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00001 To Determine the Efficacy of 1st Month Orientation Program in KKH Radiology Training

Tang Phua Hwee

KK Women's and Children's Hospital

Aims: To determine the efficacy of 1st month orientation program in KKH Radiology Training

Methodology: Structured program for radiology resident training was set up in 2019 consisting of first month orientation program covering acute conditions encountered on call as well as common disorders in encountered in daily imaging sessions.

Residents undergo quiz at end of the orientation to check how well they have understood concepts and pathology covered.

Signed consent was obtained for anonymized results to be used for teaching and research purposes.

Result: There were 80 residents and 7 medical officers who rotated through the department from 2019 to 2023 who took the post orientation quiz. There were 21 in 2nd year of residency, 45 in 3rd year of residency, 13 in 4th year of residency and 1 in final year of residency.

Of these 87, 76 passed the orientation quiz while 11 failed, giving an overall pass rate of 87%.

Radiology residents did better with a pass rate of 87% compared with 71% for medical officers.
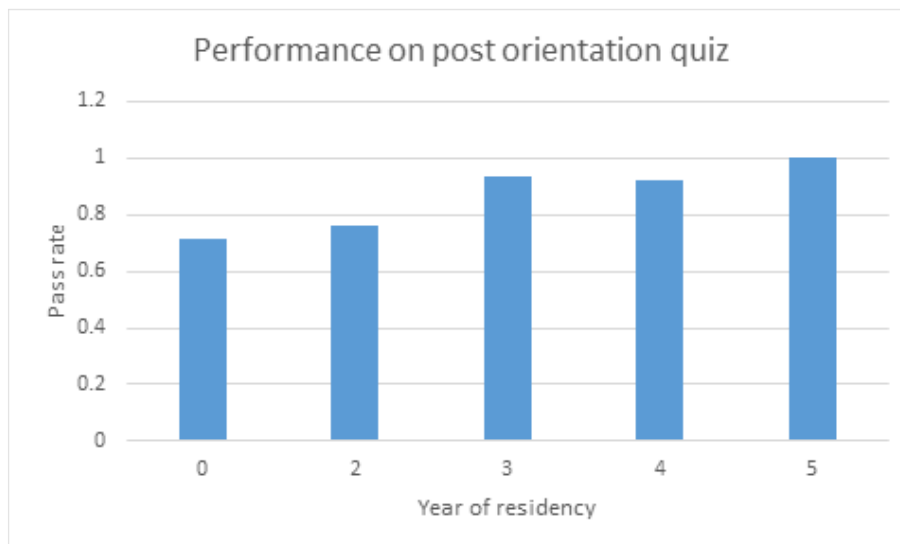
Performance on post orientation quiz

Years of residency was positively correlated with the pass rate of 76% for 2nd year residents, 93% for 3rd year residents, 92% for 4th year residents and 100% pass for the sole resident in final year of residency.

Actual scores on the quiz also showed similar trend, with medical officers having average score 5/10, 2nd year residents 6/10, 3rd year residents 6/10, 4th year residents 7/10 and the sole final year resident 8/10.

Conclusion: After 1st month orientation program in KKH Radiology Training, most medical officers and residents pass the post orientation quiz with pass rate and quiz scores correlating positively with increasing years of residency experience.

00002 To Determine the Change in Confidence Levels at Start and End of KKH Radiology Training

Tang Phua Hwee

KK Women's and Children's Hospital

Aims: To determine the change in confidence levels at start and end of KKH Radiology Training.

Methodology: Radiology resident training consists of first month orientation program inclusive of hands on training, followed by daily clinical sessions supplemented with quizzes. Confidence at start and end of KKH Radiology Training was captured using 5 point Likert scale with 1 reflecting low confidence, 3 neutral and 5 reflecting highest confidence.

Signed consent was obtained for anonymized results to be used for teaching and research purposes.

Result: There were 39 residents and 3 medical officers who completed survey of confidence levels at start and end of posting in 2020, 2021 and 2022.

Baseline average confidence scores were 3.0 for paediatric plain radiographs, 3.0 for paediatric fluoroscopic contrast study, 3.1 for paediatric ultrasound, 3.0 for paediatric MRI.

Average confidence scores increased significantly ($p < 0.01$) to 3.7 for paediatric plain radiographs, 3.9 for paediatric fluoroscopic contrast study, 3.8 for paediatric ultrasound, 3.7 for paediatric MRI at end of posting.

Medical officers showed lower baseline scores compared to residents, with scores of 2.3 for paediatric plain radiographs, 2.7 for paediatric fluoroscopic contrast study, 2.0 for paediatric ultrasound, 1.3 for paediatric MRI brain compared to residents with scores of 3.1 for paediatric plain radiographs, 3.0 for paediatric fluoroscopic contrast study, 3.2 for paediatric ultrasound, 3.2 for paediatric MRI brain.

Medical officers showed increased end of posting scores of 3.0 for paediatric plain radiographs, 3.7 for paediatric fluoroscopic contrast study, 3.3 for paediatric ultrasound, 2.7 for paediatric MRI brain compared to residents with scores of 3.7 for paediatric plain radiographs, 3.9 for paediatric fluoroscopic contrast study, 3.8 for paediatric ultrasound, 3.8 for paediatric MRI brain.

Confidence level for plain x-ray reporting
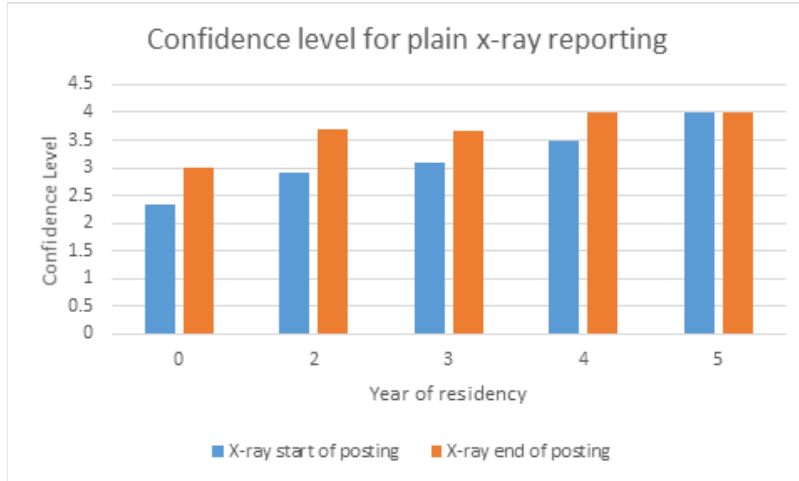
Conclusion: Medical officers show low confidence while radiology residents are neutral at start of posting with both groups showing increased confidence at end of posting.

00003 Application of a Deep Learning Algorithm in the Detection of Hip Fractures

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Aims: Hip fractures are a major health problem and can increase patient mortality and morbidity. The aim is to evaluate the performance of a deep convolutional neural network (DCNN) in detecting and localising hip fractures on plain frontal pelvic radiographs (PXRs).

Methodology: A DCNN was developed using 36442 PXRs between January 2016 and December 2020, of which 29153 PXRs and 7289 PXRs were allocated for training and validation sets respectively. The accuracy, sensitivity, specificity, and area under the receiver operating characteristic curve (AUC) were evaluated on 3761 independent PXRs acquired from the emergency department from 2016 to 2020. PXRs with metallic implants, suboptimal positioning and poor image contrast were included to increase its clinical applicability and simulate real world situations. The authors also used the visualization algorithm gradient-weighted class activation mapping (Grad-CAM) to assess the validity of the model.

Result: The algorithm achieved an accuracy of 96%, a sensitivity of 94%, a specificity of 96%, and an AUC of 0.990 for identifying hip fractures. The visualization algorithm showed an accuracy of 76.1% for fracture localisation.

Conclusion: A DCNN can detect hip fractures on PXRs with a high accuracy and might assist clinicians in the emergency department.

