengthening for the COVID era.	Keynote speaker Amy Brown <i>Health Research Fellow - Townsville Cancer Centre, Townsville Hospital and Health Service</i> Title: Meaningful Consumer Engagement in Health Research: A Call to Action.	
11:15	Session 1B	Session 2B	
12:30	Lunch Federation Gardens, Townsville University Hospital		
1:30	Plenary speaker Professor Alan Cass <i>Menzies School of Health Research</i> Title: The Answer Was 17 years: Place-based collaboration between researchers, health providers, community and policy-makers - How we close the research translation gap in northern Australia		
2:30	Afternoon Tea		
3:00	Session 1C	Session 2C	ECR Networking Session Boosting your online research profile hosted by The JCU library
4.00	Open forum Future Directions of Research		
4:30	Thank you and prizes		

PLENARY SPEAKER



Professor Alan Cass

Alan Cass is the Director of Menzies School of Health Research in Darwin. A clinician-researcher and nephrologist, he has led the conduct of national and international clinical trials; analysed the health outcomes and costs, patient experience and community perspectives regarding alternative models of health care delivery in urban, rural and remote areas; worked to improve cross-cultural health communication; and to address inequity in access to care for First Nations Australians.

Professor Cass was President of the Australia and New Zealand Society of Nephrology; Chair of the Scientific Committee of the Australasian Kidney Trials Network; a Director of the Australian Clinical Trials Alliance; Chair of the MBS Review Renal Clinical Committee and Board Director for Top End Area Health Services. He is Acting Chair of the NT Clinical Senate, a Board Director for the Central Australia Academic Health Sciences Network and a Fellow of the Academy of Health and Medical Sciences.

KEYNOTE SPEAKERS



Associate Professor Stephanie Topp

PhD, MPhil, MIPH,

College of Public Health Medical and Veterinary Sciences, James Cook University

Biography: Steph is an Associate Professor of Global Health and Development at James Cook University, and Associate Research Fellow at the Nossal Institute for Global Health at the University of Melbourne. Her research and teaching focuses on governance for health system strengthening with a particular focus on the relationships, values and norms that influence public health policy, system and service design. Steph has a long standing interest in health workforce and community health workers stemming from eight years working on integrated models in sub-Saharan Africa, but is currently focused on governance of public health systems in northern Australia. She is Associate Editor for the journal BMJ Global Health, sits on the Board of Directors of Health Systems Global, and holds an NHMRC Investigator Award.



Mrs. Amy Brown

Health Research Fellow

Townsville Cancer Centre, Townsville Hospital and Health Service

Biography: Amy is the Research Fellow for Cancer Services, Townsville Cancer Centre at Townsville Hospital and Health Service, with a clinical background as a radiation therapist. In her role, she supports investigator-led research across the Townsville Cancer Centre, largely through mentorship of research-novice staff, and establishing and supporting research collaborations. Amy works with all disciplines including medical, allied health and nursing, including Medical Oncology, Radiation Oncology, Haematology and Palliative Care. Amy has personal research interests in improving prostate cancer treatment, health economics and health preference research, particularly the preferences of patients. As part of her PhD, Amy worked with a consumer-investigator, finding this experience invaluable.

SESSION 1A - RDA

Time to Therapeutic Vancomycin Levels with Loading Dose Capping According to Local Tertiary Hospital Guidelines

Lily Arrate,¹ Kayla O'Kane,¹ Steven Pham,¹ Lauren Hopner,¹ Dr Robi Islam,¹ Kerrie Aitken^{1,2}, Cassie Lanskey^{1,2}

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Background: Vancomycin is a glycopeptide antibiotic with a narrow therapeutic index. Therapeutic drug monitoring is necessary to ensure that serum levels remain within a target range that optimises efficacy and minimises the risk of adverse effects. Weight-based loading doses are used for more rapid attainment of therapeutic levels. The aim of this project was to assess the suitability of local guidelines by determining the time taken for vancomycin to reach therapeutic levels when a loading dose cap of 2000mg is applied for patients weighing over 80kg.

Methods: This was a single-centre retrospective audit of medical records linked to adult patients prescribed vancomycin. Patients were included if they weighed over 80kg and received intravenous vancomycin according to local guidelines for at least 48 hours. Patients in the intensive care unit were excluded due to potential for altered pharmacokinetics. A validated data collection tool was used.

Results: Of the 81 patients included, 34 (42%) did not ever reach a therapeutic level (i.e., levels remained subtherapeutic). The average time to therapeutic level was 73.6 hours, with 21 patients (25.9%) achieving a therapeutic level within 48 hours. A statistically significant relationship was found between advancing age and faster time to therapeutic levels ($P=0.018$).

Conclusion: There are substantial delays to therapeutic levels when a 2000mg maximum loading dose is used. These results support use of a larger (3000mg) loading cap, in line with international guidelines. The age-related changes in volume of distribution of vancomycin should be considered alongside weight and renal function when optimising guidelines.

Same day fiducial marker insertion and radiotherapy simulation in prostate cancer patients: a cost-minimisation analysis

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Background: Usual practice for the insertion of prostate fiducial markers involves at least one week delay between insertion and radiotherapy simulation. An evidence-based practice change was implemented whereby fiducial marker insertion occurred on the same day as simulation. The aim of this study was to quantify the health service costs and clinical outcomes associated with this practice change.

Method: A cost-minimisation analysis was undertaken from the perspective of the health service. A retrospective chart audit collected data on 149 patients in the pre-implementation cohort and 138 patients in the post-implementation cohort. Associated costs with insertion and simulation were calculated and compared across the two cohorts; including subsidised travel costs for rural and remote patients. Fiducial marker positions on the simulation computed tomography scan and first treatment cone-beam computed tomography scan were measured for all patients as the surrogate clinical outcome measure for oedema.

Results: The health service saved an average of \$AU 361 (CI \$311 – \$412) per patient after the practice change. These results were robust to the effects of uncertainty, with 95% confidence intervals that did not cross zero. There was no significant difference in fiducial marker position pre- and post- implementation ($p<0.05$).