00004 "Kopi and Loti with You", A Preventive Health Program for Elderly Residents Residing in Rental Flats

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Sengkang General Hospital

Aims: Rental flats residents generally face higher risk of social and health issues. The challenges they face in their daily living may predispose them to chronic illnesses (mental and physical), or lead to complications from current chronic illnesses.

The project utilizes a ground-up approach to engage residents in helping service providers understand from their perspectives physical and social health, as well as challenges in achieving it. Following which, the team worked with different Allied Health Professionals (AHPs) to design a 6 months' program for the participants.

Objectives include:
1) Promote health seeking behaviours defined by participants
2) Aim to improve quality of life and delay onset and complications of physical and social health.
3) Increase health literacy, knowledge and motivation of preventive health behaviours.

Methodology: There are two phases for this project. The first phase involves a Focus Group Discussion (FGD) with potential participants to identify their social and health challenges, as well as the activities that they perceived will benefit them. The second phase of the project involves using data collected from the FGD to design a 6 months' program.

Phase 1:

    a) Recruitment

Potential participants were identified through two Senior Activity Centres (SACs). Five participants from each SAC were recruited.

Inclusion criteria: Aged 60 years and above. Able to speak simple English.

Data Collection

Participants were invited to complete a basic demographic survey, followed by a 1-hour FGD.

    b) Data Analysis

The FGD session was audio-recorded and verbatim transcribed. Thematic analysis was then used to identify themes from the results.

Phase 2

a) Recruitment

Inclusion criteria are the same phase 1. A total of 20 participants from both SACs were recruited.

b) Program Details

The program has covered different aspects of health and mental health well-being:

Session #1: Fall prevention and recovery and eco-map

Session #2: Proper footwear and foot care and Forum Theatre

Session #3: Healthy budget eating and Reminiscence box

c) Data Collection

Participants completed a pre-test survey questionnaire before the first session and the same survey at the end of the program.

Three 3 main aspects were measured: Motivation, knowledge and health literacy of topics covered.

d) Data Analysis

Results were analysed using Excel to identify the changes in knowledge, motivation and health literacy.

Result: From the FGD, findings were classified into four overarching themes: Perception of good health, ways to achieve good health, motivation to achieve good health, and activities enjoyed.

The results of pre-test and post-test questionnaires shows an overall increase in motivation for health seeking behaviors, increased in knowledge and health literacy of the different program components.

Conclusion: This ground-up approach helped service providers to identify areas of physical and social well-being that matters to the target population. The program implemented was planned according to their needs and wants, and aim to improve health behaviors. Overall, this program helped to increase knowledge, health literacy and motivation of rental flat seniors.

00005 Redefining Frailty with Resilience and Self-Efficacy in Older Adults and Caregivers in the Acute Care Context

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Aims: Building of resilience and self-efficacy serve as key protective factors, which is essential in delaying frailty. This study explored the perception of frailty and the role of resilience or self-efficacy through older adults and their caregivers in an acute care hospital setting.

Methodology: A grounded theory approach based on Glaser and Strauss was used to redefine frailty in the context of resilience and self-efficacy. Semi-structured individual interviews were conducted with 24 patients who were 65 years and above and hospitalised in the inpatient wards, as well as 10 family caregivers.

Result: Although the theory of redefining frailty begins with the construct of resilience, in a deceptively linear trajectory, the process of frailty is not linear. Frailty encompassed of physical element with manifestations of psychological traits, fear of the unknown and being in control. Resilience was determined by individual psychological traits and mindset, and possession of coping mechanism. Self-efficacy involved having inner motivations and receiving physical assistance.

Conclusion: Resilience and self-efficacy play a pivotal role in the context of frailty. The three constructs demonstrated a complex interplay of intrinsic and extrinsic factors which should be taken into consideration in future interventions.

00006 Risk of Hypoglycemia in Hyperkalemia Management with Insulin among Inpatients - Experience in an Acute Care Tertiary Hospital

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Aims: This study evaluated the outcomes of adult patients who received hyperkalaemia treatment, including the incidence rate of hypoglycaemia and its associated risk factors among hospitalized adult patients. Parameters of patients who experienced hypoglycaemic episodes withcorrected hyperkalaemia and those without were also compared.

Methodology: This prospective descriptive study included patients who received intravenous insulin for the treatment of hyperkalaemia in six inpatient wards (surgical and medical) between November 2020 and July 2022. Blood glucose monitoring (BGM) regimen was carried out at regular intervals of 1, 2, 4, and 6 hours after receiving intravenous insulin. The outcome was assessed by capillary blood glucose readings.

Result: A total of 319 patients were included. The hypoglycemia rate identified was 18.5% (n=70). One significant association with increased risk for hypoglycemia was prior history of the kidney-related condition (odds ratio 2.09, p=0.02). Fndings reported 78.6% of the hypoglycemic events occurring within the first two hours and 12.9% and 8.6% of hypoglycemic events occurring at 4 and 6 hours post-treatment, respectively. Among those who received the hyperkalaemia treatment, 42.0% (n=134) had persistent uncorrected serum potassium readings, and 21.6% (n=29) of these patients experienced hypoglycaemia episodes.

Conclusion: The high incidence of hypoglycaemia highlighted the importance of frequent blood glucose monitoring up to six hours post hyperkalaemia treatment. Administration of IV insulin and dextrose needs to take into consideration the patient's prior history of renal disease for hyperkalaemia treatment.

00007 Development of a Metaverse Escape Room for Education on the "War On Salt"

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Aims: Excessive salt intake is one of the risk factors that leads to cardiovascular disease, which is the leading cause of death globally. In Singapore, a national strategy has been planned to encourage people to replace their foods with lower sodium alternatives and cut their sodium intake by ~15% over the next 5 years. With recent hype about the Metaverse, this study aimed to develop an in-house educational Metaverse Escape Room (MER) on the "War On Salt" (WoS) to increase public awareness on healthy eating habits and a healthy lifestyle, so that consumers can make better informed choices.

Methodology: MER was developed on a commercial Metaverse event platform. It consisted of 5 rooms/"worlds" which contained clues, puzzles and fun facts related to the WoS (Figure 1). Players could play the game in teams of 4 to 5 by interacting with the artifacts and communicating with other avatars in real-time. Participants from a local polytechnic were recruited to play the game. They completed pre- and post-game quizzes that contained 15 questions focused on the risks, signs and symptoms of excessive salt intake, ways to reduce salt consumption, maintaining a healthy diet and lifestyle, and local government initiatives to increase public awareness about the WoS. Additionally, they completed a user experience survey on their game play.

Result: Twenty-nine participants (17-21 years, 52% males, 48% females) played MER. Majority (83%) had an increase in their knowledge (median=12/15 post-quiz versus 9/15 pre-quiz scores, $p<0.001$). All players agreed that the content in MER was relevant, useful and easy to understand (100% each). Most enjoyed playing MER (97%), were engaged and actively participated in game play (97%), and found the storyline creative and interesting (93%). Almost all (96.6% each) wanted MER to be part of their curriculum and would recommend it to friends and family.

Conclusion: MER was useful for increasing public awareness on WoS among local polytechnic students. The Metaverse can potentially make learning more immersive and effective for the younger generations in a post-pandemic world where digital learning is the way to go.

00008 A Meta-synthesis on the Older Adults' Perspective of Advance Care Planning

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Aims: To synthesise the evidence regarding older adults' perception of advance care planning in preparation for end-of-life care.

Methodology: Design: The meta-synthesis was conducted according to the Enhancing Transparency in Reporting the Synthesis of Qualitative research (ENTREQ) guidelines and thematic synthesis was employed to synthesise the qualitative findings in an inductive manner.

Data Source: A search was completed on six electronic databases (PubMed, EMBASE, CINAHL, PsycINFO, Web of Science, Scopus), for publications from 1 January 2000 to 4 December 2021.

Review Method: The certainty of the evidence was assessed using the Grading of Recommendations Assessment, Development and Evaluation and Confidence (GRADE-CERQual) in the Evidence from Reviews of Qualitative research. Two independent reviewers conducted this process, and disagreements were resolved through discussions.

Result: Results: Fourteen studies were analysed. Four major themes and eleven subthemes emerged from the thematic synthesis: (1) psychosocial preparedness, (2) medical preparedness, (3) psychological barriers towards advance care planning and (4) extrinsic barriers towards advance care planning.

Discussion: These themes consolidated older adults' views of advance care planning and how engagement in this planning affected their end-of-life preparedness

Conclusion: This review suggested psychological and extrinsic factors were barriers to the uptake of advance care planning and provided directions for future research to achieve a holistic understanding of the impact of advance care planning on end-of-life preparedness.

00009 Effectiveness of Video Conferencing in Improving HBA1C among Older Adults with Diabetes: A Systematic Review

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Aims: Videoconferencing has the potential to enhance Type 2 Diabetes health outcomes and healthcare access by replacing physical follow-up and increasing follow-up outpatient appointments attendance. Due to the increased usage of videoconferencing during the pandemic, it is critical to evaluate its effectiveness in diabetes management. This review aims to synthesize the available evidence to evaluate the effectiveness of videoconferencing regarding clinical outcomes in older adults with diabetes.

Methodology: Electronic databases (Cochrane, PubMed, Embase, CINAHL, Web of Science, Scopus) were searched for relevant publications. Published experimental studies on video conferencing as the online intervention for diabetes management for older adults $\geqslant$ 60 with diabetes since 2005 were included. Endnote software removed duplicated studies, and articles were screened against the eligibility criteria. Two reviewers screened, appraised, and extracted the data independently. Risk of Bias

Tools and GRADE was used to appraise the quality of eligible studies. A narrative synthesis was used to synthesize findings for the overall effect of video conferencing.

Result: Among the 3011 studies retrieved, five studies were retrieved. According to the GRADE criteria, the overall quality of evidence was low to moderate. All of the trials had a high risk of bias. Narrative synthesis revealed that participants in the video conferencing group had improved HbA1c compared to usual care.

Conclusion: Videoconferencing is an effective tool for delivering more frequent and timely health care to older adults with T2D at a distance and for improving access to health care. Future reviews should consider evaluating the cost effectiveness of videoconferencing interventions to strengthen further health-care related economic policies.

00010 Nurse Led Protocol in Urgent O&G Centre (UOGC): Hyperemesis Gravidarum

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KK Women's and Children's Hospital

Aims: To initiate treatment within 30 minutes after triaging and to improve patient experience in UOGC.

Methodology: The team did a time motion study from 12th April to 3rd May 2022. We found that patients waited an average of 75 minutes before receiving treatment. In the year 2021, 783 patients with hyperemesis gravidarum visited Urgent O&G Centre (UOGC), 338 (48%) of patients were admitted. A protocol has been established based on 24-hour Pregnancy-Unique Quantification of Emesis (PUQE) (The Management of Nausea & Vomiting and Hyperemesis Gravidarum of Pregnancy, Royal College of Obstetricians & Gynecologists, 2016). Inclusion & exclusion criteria have been established. Patients with a scan done below 22 weeks of gestation, with no kidney or heart conditions were included in the study. The project was initiated 28th October 2022. Patients with a severe PUQE score will have their treatment expedited. They will receive a hydration package after triaging is done and the package is ordered, Patients with moderate and mild PUQE scores will undergo a urine test for ketones. A urine ketone of 2+ and above will result in patients receiving the hydration package. Patients with a urine ketone of 1+ and below will wait until they are seen by a Doctor before treatment is decided

Result: The aims of the project were achieved: the average waiting time before patients received treatment was 30 minutes. Their reported experiences in UOGC were all rated between excellent and good. There were 129 patients recruited from the study from 28th Oct 2022 up to 7thth March 2023. Forty-five (45) patients (34%) were admitted, seventy-three (73) were discharged and eleven (11) patients went home against medical advice due to social reasons.There is a reduction of 14% admission rate compared to the year 2021.

Conclusion: The new protocol can be adopted by other O&G Hospitals to enhance patient's experience.

00011 The Effect of Comorbidity on Hospital Mortality And Hospitalization in Patients with Clinically Diagnosed Carbapenemase-Producing Carbapenem-Resistant Enterobacteriaceae from An Asian Tertiary Hospital

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Aims: Infection with Carbapenemase-Producing Carbapenem-Resistant Enterobacteriaceae (CPE) has emerged as a major public health concern. However, little is known about the burden and risk predictor of clinically diagnosed CPE, especially patients infected with multiple resistant genotypes and with comorbid conditions in Asian patient population. We aim to assess the disease burden of patients with clinically diagnosed CPE and the usefulness of the Charlson Comorbidity Index (CCI) as risk adjusted hospital mortality predictors in this group of patients from a large tertiary acute care hospital in Singapore

Methodology: Retrospective cohort study of hospital laboratory database to identify patients with CPE with single or multiple genotypes in clinical sample from Jan 2016 to Sep 2022; hospital discharge database was also used to extract clinical information and identify respective patients with comorbidity using International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM) codes

Result: Over the 7-year period, 276 patients had CPE from clinical sample were identified, including 26 patients infected with multiple genotypes (9.4%), with an overall hospital mortality rate of 28.3%. Patient with multiple CPE genotypes had a significantly higher hospital mortality rate (46.2% vs 26.4%, p=0.033) compared to patient with a single genotype. The hospital mortality rates (13.2%, 24.5%, 38.2%, and 100.0%, respectively, p<0.001) and hospital length of stay (geometric mean, 24.9, 23.0, 43.8, and 76.4 days, respectively, p<0.001) were consistently increased for patients with CCI ranging from none, low, moderate to high grade, respectively. Logistic regression model analysis showed that CCI (Odds ratio (OR) 12.3, high vs. none, CI 2.8-54.6, p=0.001), but not for patient with multiple genotypes (OR 1.5, 95% CI 0.7-3.4, p=0.318) was significant and independent predictors of hospital mortality after adjustment of age group, gender, DEM admission, medical management, discharge class, ICU admission. Similar results were also seen with hospital length of stay by zero-truncated negative binomial regression model analysis.

Conclusion: The burden of CPE infection is high in this population. Comorbidity but not CPE with multiple genotypes was one of the most important contributors to hospital mortality and resource utilization.

00012 Empowering Pre Frail Older Adults: A Community Nutrition Education Intervention to Improve Nutrition Knowledge and Intake to Avoid Frailty Progression

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Aims: To assess the effectiveness of a practical nutrition education intervention, as part of a multi-factorial intervention, on nutritional status, nutrition knowledge and dietary intake in pre frail community older adults

Methodology: This is a non-controlled study involving a 4-month exercise and nutritional intervention for pre frail community older adults (55 years and above) attending senior activity centres. Nutrition intervention aimed to facilitate healthy eating habits that achieved adequate nutritional intake to avoid frailty progression without the use of oral nutrition supplement. A trained nutritionist conducted 6 sessions, incorporating a combination of didactics teaching, food-based games and grocery-shopping trip. COVID pandemic affected attendance rate and sessions were converted online.

Nutrition knowledge was assessed with a pre and post quiz. Nutritional status of participants was assessed using Mini-Nutritional Assessment – Short Form and Subjective Global Assessment. Participants' dietary intake was analyzed using a 3-day dietary recall at pre-, post-, 6-month and 12-month post intervention.

Result: Amongst 172 participants (75% female, 83% Chinese, mean age 71 years), 27.3% was at risk of malnutrition and 5.8% was diagnosed malnourished. Participants' nutrition knowledge increased significantly post intervention (pre: 2.5 to post: 3.1 score, <0.001). There was no significant change in nutritional status throughout the study period.