Conclusions: The practice change to perform insertion and radiotherapy simulation on the same day resulted in substantial savings to the health system, without compromising clinical outcomes. The practice change increases both the value and accessibility of best-practice health care to those most at risk of missing out, decreasing patient attendance requirements for rural and remote populations.

Validation of CalECG software for primary prevention heart failure patients: reducing inter-observer measurement variability.

Nathan Engstrom^{1,2}, Geoffrey P Dobson², Kevin Ng³, Krystle Lander¹, Ky Win¹, Anudeep Gupta¹, Hayley Letson²

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Background: In primary prevention heart failure patients the 12-lead electrocardiogram (ECG) may be useful for the prediction of ventricular arrhythmias. However, inter-observer measurement variability first needs to be identified and any software used, validated. Aims: To compare manual ECG measures with CalECG software and to assess the reliability of visual recognition of fragmented QRS (fQRS) by advanced cardiology trainees.

Methods: 30 pre-implant ECGs were assessed on patients who met guidelines for primary prevention Implantable Cardiac Defibrillator. Parameters included RR, PR, QT, QRS duration, axis location, fQRS and T wave peak to T wave end (TpTe). ECGs were analysed by members of the cardiology department with different levels of experience, and compared to CalECG software. Interobserver agreement was assessed using Fleiss' Kappa (κ) and intraclass correlation coefficients (ICC). Pearson correlation coefficient (r) was used to compare human and software measures.

Results: Strong/very strong correlation was recorded across manual ECG measures (ICC=0.749-0.979, $p \leq 0.0001$) with moderate/strong correlation for TpTe (ICC=0.547-0.765, $p \leq 0.001$). Advanced cardiology trainees demonstrated substantial agreement on ECG interpretation ($\kappa=0.788$, $p \leq 0.0001$), however, reliability of fQRS assessment was only moderate for identification ($\kappa=0.5$, $p \leq 0.0001$) and fair for location ($\kappa=0.295$, $p=0.001$). CalECG software showed strong/very strong correlation with manual measurement for standard measures ($r=0.756-0.977$, $p \leq 0.001$). Concordance between human and software TpTe measurements varied between leads, with V5 showing a non-significant weak correlation ($r=0.197$).

Conclusion: CalECG software showed strong/very strong correlation with standard manual measures which affirms its use in ECG analysis. Advanced cardiology trainees showed greater variability in the identification and location of fQRS.

Epidemiology and Outcomes of Head Trauma in Rural and Urban Populations: A systematic review and meta-analysis

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Background: Head trauma is associated with significant morbidity and mortality. Rural patients are disadvantaged by limited access to medical care and longer prehospital times. The aim of this systematic review and meta-analysis was to identify and describe differences in demographics, injury characteristics, and outcomes between rural and urban traumatic head injury patients.

Method: A systematic review and meta-analysis of studies comparing epidemiology and outcomes of traumatic head injury between rural and urban areas was conducted. Primary research articles published in English were identified from CINAHL, Emcare, MEDLINE and Scopus databases. A modified Newcastle-Ottawa tool was used for quality assessment.

Results: 36 studies with ~2.5 million patients were included. 20 studies were population-based and 17 were high quality. Incidence of head injury was higher in males, regardless of location. Transport-related head injuries, particularly involving motorized vehicles other than cars, were significantly higher in rural populations (OR:3.63, 95%CI [1.58,8.35], $p=0.002$), whereas urban residents had more fall-induced head trauma (OR:0.73, 95%CI [0.66,0.81], $p<0.00001$). Rural patients were 28% more likely to suffer severe injury (OR:1.28, 95%CI [1.04,1.58], $p=0.02$), and urban patients were twice as likely to be discharged with a good outcome (OR:0.52, 95%CI [0.41,0.67], $p<0.00001$), however there was no difference in mortality (OR:1.09, 95%CI [0.73,1.61], $p=0.067$).

Conclusions: Rurality is associated with greater severity and poorer outcomes of head trauma when compared to urban areas. Transport accidents disproportionately affect those travelling on rural roads. Future research recommendations include addition of prehospital data, standardised scoring systems, and subgroup analyses of high-risk groups, e.g., Indigenous populations.

Measuring the long term effects of probiotic supplementation of preterm infants from the NICU

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Background: Preterm infants admitted to NICU are high risk for developing life-threatening diseases such as necrotising enterocolitis and sepsis. Although, not universally accepted, this risk is currently mitigated in babies <32 weeks and 1500g via probiotic supplementation during their hospital admission. Protection is likely the result of acute modulation of the gut environment and microbiome by probiotic species. Our study aimed to explore this modulation and persistence up to 18 months following discharge.

Methods: We conducted a cross-sectional analysis at ~18 months of age, and a longitudinal analysis, at three time points admission, discharge and 18 months of age, of the gut microbiome of preterm infants (<32 weeks) receiving probiotics during their NICU admission, using both shotgun metagenomics and 16S rRNA profiling.

Results: The Infloran® probiotic used in the TUH NICU contains both Bifidobacterium and Lactobacillus species. The gut microbiome of probiotic supplemented infants showed a significantly greater alpha diversity at discharge when compared to non-supplemented infants at the same age, however, this did not persist post discharge. Samples clustered significantly by the sampling time based on their taxonomic composition, showing a significant increase in alpha diversity post-discharge when compared to admission ($p < 0.0001$), and discharge ($p < 0.0001$). The infant microbiome was dominated early on by the phylum Firmicutes, followed by Proteobacteria and Actinobacteriota at discharge, and then Bacteroidota and Firmicutes post-discharge.

Conclusion: Despite the lack of long-term colonisation, the presence of probiotics during early neonatal life may have modulatory effects on the microbiome assembly and immune system training.

SESSION 1B - RDA

Pregnancy outcomes in women with active anorexia nervosa – a systematic review

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Background: It is a common misconception that women with active anorexia nervosa (AN) are less likely to conceive. Pregnancies in women with AN are considered high risk. The purpose of this systematic review was to explore pregnancy complications in women with active AN, including maternal, fetal, and neonatal complications.