Participants consumed significantly higher daily intake of calories (1421kcal to 1560kcal, p <0.001), protein (75.08g to 83.30g, p <0.001), protein per body weight per day (kg/d) (1.40g to 1.54g, p <0.001) and calcium (782mg to 939mg, p <0.001). Participants attending at least 4 sessions (59.3%) consumed higher amount of daily protein (p = 0.008), protein per kg/d (p = 0.008) and calcium (p = 0.042) post intervention. Intake significantly decreased 6 months post intervention for daily protein (p = 0.025), protein per kg/d (p = 0.039), calcium (p = 0.015). Compared to baseline, there was no change found in dietary intake except for calorie (6.2% increase, p = 0.004) at 12-month follow up.

For protein distribution across meals post intervention, there was significantly higher protein intake for lunch (26.93g to 29.35g, p = 0.001) and dinner (28.31g to 31.57g, p = 0.004) but not for breakfast (13.44g to 13.55g, p = 0.848). At 12-month follow up, there was no difference in intake for all meals.

Conclusion: A practical nutrition education intervention without the use of oral nutrition supplement was effective in empowering community older adults to avoid frailty progression through the maintenance of nutritional status, increased nutritional knowledge and dietary intake. However,

increased dietary intake was not sustained 6 months after the intervention. Moving forward, studies should focus on studying factors that drive sustainable behavioral change in this group of pre frail community older adults.

00013 Assessing The Financial Impact of Cancer Drug List (CDL) Implementation on Patients Receiving Chemotherapy in an Ambulatory Cancer Centre in Singapore

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Aims: Since 1st Sept 2022, the Cancer Drug List (CDL) was implemented to ensure the long-term affordability of chemotherapy and insurance premiums. This project aims to determine the impact of CDL on out-of-pocket expenses (OOPE), acceptability and financial toxicity (FT) after CDL implementation.

Methodology: A cross-sectional study was conducted at the National Cancer Center Singapore. We analyzed OOPE before and after implementation of CDL by reviewing billing transactions in Aug-Sept 2022. FT and acceptability were determined using the COmprehensive Score for financial Toxicity (COST) tool and theoretical framework of acceptability (TFA) respectively via survey.

Result: Of the 314 patients finalized bills examined, majority (68.6%) experienced no change in their OOPE. Most patients (72.6%) were unaware of implementation of CDL. Among patients aware of CDL, majority (61.9%) were accepting, but unsure on how it benefits them. Financial toxicity was reported as low (mean COST score=22.4$\pm$9.95), and patients $\geqslant$65 years old or have at least pre-university education were less likely to experience FT.

Conclusion: Despite best efforts from policymakers, it is challenging to achieve a one-size fits funding or subsidy framework that can cater to the needs of all patients. Patients can be better empowered to seek financial assistance or resources.

00014 Developing a Basic Gynaecology Nursing Course by Applying Kern's Six- Step and Kirkpatrick Model for Curriculum Development and Evaluation: A multidisciplinary Inter-professional Approach

Zhang Xinrong, Geetha Daniel, Li Mingyue, Huang Fang, Manisha Mathur

KK Women's and Children's Hospital

Aims: Foundation nursing education equips nurses to the level of starting work. However, novice nurses with limited specialized training and clinical attachments in a specialized tertiary institution post a challenge to them, whereby a lot of learnings are on job training. Baseline survey revert opportunistic training is insufficient, there is a need to enhance clinical practice. A team of expert nurses, clinical educators, and doctors decided to create a Basic Gynaecology Nursing Course to build on the foundation in gynaecology nursing, with a goal to improve patient care.

Methodology: Team adopted conceptual framework of Kern's Six-Step and Kirkpatrick Model for curriculum development and evaluation. Team incorporated professional guidelines, hospital protocols, communication and skill competences into the development. We utilized SingHealth E-Learning portal for the training and feedback. Two stages of assessment were conducted: immediate pre and post course; and case study and live case analysis at three to six months.

Result: All twenty novice nurse failed pre course test. Post test showed significant improvement of 25.2% on average. Stage two assessment also demonstrated distinct improvement in identifying potential issues, providing proper patient education, and managing case effectively. Feedback shown nurses strongly agreed with: the course content relevant to work (93.7%), gained new skills and knowledge (75%), and confidence to apply to work (81.2%).

Pre and Post Scores
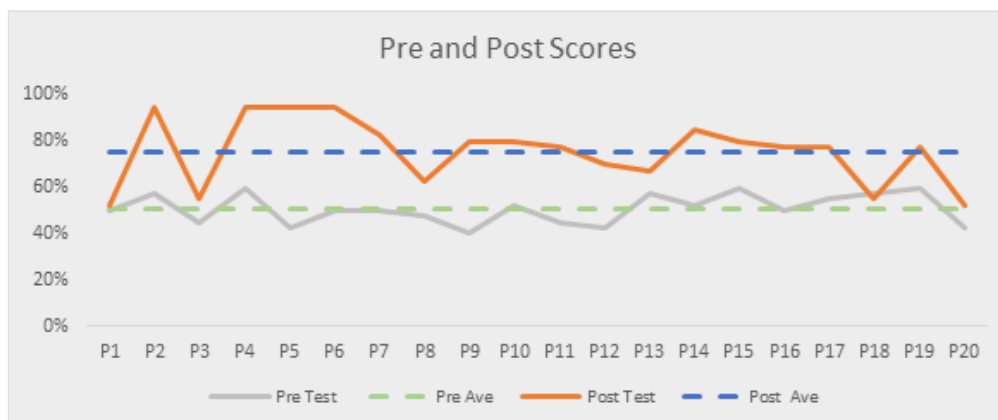
Conclusion: On job training is not adequate for novice nurses. The multidisciplinary inter-professional approach addresses all area of training needs. A structured training programme enhances nurses' clinical capability and brings benefit to our patients in the daily care.

00015 Challenges and Solutions in Setting up a Telehealth Advanced Practiced Nurse - Led Clinic

Zhang Xinrong, Huang Fang, Manisha Mathur

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Aims: The COVID-19 pandemic has upshifted the development of telehealth services worldwide. Teleconsultation become an efficient and timely communication tool between healthcare providers and patients. However, there are barriers and challenges encountered such as: privacy, data confidentiality, reimbursement, physical examination and diagnostics, and acceptability. To overcome the challenges, Advanced Practiced Nurse (APN) led TeleGyn clinic sets up with the aim to provide safe and seamless care to suitable low risk women for teleconsultation.

Methodology: The APN Led Gynecology Clinic manages low risk women with stable fibroids and benign ovarian cysts. During early COVID-19 pandemic, we have a trial to reach out to low risk group of women through phone consultation with positive feedback and good acceptance. Therefore, TeleGyn APN clinic is set up in April 2022 to provide consultation for them. Women in low risk group are on yearly follow up with ultrasound scans. APNs will review their scan report to select suitable cases to offer telehealth service. Women who consented for video consultation (VC) will be provided a save zoom link for consultation. Phone consultation (PC) is also available if patient is not familiar with zoom. Physical examination is unable to conducted on teleconsultation, if patient verbalize any issue or concern required for examination, she will be given priority for an in-person consultation within a week of the teleconsultation. If patient request ultrasound report or soft copy memo during teleconsultation, clinic will encrypt the file to email to maintain patient confidentiality. Post consultation patient will receive a safe payment link.

Result: Total 113 ultrasound scans reviewed by APNs in a year, 65% of low risk group of women are suitable for teleconsultation. 32% of them are keen for teleconsultation (70% VC vs 30% PC). One case needed to return for an in-person review due to heavy menses. One case defaulted teleconsultation. The mean age of women showed acceptance towards teleconsultation vs face-to-face consultation are similar (mean 56.3 vs 56.6). Women who are exposed to video or phone consultation before are more willing to take the offer. About 75% cases underwent teleconsultation required follow up are keen for teleconsultation again. 25% of women opted for face to face consultation mainly due to physical examination and investigation of cervical cancer screening.

Conclusion: Telehealth provide timely and effectively communication to patients. Safe and easily accessible are the key. TeleGyn APN clinic selects low risk group of women with yearly ultrasound scan review to address the safety net in providing comprehensive teleconsultation service to them. Women has showed positive experience to teleservice are more willing to take teleconsultation again.

00016 Enhancing Post Surgery with the Use of Telehealth, AI Assisted Wound Imaging and Assessment

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Aims: To demonstrate the feasibility of adoption, utilization and effectiveness of telehealth monitoring among surgical patients.

Methodology: This is a quasi-experimental study where patients were recruited using convenience sampling. Post- surgical breast and liver patients with wounds and/or surgical drains requiring monitoring by healthcare professional upon discharge were recruited. Patients with IOS system handphone were recruited to be in the intervention group while those without the IOS system handphone were recruited into the control group. The intervention group used a wound management system mobile application to take wound and drain images, report drainage and answer assessment questions. The control group follows the existing practice of calling the specialty nurses to report on the progress of their wound, drainage and drain exit site.

Result: A total of 57 patients were recruited, with 30 patients in the control group and 27 patients in the intervention group. Within the intervention group, there were 18 patients (62.1%) who consistently entered into the application. In both group, there were 5 patients flagged for abnormalities. As for unexpected hospital visitation, there was one patient in the control group and two patients for the intervention group. Up to 88% (N=22) of patients did not face any issues using the app. Upto 72% (n= 18) of patients preferred to report their symptoms using the app as compared to calling the nurses daily. The patients felt safe despite the lack of physical appointment and calls from the nurses (n=21, 84%). Both patients (n= 22, 88%) and nurses (n= 8, 89%) were generally satisfied with the mobile application and wanted telewound consult to be more available (patients= 22, 88%; nurses= 9, 100%).

Conclusion: The results indicate that patients are forthcoming to adopt telehealth, and are satisfied with healthcare monitoring available through the use of telehealth instead of the conventional existing practice of making phone call or coming down for hospital appointments.

00017 Training of a Machine Learning (Ml) Algorithm to Identify Patients at Risk of Developing Pressure Injury (PI)

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Aims: To train and evaluate potential ML algorithms using electronic medical records to identify patients at risk for PIs

Methodology: A total of 100 patients' cases data were extracted from the hospital pressure injury dashboard, where (n=50) developed PI during hospitalisation and (n=50) did not develop PI. Data included patient demographics, clinical records, nursing care observations, allied health records, laboratory test results and surgical records. Data was de-identified before handed to the research partner to develop a ML classifier that identifies patients at risk for PI, and as an eventual goal, without Braden scale scores as features. After data exploration and excluding outliers, a one-shot dataset was constructed for training of ML algorithms. Features used were height, weight, Braden's moisture score, use of indwelling urinary catheter and surgery duration to predict probability of an inpatient developing PI. PyCaret was used to trial multiple machine learning algorithms on data. Linear Discriminant Analysis (LDA) was found to provide overall best area under curve (AUC) metrics.

Result: Out of 14 machine learning algorithms, LDA classifier had an AUC score of 0.86 and accuracy score of 0.64, compared to baseline random guess of 0.5. This suggests that despite a small dataset size, features used were able to derive useful indicators towards predicting PI.

Conclusion: ML appears to have potential to better stratify PI risk in inpatients, reduce administrative burden and improve patient outcomes. Future plans involve using 5 years of inpatient data, more features, and training in more Artificial Intelligence (AI) tools such as neural networks.

00018 Examining the Healing Rate of Patients with Venous Leg Ulcers in Singapore

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[1]Singapore General Hospital, [2]Home Nursing Foundation

Aims: To examine the healing rate of venous leg ulcer (VLU) patients in the community compared to the acute care setting.

Methodology: This was a retrospective medical record review of VLU patients managed by the community home care nurses and a wound clinic in the acute care setting. Patient medical history, demographics, type of compression therapy, and healing rate were extracted from the home care wound database and the medical record from a wound clinic in an acute care hospital between January 2016 to December 2018. Univariate analysis was performed to compare the outcomes of VLU healing with and without compression stockings between the two settings.

Result: Data from 603 patients' medical records were analyzed (226 from community home care; 377 from acute care wound clinic). The mean age of VLU patients was (69.8; SD=12.7) in the community versus the acute care setting (64.7; SD=12.4). There were more independent ambulant patients in the acute care setting (n=279; 74%) compared to the community (n=51; 22.6%). Patients in the community did not utilize any form of compression therapy unlike patients from the acute care wound clinic. A total of 142 patients records from the community (n=73) and acute care wound clinic (n=69) were further compared on the healing outcomes for patients wearing compression stockings and those without. At 12 weeks, more VLU healed under the community home care (no compression) (n=25; 34.2%) compared to the acute care wound clinic (compression stockings) (n=7; 10.1%), p=0.008. Patients on compression stockings took a longer time to heal compared to no compression (299 days versus 163 days, p=0.093).

Conclusion: Our study showed that the healing rate is comparable between acute and community home care for those with compression stockings. Future studies are needed to understand the selection process and compliance while on compression therapy.

00019 Comparison of Care Outcomes of Venous Leg Ulcers between the Community and the Acute Care Setting

Nanthakumahrie D/O Gunasegaran[1], Hafidah Saipollah[2], Goh Wee Ting[1], Raden Nurheryany Sunari[1], Chong Hui Ru[1], Chong Tze Tec[1], Ang Shin Yuh[1], Fazila Aloweni[1]

[1]Singapore General Hospital, [2]Home Nursing Foundation

Aims: To examine the healing outcomes of the venous leg ulcers (VLU) patients between community home care and acute care wound clinic

Methodology: This was an analytical observational cohort study to examine the healing outcomes where patients were recruited based on convenience sampling from the acute care wound clinic between May 2021 to August 2022. The inclusion criteria included patients aged 21 years and above diagnosed with VLU who require compression therapy (2 or 4 Layer Bandaging). The exclusion criteria are patients with complex VLUs with active wound infection or requiring debridement. A specialist vascular nurse and Wound Ostomy Continence (WOC) trained nurses from acute care provided the training to the home care nurses in the community. Patients who were agreeable for community care services were referred to the community care service provider to be followed up. Those patients who were not agreeable were continued to be managed at the acute care wound clinic. Recruited patients were monitored weekly for up to 12 weeks. The following outcomes were reported: type of compression therapy, wound area, wound characteristics and healing time. Transport costs, clinic visit costs, and patients' Quality of Life were obtained at baseline and 12th week.

Result: A total of 47 patients were recruited, where (n=27) followed up with the community home care and (n=20) with the acute care wound clinic. However, at the 12th week, 21 patients dropped out, with 15 followed-up at community home care and 11 at acute care wound clinic, respectively. The patient's age ranged from 66 to 73 years, with a mean age of 70 (SD 11.04 years). Most venous ulcer wounds are presented over the shin area (n=18; 38.3%) from both settings. 4-layer compression was used more than 2-layer compression (n=7; 46.7%) and (n=8; 72.7%) in community home care and acute wound care clinic, respectively. The healing times (in weeks) were shorter in the community (median 5.0, min-max:2-12) whereas in the acute care wound clinic it was (median 6.0, min-max: 3-12). The total surface area healing means the difference among patients who received compression therapy at home and acute wound care clinic was 9.76 (SD=18.56; 95% CI -0.51,20.04) and 12.75 (SD=18.32; 95% CI 0.43, 25.06), p=0.044 respectively, which was statistically significant. Eleven patients received financial assistance from the community home care and five from the acute care wound clinic. The mean total consumables cost was 144.36 (SD=277.81) in the community home care and 181.54 (SD= 220.98) in the acute care wound clinic, p= 0.143.

Conclusion: This is the first study conducted in the tropics to compare VLU healing outcomes in the community and acute care setting. The study has reported compression therapy performed by

community home care nurses is superior as that by acute wound care clinic nurses. Findings from this study will further aid in building expertise in the community and ensure value-based healthcare. This will also inform the implementation of future community wound care services in Singapore.