Methods: The authors conducted a systematic review in accordance with PRISMA statement guidelines with stringent selection criteria to include studies on patients with active AN during pregnancy.

Results: There were 21 studies included in our review. Anaemia, caesarean section, concurrent recreational substance use, intrauterine growth restriction, preterm birth, small-for-gestation (SGA) birth, and low birth weight were the most reported pregnancy complications in women with active AN, while the rates of gestational diabetes and postpartum haemorrhage were lower.

Conclusion: Women with active AN have a different profile of pregnancy complications comparing to malnourished women and women in starvation. We recommend early discussion with women diagnosed with AN regarding their fertility and pregnancy complications. We recommend clinicians to aim to improve physical and psychological symptoms of AN as well as correction of any nutritional deficiency ideally prior to conception. Management of pregnancies in women with active AN requires regular monitoring, active involvement of obstetricians and psychiatrist. Paediatric follow-up postpartum is recommended to ensure adequate feeding, wellbeing and general health of the infants. Psychiatric follow-up is recommended for mothers due to risk of worsening symptoms of AN during perinatal period.

Togs on or togs off? Perineal outcomes for women who birth in water compared to women who do not

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Background: Women who birth at Townsville Birth Centre can choose to birth in water. Controversy exists over the perineal outcomes for waterbirths. This study aimed to assess whether there was any difference in the rates and severity of perineal trauma for women with low-risk pregnancies who birthed in water compared to those women who did not birth in water.

Method: Perinatal data pertaining to all women who gave birth at the Birth Centre from 1 October 2010 to 28 February 2022 were reviewed retrospectively.

Results: 702 (40.2%) of the 1748 women birthed in water. Women who birthed in water were statistically more likely to have an intact perineum compared to women who did not birth in water χ^2 (1, n=474) =6.643, p=0.012. Similarly, women who birthed in water were statistically less likely to have severe perineal trauma, compared to those who did not birth in water χ^2 (1, n=8) =6.595, p=0.010. Secondary outcomes were also statistically significant. Women who birthed in water required less narcotic analgesia χ^2 (1, n=5) =40.065, p<0.001, and were less likely to have a postpartum haemorrhage χ^2 (1, n=48) =7.107, p=0.008 compared to those who did not birth in water.

Conclusions: In this low-risk population, waterbirth is associated with an increased likelihood of intact perineum and decreased severe perineal trauma. Given these findings pertaining to over a decade, we feel confident in providing this information to assist women in making decisions regarding their birth options and use of water in

Being with computer: Midwives' perspectives of the impact of the electronic maternity record on their practice providing woman-centred care. ✓

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Background: Increasingly midwives in both community and hospital settings are using digital technology in place of handheld records to document midwifery care across the childbirth continuum. A rationale for this change has been the purported benefits of electronic health records (EHR) in reducing errors of omission, duplication, transcription, and interpretation that are caused by unclear, illegible, absent, and lost information. However, studies have reported both positive and negative features of EHRs.

Methods: The objectives of this study were to explore midwives' experiences using the integrated electronic maternity record (EMR) and their perspectives on the impact of EMR on midwifery practice and the provision of woman-centred care. We conducted a thematic analysis of semi-structured interviews with midwives across two Australian tertiary public hospitals. Participating midwives cared for women across the pregnancy continuum.

Results: Interviews were conducted with 15 midwives: 12 practiced in core hospital models and 3 in caseload models of care and care. Midwives described a significant increase to the documentation burden since the transition from paper to EMR. An overarching theme of reconciling being with woman while being with computer emerged. Midwives described how their professional identity, embedded in their ability to be intimately present with the labouring woman, conflicted with medico-legal requirements of contemporaneous documentation and practicalities, such as the location of the computers.

Conclusion: Midwives negotiated these competing demands to keep the woman at the centre of care. The lack of functionality of the EMR led to workflow inefficiencies, workplace tension and loss of job satisfaction.

Coaching in Nursing: A Principle-Based Concept Analysis ✓

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Background: Coaching in nursing is a relatively new concept that has been applied from other disciplines such as psychology, business and education. As we utilise the principles and process for coaching within nursing, we need to clarify its application and meaning. A concept analysis was conducted to theoretically define the concept of nursing using Penrod and Hupcey's (2005) principle-based method as a framework.

Method: A literature review was conducted in February 2021 and updated in July 2021 using JCU OneSearch, from 2010 to 2020. Scholarly papers providing a definition of coaching or data that provided information on the epistemological, pragmatic, linguistic or logical principles of the concept of coaching were included. The final dataset included 28 papers.

Results: The concept of coaching in nursing is varied with no clear definition of coaching that consistently applies within the nursing literature. The varied operationalised constructs and lack of definition would indicate the concept lacks conceptual maturity, suggesting that coaching is narrowly understood and is narrowly positioned within the nursing literature. This presentation will discuss outcomes and findings from the concept analysis.

Conclusions: There are limited definitions and applications of coaching, with blurring of coaching concepts, specifically between coaching and mentoring/precepting. Coaching has been narrowly applied and focused on areas of executive or nursing leadership and nursing education. There are further opportunities to explore this concept in nursing practice for staff who are not in leadership positions, including shift coordinators, frontline clinicians and peer coaching relationships.

Prevalence and risk factors for ischemic heart disease in patients with diabetic foot ulcers: a systematic review and meta-analyses *Slide presentation*

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¹James Cook University, Townsville, Queensland, Australia

Background: Ischemic heart disease in patients with diabetic foot ulcers is common. There is limited recognition of the frequency and risk factors for this association. This review aimed to determine the prevalence of and risk factors for ischemic heart disease in patients with diabetic foot ulcers.

Methods: To identify eligible studies, a literature search was performed using Seven electronic databases were searched from inception to April 2021. Studies were considered eligible to be included in the review if diabetic foot ulcers were diagnosed in adult patients with Type 2 Diabetes and allowed statistical evaluation for prevalence of ischemic heart disease and at least one risk factor for the condition. Studies were excluded where participants included paediatric patients and diabetic complications arose solely from Type 1 Diabetes or where data was unable to be extracted.