00020 Outcomes of Patients with Pressure Injuries and Direct Healthcare Cost: Interim Results from Singapore's First Chronic Wounds Registry

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Aims: To report on using the Chronic Wound Registry (CWR) database in Singapore to investigate the outcomes of patients with pressure injuries (PI), healthcare utilisation and direct healthcare costs over six months.

Methodology: This study extracted data from the inaugural Chronic Wound Registry database (Nov 2019 - Nov 2021). Hospital and community-acquired PI wound data of adult patients recruited from two tertiary hospitals in Singapore were de-identified and extracted. The patient's basic demographic, co-morbidities, wound-related clinical data, wound images, interventions/treatment, number of hospitalisations, length of stay per admission, and all inpatient and outpatient bills were analysed. Our study outcomes were wound healing, factors predictive of wound healing and healthcare utilisation and direct healthcare costs over six months.

Result: A total of 63 patients with PIs were included in our study. Mean age was 67.3 ± 16.9 years, with slightly more than half of the patients being male (n=35; 56%). Community-acquired PI was seen in 46% of patients. One-fourth of the patients had BMI < 18 kg/m2. Mean duration of the wound was 0.91 ± 2.76 years. Incidence of complete wound healing at 1-month, 3-month and 6-month was 18%, 46% and 46%, respectively. Chinese ethnicity and diabetes mellitus were independently associated with worse wound outcomes with a hazard ratio of 5.38 (95% CI: 1.00-29.02) and 0.14 (95% CI: 0.02-0.86), respectively. Patients with PIs had an average of 2.7 outpatient wound nurse visits, 3.2 specialist visits, and 4.8 outpatient visits over six months.

Conclusion: The prevalence of PIs may increase with the ageing population in Singapore, posing substantial economic challenges to the healthcare system. Comprehensive clinical and cost information is imperative in reforming existing models of care and proposing alternative healthcare pressure bundles or programmes.

00021 An Integrative Review of the Risk Factors of Community-acquired Pressure Injury and Outcomes of Pressure Injury Care Bundle

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Aims: To summarise the evidence and present the state of the science on pressure injury care bundles in the community. Specifically, this review examined (i) the extent of pressure injury by studying its prevalence and incidence in the last ten years, (ii) the risk factors associated with community-acquired pressure injury, and (iii) the components and outcomes associated with effective pressure injury care bundles in the community.

Methodology: This integrative review is guided by Whittemore and Knafl framework and followed the reporting guidelines from the Preferred Reporting Items for Systematic Reviews and Meta-analyses. Quality appraisal was applied to assess the quality of selected articles. Data relevant to the review aims were extracted, and thematic analysis was used to synthesise and present the findings. PubMed, Medline, CINAHL and Web of Science were searched. Studies published in the English language between 2012 and 2022 were retrieved.

Result: A total of 386 articles were retrieved; 30 met the inclusion criteria. Most studies reported the point-prevalence and period-prevalence of CAPI, and only one study reported the incidence of CAPI. The point-prevalence and period-prevalence of community-acquired pressure injury were 0.02% to 10.8% and 3.3% to 86.4%, respectively, and the cumulative incidence was 1.3%. The risk factors for community-acquired pressure injury assessed vary between studies; older age, poor nutrition, immobility and multiple comorbidities are commonly reported. Socioeconomic and caregiving factors were not included. Very few studies evaluated pressure injury care bundles in the community. Even so, the components of the pressure injury care bundle vary between studies.

Conclusion: There is a complex interplay of factors associated with pressure injury development. A multicomponent pressure injury preventive care bundle needs to be implemented and evaluated in the community setting.

00022 Socio-economic and Environmental Factors Associated with Community-acquired Pressure Injuries: A Mixed Method Study

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Aims: (1) To report on the prevalence of community-acquired pressure injuries (CAPIs) in patients admitted into the acute care setting; (2) to examine the socio-economic and home environment associated with CAPIs; (3) to understand the challenges of caring for patients with CAPIs at home.

Methodology: This mixed-method study recruited patients admitted with CAPIs in the acute care hospital between March 2021 to June 2022. The hospital's pressure injury (PI) database was used to screen patients admitted with CAPIs. A convenience sample of CAPI patients and their caregivers were approached to participate in this study. Pa¬tients' demographic data were extracted from their medical records after their consent. Caregivers were interviewed to understand the challenges of caring for PI patients during the home visit.

Result: The CAPI prevalence was reported at 1.1% during the study period (1039 out of 97 912 patients admitted had CAPIs). Only 70 out of 164 eligible patients consented to participate. The mean age of patients was 84.2 (SD=10.4) years old; 68.6% (n=48) were females. Majority presented with a deep tissue injury (DTI) (37.1%; n=26) or unstageable PI (31.4%; n=22). More than half of the patients had alternating air mattresses at home (54.3%; n=38), and only 10% (n=7) had positioning wedges and used a sliding sheet for turning. Continuous data were summarised using means and standard deviations, and categorical data were summarised using frequencies and percentages. Logistic regression found no significant socio-demographic and clinical predictors of patients having PI stages 2, 3, and 4 compared to patients with DTI and unstageable PI. Challenges to caring for PI at home include high financial burden, physical limitations, and personal challenges in CAPIs management.

Conclusion: CAPIs are prevalent among patients admitted to the acute care setting. Ongoing support to the caregivers in the community is essential to address the reported physical challenges, financial burden, and personal challenges in PI care.

00023 Evaluation of Human-centric Lighting in an Acute Care Ward: Staff Reported Satisfaction and Impact on the Sleep Quality and Fatigue of Nurses

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Aims: This study aimed to evaluate the impact of human-centric lighting in workspaces on nurses' reported sleep quality, fatigue, and staff satisfaction.

Methodology: An evaluation study was conducted. Nineteen nurses were recruited from an intervention ward (installed with human-centric lighting); and 19 nurses from control wards (installed with fluorescent lighting). Pittsburgh Sleep Quality Index (PSQI) and Flinders Fatigue Scale (FFS) were collected at three timepoints (First: Pre-installation of human-centric lighting; Second: Two months post-installation; Third: Three months post-installation). Staff were surveyed for their satisfaction of lighting in the intervention ward.

Result: No statistically significant differences were found in PSQI or FFS median scores between groups at all timepoints. Staff were mostly satisfied with the lighting in the intervention ward.

Conclusion: Human-centric lighting alone may not negate the negative consequences of shift work to improve sleep quality or fatigue levels of nurses. Fatigue among nurses is detrimental in the healthcare setting. More research is needed on the effectiveness of strategies to mitigate the negative impacts of shift work on nurses' well-being beyond infrastructure fixtures.

00024 Enhancing the Hospital-at-Home Experience

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Aims: To evaluate the design and use of an integrated structure for hospital at home.

Methodology: This is a mixed methods study design.

Phase one: A survey was performed among stakeholders providing or receiving healthcare in the community (nurses, patients, caregivers, relatives) to understand their challenges and needs in carrying out healthcare at home.

Phase two: A prototype of an integrated structure was designed and fabricated based on suggestions from stakeholders providing or receiving healthcare in the community. Phase three: The prototype was piloted in 10 patients' homes and interviews were conducted on its feasibility as well as the preferences of stakeholders.

Result: There was a total of 70 respondents to the survey (20 nurses and 50 patients/caregivers/relatives).

Main finding for phase one: The physical home environment [clutter (38%) and space constraints (17%)] was most commonly cited as the main challenge when providing care at home. Among patients/caregivers/relatives, medication management (54%) was the greatest challenge.

A total of 10 patients/caregivers and 9 community nurses tested the prototype and provided their feedback on the integrated structure.

Main finding for phase three: The integrated structure was able to provide proper storage and workspace for the nurses to carry out patient/caregiver education and nursing care procedures effectively at home. All patients/caregivers found the integrated structure useful to store and organize their medical supplies.