Results: The prevalence of IHD in DFU patients ranged from 6.83% to 60.61% with a pooled mean of 25.85% (95% CI, 24.28%e27.32%). Several risk factors were identified including hypertension, male gender, smoking, and peripheral vascular disease.

Conclusion: This systematic review suggests that approximately 1 in every 4 patients with a diabetic foot ulcer develop ischemic heart disease over time. We also identified several risk factors for the development of ischemic heart disease in these patients, which may allow early identification of cases to facilitate stringent interventions to increase the long-term quality of life for patients with diabetic foot ulcers.

SESSION 1C - RDA

Promoting and facilitating spontaneous vaginal birth in nulliparous women at full term: a descriptive systematic review

Dr Kendall George¹, Assoc Prof Lauren Kearney², Dr Rachel Nugent³, Dr Rebecca Shipstone⁴, Dr Jane Maher³, Prof Fiona Bogassian⁴

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Background: How women give birth is important. In the past two decades, caesarean births (CB) have doubled¹ while instrumental (assisted and operative) vaginal births for first-time mothers have also steadily risen, leading to a decline in non-instrumental, spontaneous vaginal births (SVB)². No concomitant improvements have been afforded in maternal and neonatal morbidity resulting from these trends in mode of birth³. The aim of this systematic review was to identify the factors associated with spontaneous vaginal birth at term, in nulliparous, women with a singleton pregnancy.

Methods: Nine databases were searched with dates extending from inception to 16 July 2021. Quantitative studies of all designs, published in English, of nulliparous women with a singleton pregnancy and cephalic presentation, who experienced a spontaneous vaginal birth (SVB) at term were included. Covidence was used to manage citation screening and full text review. Two reviewers undertook quality appraisal and RCTs with high risk of bias (ROB 2.0) and other designs (QATSDD) scoring $\leq 50\%$ were excluded. Data was abstracted from: 78 studies (30 RCTs, 33 cohort, 9 cross-sectional, 4 prevalence and 2 case control).

Results: Data was abstracted from 78 studies (31 RCTs, 33 cohort, 9 cross-sectional, 4 prevalence and 2 case control) and factors associated with SVB were categorised as maternal, clinical care and fetal to synthesise findings. There was strong evidence to support interventions to address maternal BMI, birth intentions and fear of childbirth as well as childbirth education, breathing and exercise interventions in the antenatal period and midwifery models of care to increase SVB in nulliparas. Findings did not support routine induction as a means to promote SVB, but the relationship between maternal pelvic anatomy and fetal positioning and strategies to optimise labour progression emerged as promising areas for further research.

Conclusion: How women give birth the first time is important, and this review highlights key domains where evidence synthesis can guide improvements in care and direct future research.

Renal and Cardiovascular Effects of SGLT2-inhibitor in Patients with Type 2 Diabetes Mellitus at Townsville University Hospital: A Retrospective Cohort Study

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Background: Sodium glucose cotransporter-2 inhibitors (SGLT2is) have demonstrated beneficial effects on renal function and cardiovascular risk markers in worldwide studies. With its effects unknown in the Northern Queensland region of Australia, our study investigated the renal and cardiovascular effects of SGLT2is in patients with type 2 diabetes mellitus (T2DM) at the Townsville University Hospital (TUH).

Method: We conducted a retrospective cohort study including 230 patients who used SGLT2i for 6 months between 2015 to 2018. Endpoints were changes from baseline urine albumin creatinine ratio (UACR), glomerular filtration rate, serum creatinine, albumin, hemoglobin A1c (HbA1c), lipid profile, anthropometry, and blood pressure (BP) at 6 months of SGLT2i treatment. Data were collected through chart review and analyzed using SPSS version 25.

Results: SGLT2is produced a clinically significant reduction in HbA1c at 6 months of administration (median 8.1%; Q1:7.9-Q3:9.7%) compared to pre-SGLT2i therapy (median 8.8%; Q1:7.2-Q3:9.1%) ($P=0.002$). Significant difference was also observed in body weight, with a median of 103.7kg (Q1:90.7-Q3:117.4kg) at 6 months of SGLT2i administration versus 105kg (Q1:92.0-Q3:121.8kg) ($P=0.001$) at initiation. The systolic BP was significantly lower after 6 months of SGLT2i therapy (median 126mmHg; Q1:116-Q3:140mmHg) compared to baseline (134mmHg; Q1:125-Q3:147mmHg) ($P=0.001$). SGLT2i did not alter renal parameters, lipid profile or diastolic BP.

Conclusions: SGLT2is provided glycemic efficacy with added benefit of weight loss and systolic BP reduction in a 6-month period in patients with T2DM, thereby decreasing the risks for cardiovascular diseases. However, no clinically beneficial effects were found on lipid profile or renal function. Future studies with longer study periods may be beneficial.

Pilot testing the clinical utility of neonatal brain MRI for North-Queensland infants at high-risk for adverse neurodevelopmental outcomes

Liza van Eijk¹, Professor Roslyn Boyd², Dr Jurgen Fripp³, Professor Ian Wright¹, Dr Kerstin Pannek³, Dr Alex Pagnozzi³, Dr Syed Afroz Keramat², Dr Margot Bosanquet⁴, Dr Sandhya Menon⁴, Dr Prasanna Kumar⁴, Dr Mohan Swaminathan⁵, Dr Neil Archer⁵, Dr Daniel Webb⁵, Ms Carly Luke², Ms Lynda McNamara⁵, Ms Leeann Mick-Ramsamy², & Ms Anya Gordon⁴

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Background: Infants born preterm, with low birth weight, or whom have a hypoxic event or brain injury are at risk for adverse neurodevelopmental outcomes. Early targeted intervention has shown to improve outcomes and reduce the burden for families and health care systems, but this requires early detection. An MRI can augment and provide detailed, accurate information about brain injury and prognosis, however, currently, the timing of MRI is variable, often performed at an age when general anaesthesia (GA) is required (>4 months), posing additional risks and costs.

Methods: This project will examine the clinical utility of neonatal MRI at Townsville University and Cairns Hospital, by implementation of neonatal MRI protocols similar to the Royal Brisbane Women's Hospital. 42 infants at high-risk will be recruited, who will receive a neonatal MRI scan before or at term-corrected age (once clinically stable) with an approved, standardised feed-and-wrap method. A neonatal MRI may diminish risks and costs associated with a later MRI (under GA), and provides the opportunity to identify infants' risk status early, enabling individualized disease-specific treatment plans.

Analyses: The cost-effectiveness of having a neonatal MRI versus standard care (e.g., MRI at later age, >3 months' corrected age) will be evaluated by using a cost-and-consequence analysis, examining potential for increased health benefits, and reduced health care and societal costs.

Conclusion: The clinical utility of a neonatal MRI will be tested and compared to outcomes, including earlier accurate identification of infants at high risk, and enabling earlier diagnosis and referrals to allied health intervention.

Prevalence and risk factors for cardiovascular complications in patients with diabetic foot ulcers- A seven-year retrospective study

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Background: The aim of our study was to evaluate the prevalence of and risk factors for cardiovascular complications in patients with diabetic foot ulcers presenting to a diabetes clinic in regional Australia.

Method: A retrospective quantitative, case-control study was undertaken using clinical and biochemical data of diabetic patients with and without foot ulcers, attending the Diabetes Clinic at Townsville University Hospital, Australia, between January 1, 2013, and December 31, 2019.

Results: The total study sample included 209 subjects, comprising of 87 females and 122 males. Fifty-six subjects identified as Aboriginal or Torres Strait Islander Australians, representing 26.8% of the overall study cohort. The median age of the cohort was 66.47 years [58.0-75.0]. Cardiovascular events were identified as a common and significant outcome (n= 93), occurring more commonly amongst diabetic patients with foot ulceration (76.3% versus 23.7%; p= 0.95, OR 0.98). Risk factors most closely associated with diabetic foot ulceration included stroke (p= 0.01, OR 5.26 [1.41-18.87]) and hypertension (p= 0.47, OR 1.28 [0.65-2.53]). Although ischemic heart disease, heart failure, dyslipidemia, peripheral vascular disease, chronic kidney disease, chronic liver disease, were higher amongst diabetic patients with diabetic foot ulceration, they were statistically insignificant.

Conclusions: Cardiovascular comorbidities and adverse events are more common in diabetic patients with a history of diabetic foot ulcers in comparison to those with none. Diabetic foot ulceration is concomitantly associated with stroke and hypertension amongst diabetic subjects. Further research is needed to characterise our findings.

SESSION 2A - JCU CLINICAL SCHOOL

Raising the D-dimer threshold for ruling out pulmonary embolism: A single-site, observational study with a historical comparison.

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Background: There are concerns for over investigation and over diagnosis of pulmonary embolism (PE) in the Emergency Department. The objective of this study was to assess the impact of introduction of a new PE diagnostic guideline with a raised D-dimer threshold.

Methods: This is a single-site, observational, cohort study with a historical comparison. The new guideline raised the D-dimer threshold to 1000ng/ml for most patients with a Wells' score of 4 or less. Patients investigated for PE with D-dimer and/or definitive imaging in 6-month periods before and after the introduction of the guideline were eligible. Patients with D-dimer of 500ng/ml to 1000ng/ml were prospectively followed up at 3 months for missed PE.

Results: The before phase identified 688 patients investigated for PE, 366 (53.2%) received definitive imaging and 39 PE were diagnosed (5.7% overall, 10.7% of those imaged). For the 121 patients with D-dimers ≥ 500 ng/ml and < 1000 ng/ml, 87 (71.9%) were imaged with 7 (5.8%) having a PE diagnosed. The after phase identified 930 patients, 426 (45.8%) received definitive chest imaging and there were 50 patients with PE diagnosed (5.4% overall, 11.7% of those imaged). For the 185 patients with D-dimers ≥ 500 ng/ml and < 1000 ng/ml, 60 (32.4%) were imaged with 5 (2.7%) having PE diagnosed. No cases of missed PE were identified at 3 months.

Conclusion: The introduction of the new guideline was associated with a reduction in overall imaging rates without evidence of missed PE. Further evaluation in other settings is recommended.

The efficacy of PCT, ESR, CRP and WCC in diagnosing diabetic foot ulcers/osteomyelitis

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Background: Diabetes foot ulcer (DFU) is a complication of diabetes mellitus. Accurate diagnosis of DFU severity through inflammatory markers will assist in reducing impact on quality of life. We aimed to ascertain the diagnostic test accuracy of commonly used inflammatory markers such as erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), procalcitonin (PCT), and white cell count (WCC) for the diagnosis and differentiation between DFU grades based on the International Working Group on the Diabetic Foot classification system.

Method: This systematic review explored studies that investigated one or more of the above-listed index tests aiding in diagnosing infected DFU. This review was registered on PROSPERO database (ID= CRD42021255618) and searched 5 databases including an assessment of the references of included studies. Records were manually screened as per Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines. A total of 16 studies were included which were assessed for quality using QUADAS-2 tool and meta-analysed using Meta-Disc v1.4.

Results: CRP had the greatest area under the curve (AUC) of 0.893 for diagnosing grade 2 DFU. This returned a pooled sensitivity and specificity of 77.4% (95% CI: 72% to 82%) and 84.3% (95% CI: 79% to 89%) respectively. In terms of diagnosing grade 3 DFU, procalcitonin had the highest AUC value of 0.844 when compared with other markers. The pooled sensitivity of PCT was calculated as 85.5% (95% CI: 79% to 90%) and specificity as 68.9% (95% CI: 63% to 75%).

Conclusions: CRP and PCT are the best markers for diagnosing grade 2 and grade 3 DFU respectively. Other markers are also valuable when used in conjunction with clinical judgement. The findings accentuate the necessity of further research to establish standardised cut-off values for these inflammatory markers in diagnosing diabetic foot ulcers.