Conclusion: An integrated structure that can fulfill the physical, spatial and interpersonal needs of patients at an affordable price could be useful in facilitating the delivery and receiving hospital care in the home setting. Moving forward, these findings could inform future marketable design concept that could further create trust and promote seamless care delivery at home.

00025 Practice Readiness and Factors Associated with It - Experience of New Nurses in Their First Two Years of Practice

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Aims: Determining the practice readiness of newly graduate nurses can aid in the fostering of better support to the nurses as they transit into the workforce; as well as inform curriculum design and partnerships between schools and employers. This study aimed to: (i) provide an overview of the perception of practice readiness of newly graduated nurses for their professional nursing role; and (ii) examine associations between nurses' readiness with individual demographic and occupational variables, and reasons for choosing the nursing profession.

Methodology: This cross-sectional study with a convenience sampling approach was conducted between November and December 2022. Staff nurses who graduated from local nursing programs within the last two years and working in one of the healthcare clusters in Singapore were approached to participate in the survey. An online questionnaire was administered, consisting of questions from the Casey-Fink Readiness for Practice Survey and questions eliciting responses to key competencies for future practice. Nurses' sociodemographic data, major reasons for choice of nursing as a career and skills or procedures that they were most uncomfortable performing independently were also obtained.

Result: A total of 445 responses were obtained. More than half of the respondents (57.5%) identified at least 3 skills and procedures which they were uncomfortable performing independently, including: (i) responding to an emergency/assisting in code blue (73%); (ii) tracheostomy care and suctioning (44.3%); and (iii) chest tube care (41.3%). The top reason of choosing nursing as a career was nursing is a stable industry (54.2%). Nurses were most concerned with the areas of trials and tribulations (42.5%) and clinical competency (36.6%). When compared to nurses in their first year, those working in their second year reported more confidence in the ability to problem solve (mean=2.95 versus mean=2.83, p=0.003), caring for a dying patient (mean=2.76 versus mean=2.59, p=0.004), less difficulties in prioritising patient care needs (mean=2.15 versus mean=2.25, p=0.04). They also perceived themselves as a good problem solver (mean=2.81 versus mean=2.70, p=0.03). The results showed no significant differences in their readiness for practice and readiness for future practice between the diploma graduate nurses and degree graduate nurses.

Conclusion: It is critical to facilitate the development of newly graduated nurses' clinical competence and confidence for practice, to prepare them for the clinical challenges at work.

00026 Building Emotional Resilience among Health Care Workers Using a Mobile Application Deployed via Staff's Own Devices

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Aims: Spaced education pedagogy is a novel approach in implementing online teaching via the process of spacing, repetition, and testing. Integrating spaced education-based strategies using a mobile application may mitigate stress by building resilience. Using the Spaced education pedagogy, this study evaluated the effectiveness, usability and acceptability of mobile-assisted cognitive-behavioural therapy in building resilience among nurses working in the acute care setting.

Methodology: This one group pre-test and post-test trial recruited 139 registered nurses working in the acute care setting from May 2021 to July 2022. The group used the mobile application daily for one month which administered resilience training through psychoeducation, reflective activity, workplace scenarios, stress reduction, and mindfulness techniques. The level of resilience was measured using the Connor-Davison Resilience Scale at baseline and upon completion of training. The usability (System Usability Scale) and acceptability (evaluation feedback) of mobile-assisted cognitive-behavioural therapy were measured upon completion of the training. Participants were asked about strategies they found most useful in daily life. Descriptive and inferential statistics were used in analysis.

Result: Results indicated significant increase in the resilience score (t=-4.40, p<0.001). Participants rated the mean usability score as 70.5, which was considered a good rating. Many participants (64.7%) reported that they were likely will you use the mobile application in future. Some (67.1%) found the daily learning (67.1%) and daily notification reminder (76.5%) beneficial and easy to use (Dashboard 68.3%; tools 74.1%). The top 3 strategies participants found most useful in daily life were: (i) managing negative emotions (54.1%); (ii) psychoeducation about mental health and the risks of burnout (44.7%); and (iii) achieving work and life balance (43.5%).

Conclusion: Overall, the mobile application administering resilience training reported good rating of usability and showed evidence of being acceptable among the nurses, as well as suggesting efficacy in improving resilience level.

00027 Declining Semen Quality among Men Undergoing Intra-Uterine Insemination (IUI) Over the Past 15 Years

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Aims: To compare semen quality of men who underwent Intra-uterine Insemination (IUI) between 2005 to 2007 and 2020 to 2022

Methodology: A retrospective study was carried out to compare semen parameters of 135 men who underwent IUI from year 2005 to 2007 (Group 1) and 681 men from year 2020 to 2022 (Group 2) at Singapore General Hospital.

Fresh semen samples were processed to retrieve motile sperm for IUI procedure. Neat (n) and processed (p) semen parameters were analysed; semen volume (VOL), total motility (MOT), sperm concentration (CONC), percentage of normal sperm morphology (NORM) and total motile sperm count (TMSC). TMSC is the product of VOL, MOT and CONC. Comparisons between two groups were performed using Mann-Whitney U test and P value of <0.05 is considered significant.

Result: Men's age in Group 1 was not significantly different compared to Group 2, median 34.8 versus (vs) 35.0 years, P=0.466. Men in Group 1 had significantly higher nTMSC (86.5 vs 53.7 million), pTMSC (7.9 vs 4.5 million) and pCONC (33.0 vs 18.8 million/mL) compared to Group 2, P <0.05 (Table 1). Group 1 also had a higher pregnancy rate compared to Group 2, 10.4% vs 6.6%, however it was not significant, P=0.144.

Table 1. Comparison of semen parameters between men who underwent IUI in 2005 to 2007 versus 2020 to 2022.

			Neat sample				Processed			
	Male age (Years)	Volume (mL)	Total motility (%)	Concentration (million/mL)	Normals (%)	TMSC (million)	Total motility (%)	Concentration (million/mL)	Normals (%)	TMSC (million)
Group 1 (Year 2005 – 2007)	34.8	2.5	57.0	58.0	3	86.5	97.0	33.0	5	7.9
Group 2 (Year 2020 – 2022)	35.0	2.5	48.0	47.0	1	53.7	98.0	18.8	2	4.5
P value	0.466	0.212	0.065	0.250	0.417	0.040	0.542	0.007	0.282	0.004

Among the spouses who achieved pregnancy, semen parameters of men in Group 1 were significantly higher compared to Group 2 for nCONC (93.5 vs 42.4 million/mL), pCONC (56.5 vs 25.0 million/mL), nNORM (3% vs 1%), pNORM (5% vs 2%), nTMSC (115.0 vs 67.9 million) and pTMSC (19.9 vs 6.3 million), respectively (P <0.05). 100% of pregnancies were observed in spouses of men who were less than 40 years of age in Group 1 compared to 84.4% in Group 2, P=0.843.

Conclusion: Men who underwent IUI in recent years had poorer semen quality compared to 15 years ago. Lower pregnancy rates were observed in spouses of men who are more than 40 years of age.

Therefore, men should be advised to start a family before the age of 40 as semen quality declines thereafter.

00028 Impacts of Standardised Patients as a Teaching Tool to Develop Communication Skills in Nursing Education: A Mixed-Studies Systematic Review

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Aims: Standardised patients (SPs) are used in nursing education to teach communication skills; however, their impacts are not well examined. This mixed-studies systematic review aims to use Kirkpatrick's model, as a conceptual framework, to examine and evaluate available evidence of the impacts of SPs as a teaching tool in enhancing nursing students' communication skills in a formal education setting.

Methodology: Evidence of the impact of engaging SPs as a teaching tool to develop and enhance nursing students' communication skills with patients was synthesised across eight databases, grey literature sources and hand-searching of relevant journals. Thematically synthesised findings were mapped according to Kirkpatrick's model using the best-fit framework analysis approach.

Result: The use of SPs is well-received as a teaching tool to enhance communication skills. However, real-world applications of learned simulated communication skills are required to examine the long-term and overall impact of SPs on nursing students' communication skills.