The role of interleukins for diagnosing diabetic foot osteomyelitis – a pilot study

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Background: Diabetic foot ulcers (DFU) complicated by osteomyelitis is a significant complication of diabetes mellitus leading to amputation and poor quality of life. The current diagnostic approach relies on expensive imaging modalities or invasive procedures such as bone biopsy. However, these investigations are not readily available in rural and remote centres. The aim of this study was to determine whether interleukins IL-2, IL-10, IL-20, and IL-26 differ between patients with diabetic foot osteomyelitis (DFO) compared to patients with only foot ulcers without osteomyelitis and to ascertain their diagnostic accuracy.

Method: A case-control study was designed that compared DFO group to the control group of DFU without osteomyelitis. Patients were classified based on the International Working Group on the Diabetic Foot classification system. Serum IL-2, IL-10, IL-20, and IL-26 were detected through multiplex and ELISA kits and analysed using SPSS.

Results: A total of 40 participants were included in the study – 23 SFU without osteomyelitis and 17 DFO. Of all cytokines studied, IL-10 reached statistical significance. The mean serum IL-10 levels were significantly higher in the DFO group ($p=0.045$). At a cut-off of 127.02 pg/mL, IL-10 has a sensitivity of 66.7% and specificity of 72.2%, with an area under the curve of 0.71.

Conclusion: Interleukin-10 is a useful diagnostic marker for the diagnosis of DFO compared to diabetic foot ulcers without osteomyelitis. Future studies with larger sample sizes may assist in confirming the use of IL-10 family of cytokines as useful markers for DFO diagnosis.

A novel Body-Surface Gastric Mapping device to assess gastric function: First results in classifying abnormal clinical phenotypes

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Background: Gastric emptying scintigraphy (GES) is the current gold standard for assessing gastric function. Body-Surface Gastric Mapping (BSGM; high-resolution electrogastronomy) is a novel non-invasive diagnostic strategy to measure underlying stomach electrical slow-wave activity, hypothesising that it may increase detection of gastric motility disorders.

Method: The BSGM system employed a stretchable electrode array and wearable reader device for measuring gastric electrophysiology while logging symptoms in real-time on an Ipad App. Recordings were performed (30 minutes fasted, 4 hours post-meal) with a simultaneous solid-meal GES (99mTC-labelled egg sandwich, 255-325 kcal) in patients with upper gastrointestinal symptoms. Analysis encompassed spectral/spatial electrophysiology features ('Rhythm Stability Index', frequency, amplitude, slow-wave directionality) compared to a healthy control reference range. Delayed and rapid gastric emptying were defined as >10% retention (4 hours) and <30% retention (1 hour), respectively. Data is presented as mean±standard error of the mean.

Results: Of 53 patients, 41 were female; mean age 43.8±2.3 years; mean BMI 26.0±0.8. Gastric emptying was abnormal in 13 (25%; 11 delayed, 2 rapid); BSGM was abnormal in 22 (42%) patients. BSGM disorders were classified into patient-specific phenotypes: neuromuscular disorder (Rhythm Stability Index <0.25; n=12, 23%), abnormal frequency (n=2, 4%) and retrograde propagation syndrome (retrograde slow-waves ≥ 25%; n=8, 15%). Of 31 (58%) patients with normal BSGM, 5 had delayed gastric emptying (9%; presumed gastric outlet resistance) and 26 (49%) showed four distinct meal-related symptom patterns.

Conclusions: First results show BSGM may increase the detection of various clinical phenotypes of gastric dysfunction compared to GES alone.

Midwifery Unshackled: a mixed methods approach to defining the role and scope of contemporary midwifery practice

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Background: Midwifery is a profession distinct and separate from nursing; midwifery practice is inherently different to nursing practice. However, the existing classification framework considers roles, skills and responsibilities indicative of a given classification level, the same for nurses and midwives. Professionally, and industrially it is important to establish the activities that midwives are educated/regulated to undertake and to define the role and scope of contemporary midwifery.

Method: Participants were midwives employed by Queensland Health who were purposely sampled to include broad representation. This project employed a mixed methods design and information from interviews, focus groups, a cross-sectional survey, and a modified Delphi Technique were synthesised to develop domains and descriptors of midwifery practice. Interviews and focus groups were thematically analysed and summary statistics were used to summarise the survey and Delphi technique.

Results: Participants: focus groups=14, interviews= 9; surveys = 262; Delphi = 9. The emergent domains are: Woman centered care; Evidence based midwifery practice; Collaboration; Culturally Safe Midwifery Practice; Midwifery Education and Leadership and Clinical Governance. Two themes intersect all domains: Autonomy and Accountability; and Health and Well-Being.

Conclusion: There is considerable complexity in describing midwifery practice in Queensland Health. Midwives are more likely to work to their full scope of practice in midwifery led models compared to medically led models, however there is considerable diversity in scope of practice even across various midwifery led models.

Care needs to be exercised to ensure the classification system recognises advanced expertise, further education, and leadership of the profession.

“Hospitals respond to demand. Public health needs to respond to risk”: the governance of communicable disease surveillance and response systems in northern Queensland

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Background: Public health (as distinct from publicly-funded health services) is concerned with the protection and promotion of health, and prevention of injury, illness, and disability, and is a core responsibility of government. This study examined the strengths and limitations of the governance of communicable disease surveillance and response systems in NQ.

Method: COVID-19, tuberculosis, sexually transmissible infections, and mosquito-borne arboviruses were four case units within an embedded case study design. Data were collected between October 2020-December 2021 comprising 47 interviews with clinical and public health staff, document review, and observation in organisational settings. Thematic analysis was guided by institutional theories that understand governance as the collective function of formal and informal rules enacted at all levels of the health system.

Results: Four key challenges were identified as themes. First, the stewardship challenge draws attention to limited system-wide oversight of, and accountability for, essential public health services. Second, the coordination and engagement challenge highlights gaps in intra- and cross-organisational coordination mechanisms. Third, the planning challenge reflects challenges in data compatibility, access, and sharing to enable effective, networked disease surveillance and service planning. Finally, persistent health workforce gaps underlie the capability and capacity challenge.

Conclusions: The COVID-19 experience, and the new Federal Government's promise of an Australian Centre for Disease Control, have increased public awareness of the importance of effective communicable disease surveillance and response systems. Study findings highlight an urgent need for improved governance, resourcing, and political priority of public health in NQ to address unmet needs and ongoing threats.

SESSION 2B - JCU CLINICAL SCHOOL

Effect of glucagon-like peptide 1 receptor agonists (GLP-1RAs) on renal and cardiovascular risk factors in adult patients with T2DM at TUH

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Background: Diabetic kidney disease (DKD) is a major microvascular complication of T2DM with half of patients with T2DM developing DKD. DKD also increases cardiovascular mortality and morbidity in patients with T2DM. GLP-1RAs are a class of antidiabetic agent that have potential to delay the progression of DKD. Previous research has found that use of GLP-1RAs in patients with T2DM reduces composite kidney outcomes by 17% driven by a reduction in albuminuria, particularly macroalbuminuria. The aim of this study was to investigate the effect GLP-1RAs on renal and cardiovascular risk factors in adult patients with T2DM at TUH.

Methods: All patients attending the diabetes clinic at TUH between January 2016 and January 2020 were included in the study. Inclusion criteria included patients >18 years of age with a diagnosis of T2DM and taking a GLP-1RA. Subjects <18 years of age or with other types of DM were excluded from the study. Data was collected from iEMR and AUSLAB and analysed using IBM SPSS28.

Results: A total of 164 patients were included in the study. GLP-1RA use was associated with significant reductions in HbA1c and body weight between 0 and 6mths as well as 0 and 12mths. 8.7% to 8.1% ($p<0.01$) and 115.9kg to 112.2kg ($p<0.001$). No statistically significant changes were found with regard to albuminuria or eGFR.

Conclusion: This study indicates GLP-1RA treatment in adult patients with T2DM are an effective glycaemic control agent with the added benefit of weight loss in the NQ population.

Healthcare providers' attitudes toward persons with disabilities: A study in the Ashanti Region, Ghana

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Background: Persons with disabilities (PWDs) constitute about 15% of the world's population and face several challenges in society including access to healthcare. Attitudes of healthcare providers (HPs) have a major influence on PWDs access to healthcare. This study examined healthcare providers' attitudes towards PWDs in the Ashanti region of Ghana.

Method: This systematic review explored studies that investigated one or more of the above-listed index tests aiding in diagnosing infected DFU. This review was registered on PROSPERO database (ID= CRD42021255618) and searched 5 databases including an assessment of the references of included studies. Records were manually screened as per Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines. A total of 16 studies were included which were assessed for quality using QUADAS-2 tool and meta-analysed using Meta-Disc v1.4.

Results: Out of the 399 HPs, 82% had received education on disability related issues. Mean ATD score was 46.9 ± 6 . Compared to those working in smaller health centres (44.1 ± 5.8), HPs working in district hospitals (47.6 ± 6.7 ; $p=0.001$) had more positive attitudes towards PWDs and were less discriminatory (9.9 ± 2.7 ; $p=0.01$). In relation to positive gains, those who have ever received education about PWDs (12.6 ± 3.2 ; $p=0.04$), and those working in district hospitals (12.9 ± 3.1 ; $p=0.001$) had more positive attitudes compared to their respective counterparts. Interestingly, for PWDs' prospects, male HPs (15.9 ; ±2.9 ; $p=0.01$) had more positive attitudes than females.

Conclusions: Healthcare providers had relatively positive attitude towards PWDs. Nonetheless, this varied across their socio-demographic characteristics. To increase the positive attitudes of HPs towards PWDs, it is important to intensify training opportunities for them on disability related issues and care.

Urinary Nephryn - a potential marker of early glomerular injury: a systematic review and meta-analysis

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Background: Early identification of glomerular injury and AKI diagnosis remains an important problem in clinical settings and current diagnostic biomarkers have limitations. The aim of this review was to determine the diagnostic accuracy of urinary nephryn for detecting glomerular injury.

Methods: Relevant studies published until January 31, 2022, were searched through electronic databases. The methodological quality was evaluated using Quality Assessment of Diagnostic Accuracy Studies (QUADAS-2) tool. Pooled sensitivity, specificity, and other estimates of diagnostic accuracy were determined using random effect model. The Summary Receiver Operating Characteristics (SROC) was used to pool the data and to estimate the area under the curve (AUC).

Results: The meta-analysis included 15 studies involving 1587 study participants. Overall, the pooled sensitivity of urinary nephryn for detecting glomerular injury was 0.86 (95%CI: 0.83-0.89) and specificity was 0.73 (95%CI: 0.70-0.76). The AUC-SROC to summarise the diagnostic accuracy was 0.90. As a urinary predictor of preeclampsia, urinary nephryn showed a sensitivity of 0.78 (95%CI: 0.71-0.84) and specificity of 0.79 (95%CI: 0.75-0.82), and as a predictor of nephropathy the sensitivity was 0.90 (95%CI: 0.87-0.93), and specificity was 0.62 (95%CI: 0.56-0.67). A subgroup analysis using ELISA as a method of diagnosis showed a sensitivity of 0.89 (95%CI: 0.86-0.92), and a specificity of 0.72 (95%CI: 0.69-0.75).

Conclusion: Urinary nephryn is a promising marker for the detection of early glomerular injury. ELISA assays appear to provide reasonable sensitivity and specificity. The diagnostic accuracy of urinary nephryn needs to be endorsed in a large longitudinal study before being translated into clinical practice.

Reducing the impact of chronic hepatitis B (CHB) among seasonal workers in regional Queensland

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Background: The Pacific region carries a high burden of chronic hepatitis B (CHB), yet Australian seasonal workers from this region do not qualify for Medicare. Consequently, workers (over a third of whom work in Queensland) are unfunded for the testing and monitoring required to manage CHB and its sequelae.

Our Australian government-funded project (4-H3C9CYL) will investigate barriers to healthcare service use for seasonal workers living with CHB in regional Queensland and analyse the cost-benefits of CHB service provision to inform healthcare improvement.

Method: Identify barriers to effective service provision using a sequential mixed-method design, working with regional Queensland-based seasonal workers living with CHB and service providers. Triangulation of data with key stakeholders will inform the development of an appropriate model of CHB care for seasonal workers.

Results: Consistent with participatory research approaches, the research process will involve continuous engagement and consultations with industry partners and relevant stakeholders in Queensland to assess how the findings are translated into practice and policies, including education and the development of resources. A multi-sectoral Reference Group comprising researchers, service providers and community partners is being formed to inform the research process. The project team is currently recruiting project officer personnel and PhD candidate.

Conclusions: This project aligns with National Hepatitis B and National Blood Borne Viruses and Sexually Transmissible Infection Research Strategies that identify culturally and linguistically diverse communities as priority populations requiring better support. This industry-driven collaborative project addresses critical healthcare access issues and human rights impacts on people's health.

SESSION 2C - JCU CLINICAL SCHOOL

The qualities that make up effective discharge communication from hospital to general practice: a quantitative analysis

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Background: Communication at transitions of patient care between hospital discharge and the community is an area of high-risk to patient safety. Little is known about discharge communication practices since the introduction of electronic medical records. The aim of this study was to assess the qualities of effective discharge communication within a hospital that uses a complete electronic medical record.

Methods: Measures of discharge summary quality; timeliness, completeness and medication information was assessed via a quantitative analysis on 232 discharge encounters.

Results: The median time to discharge summary completion was 1 day. Overall, 22% of discharge summaries were not complete within 30 days of discharge. 44.5% of discharge summaries were not complete within 30 days of discharge if the day of discharge was on a weekend compared to weekday (p -value=0.001). Rates of medication reconciliation were complete at approximately 35% at each point of the patient stay, however if reconciliation processes were complete, "Medications on Discharge" was more likely to be present in the discharge summary (p -value=0.007, <0.001, <0.001).

Conclusion: This study assessed current discharge summary quality since the introduction of electronic medical records. Targeted interventions in future studies that rectify the shortfalls in discharge communication are warranted, thereby improving continuity of care at point of discharge, and improving patient outcomes.

A Review into the Quality of Spirometry Testing

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Background: Chronic respiratory diseases (CRDs) decrease lung function and cost the Australian health system an estimated \$4 billion p.a. Spirometry testing is required to confirm CRD diagnoses and support management. However, despite its importance, only 30-40% of patients have their CRD diagnosis confirmed with spirometry. The quality of spirometry testing that is performed impacts diagnosis and management decisions. This review identifies the factors influencing the acceptability and repeatability (AR) of tests as one measure spirometry quality.

Method: Following the PRISMA format, MEDLINE (Ovid), CINAHL Complete, and SCOPUS electronic databases were searched to identify studies relating to the quality of spirometry. The overall %AR of spirometry tests was obtained from each article and a generalised linear model was used to determine the factors associated with %AR.

Results: Seventy-nine articles were included post screening from an initial total of 8465. Studies that took place in primary care had a significantly increased probability (42%, p <0.001) of lower %AR compared to hospital care. Studies on elderly participants had a significantly increased probability (37%, p =0.006) of lower %AR compared to studies on adults. The presence of CRD and the number of participants in each study did not significantly influence %AR.

Conclusions: The quality spirometry (defined as %AR) in published studies was significantly associated with the level of healthcare in which the study took place and the age group of participants. Further research is required to determine if the provision of operator training can increase the quality of spirometry and result in improved patient outcomes.

What can local data tell us about effective and appropriate rural aged care models? A case study from rural Sweden

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Background: Little is known about packages of homecare services, gaps in care and 'progression' through levels of care for elders in remote areas of high-income countries. Our international collaboration wants to better understand factors that promote more effective and appropriate rural care for elders. We examined patterns of (and transition between) home care services accessed by residents over 70 years in Storuman Municipality, Sweden.

Method: We analysed Storuman Municipality home and facility care services database, 2014-2020, and summarised sociodemographic characteristics using descriptive statistics. The number of median days elders spent in care facilities was assessed using the Kruskal-Wallis test, and the Dunn test for multiple comparison groups was performed, adjusting p-values with the Benjamini-Hochberg method.

Results: 353 residents moved to care facilities between 2014-2020. Of these, 132 were males, and 221 were females. Females and males spent 223 and 197.5 median days in care facilities, respectively. A Kruskal-Wallis analysis found a steady but significant increase ($H(6) = 17.306$, $p = 0.0082$) in the median number of days residents spent in care facilities over the years, irrespective of gender and subdistricts. A plot of the Dunn test z scores shows this increase with a slight decrease in 2020 (Figure 1).

Conclusion: Storuman, like other rural areas, is a challenging environment for delivering care. This research showed that since 2015 more elders moved early to care facilities, suggesting dissatisfaction with home care services or early onset of age-related health conditions. This finding has implications for resourcing care facilities, including staffing and bed numbers, and provides evidence for residents and local government about the possible impacts of changes in Aged Care.

Association of discrimination and self-rated health outcomes for humanitarian migrants: A systematic review

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Background: Due to an unprecedented worldwide rise in humanitarian migrants recently, understanding their health is becoming an increasingly important issue for research and policy globally. Good health is an essential prerequisite for successful settlement and for making meaningful contribution to society. However, currently very little is known about the health and health determinants of humanitarian migrants after they receive permanent residency in host countries. We particularly have limited knowledge on the role of discrimination in contributing to humanitarian migrants' health. This study aims to provide a systematic review of the current global literature on this association that will help address policy deficits hindering the growth of an inclusive society and better communities in Australia.

Method: This systematic review will be conducted across MEDLINE, CINAHL, EMBASE, Global Health, Web of Science, SCOPUS, PsycINFO (ProQuest) and PTSD (ProQuest) for English language empirical studies on adult humanitarian migrants. Additionally, personal contact with experts will be made. Following the PRISMA guidelines, the authors will screen the titles, abstracts, and keywords of the studies identified in the search strategy for inclusion criteria. After using the Mixed Method Appraisal Tool (MMAT) to evaluate the quality of the included studies, and data extraction, the summary of the included studies will be developed. The summary will include the study designs, socio-demographic characteristics, and the exposure (discrimination) and outcome (SRH) measures.

Results: Yet to be found out.

Conclusions: Yet to be drawn.

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