Conclusion: There are beneficial impacts of Kirkpatrick's model level one,, two, and three from engaging SPs to develop nursing students' communication skills. Future research could focus on evaluating the real-world and long-term application of learned communication skills of nursing students beyond the simulated settings.

00029 Patient Education Interventions for Dialysis Catheter Care: An Integrative Review

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Aims: To synthesise (1) evidence on the patient educational interventions on dialysis catheter care and (2) reported learning and clinical outcomes of the educational interventions

Methodology: Using Whittemore and Knafl framework, the following databases were searched: PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane Library and ProQuest. The Joanna Briggs Institute (JBI) Critical Appraisal Tool was used to appraise the articles that fit the inclusion and exclusion criteria. Thematic analysis was performed to synthesise and report the findings. Studies published in the English language were retrieved.

Result: A total of 13 studies were included. All the studies focused on educating patients who were on either tunnelled (permanent) dialysis catheters or tenckhoff catheters. Three main themes emerged: (1) teaching strategies used for educating HD patients on dialysis catheter care (2) educational practices for educating PD patients on tenckhoff catheter care and (3) outcomes of patient education on dialysis catheters. Two teaching strategies—using written materials and educational videos were identified for instructing HD patients on how to care for their dialysis catheters properly. Different educational practices for educating PD patients on tenckhoff care varied in terms of the composition and experience of the implementation care team members, educational approach, duration, training location, timing relative to catheter placement, assessment method and follow-up support. Patients' knowledge levels, catheter related blood stream infections and peritonitis rates were evaluated and compared.

Conclusion: This review highlighted several education materials and compared different educational practices on tunnelled (permanent) dialysis catheters and tenckhoff catheter care that healthcare providers used to increase knowledge and reduce catheter-related problems. Findings of this review can assist healthcare professionals in developing evidence-based patient education for HD and PD patients on dialysis catheter care. Future research can consider evaluating the education received by patients on non-tunnelled (temporary) dialysis catheters and determine the effectiveness of the education delivery approach.

00030 Evaluating Patients' Knowledge, Beliefs, Perceived and Actual Adherence to Femoral Non-tunnelled Dialysis Catheter Care: An Audit Review Study

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Aims: (1) To provide information on the current patient education about femoral non-tunnelled dialysis catheter (NTDC) and patients' adherence level towards femoral NTDC care; (2) To examine the relationship between patients' knowledge, beliefs, and perceived adherence on their actual adherence towards femoral NTDC care.

Methodology: An audit was conducted in the Singapore General Hospital renal inpatient ward from March 2022 to August 2022, using a 27-item Questionnaire. It is used to collect information on socio-demographic characteristics, knowledge, beliefs about and perceived adherence to femoral NTDC care. Content validity was assessed by full agreement of three nephrology-trained expert. Patients' actual adherence level was determined based on the nursing handover reports documented per shift.

Result: A total of 50 patients were audited. The mean age was 61.6 (SD=12.6) years old, and more than half of the patients (n=33; 66%) underwent femoral NTDC insertion for the first time, with the dialysis catheter in place for an average of 5.7 days. 76% of the patients demonstrated low to moderate actual adherence to femoral NTDC care guidelines. The existing patient education was not standardised in its content, with an average of 24.9% of patients reporting about knowledge inadequacy. Pearson's bivariate correlation showed a moderate negative correlation between patients' knowledge adequacy and their negative beliefs towards adhering to femoral NTDC care instructions (r= - 0.304, p<0.05), but no correlation for their perceived adherence toward femoral NTDC care (r=0.009, p=0.95; p>0.05). Similarly, no correlation was found between patients' knowledge regarding the benefits and disadvantages of adherence and non-adherence and their negative beliefs about femoral NTDC care (r= -0.029, p=0.844; p>0.05) and perceived adherence towards femoral NTDC care (r= 0.051, p=0.73; p>0.05). There was a weak negative correlation between patients' negative belief and their perceived adherence towards femoral NTDC care instructions (r= -0.274, p<0.05). In an ordinal logistic regression with R2 = 0.35, the following predictors: knowledge, beliefs, and perceived adherence toward femoral NTDC care, could explain 35% of patients' actual adherence. However, patients' perceived adherence to femoral NTDC care was the only significant predictor (p< 0.05) of their actual adherence while patients' knowledge, and beliefs were not statistically significant predictors (p>0.05).

Conclusion: Nurse educators should standardise patient education for all patients on femoral NTDC. This will ensure that patients receive adequate knowledge, mitigating their negative beliefs about following guidelines and hence enhancing both perceived and actual adherence to femoral NTDC care.

00031 Community Dance Programme for Older Adults in Singapore: A Mixed Method Study

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Aims: This study aims to develop and evaluate an 8-week community dance programme (CDP) in enhancing physiological and psychosocial well-being among older adults in Singapore.

Methodology: The study comprises a pilot cluster randomized controlled trial and process evaluation to assess the effects of CDP. 54 older adults were recruited from six senior activity centres, in which self-reported questionnaires, cognitive, and physical assessments were used and analysed. Focus group discussions with 20 older adults and 10 student instructors were also conducted.

Result: The findings from paired t-tests and GLM have demonstrated that CDP has significantly enhanced quality of life and accommodation relating to intergenerational communication among older adults. Three main themes were also identified during the process evaluation: (1) Three main themes were identified: (1) promoting physical, cognitive and social health with dance, 2) imagination is power: travel through dance, and 3) further enhancing the dance program.

Conclusion: The findings have highlighted the potential of CDP in improving physical and psychosocial well-being among older adults, while cultivating intergenerational bonds between the older adults and student instructors.

00032 To Explore the Feasibility of Using Digital Exergames for Fine Motor Skill Rehabilitation among Stroke Patients in an Acute Hospital: A Cross-Sectional Non-Experimental Study

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Aims: This study aimed to assess the feasibility of exergames for fine motor skill rehabilitation among stroke survivors in an acute hospital. The objectives were 1) to explore the feasibility of exergames for fine motor recovery among acute and sub-acute stroke patients; 2) to examine the patient's attitude toward using exergames; 3) to assess patients' intention to use exergames in the future.

Methodology: Design: Cross-sectional non-experimental quantitative study

Setting(s): Acute hospital in Singapore

Participants: 47 participants

Participants were recruited from an acute hospital in Singapore. Two exergames (Fishing and Brave Bird) were used to test the feasibility of exergames among sub-acute stroke survivors. The Technology Acceptance Model (TAM) based questionnaire was used for the data collection. Descriptive statistics were used to analyse the TAM survey and inferential statistics were used to evaluate the association between the TAM scores and demographic data.

Result: The age of the recruited patients varied from 44 to 75 years old. Participants had a mean age of 60.6 years old (SD=8.88), and most were male (n=27; 57.4%). Patients aged 40 to 60 had a mean rank of 28.3 and patients who are 61 years old and above had mean rank of 19.5, indicating that the mean overall TAM score was higher in the younger group compared to the older group. The mean overall TAM showed a higher score in males (72.67 ± 12.75) and was slightly lower among females (67.95 ± 12.28). The feedback revealed a high level of perceived user-friendliness, positive attitude towards exergames and great desire to continue using or recommending them to others in the future.

Conclusion: This study set out to assess the feasibility of exergames for fine motor skill rehabilitation among inpatient stroke survivors and their attitude as well as future intention use towards exergames. Although findings from this study have established that most stroke survivors are receptive towards the novel intervention, there is still a pertinent need to improve the exergame intervention based on the feedbacks gathered.

00033 Sleep Disturbances among Community Dwelling Senior Citizens in Singapore with Amnestic Mild Cognitive Impairment

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Aims: People with the amnestic mild cognitive impairment (aMCI) subtype are at risk of developing Alzheimer's disease (AD). Identifying symptoms that occur during aMCI can potentially help detect those with an increased risk of transitioning from aMCI to AD. One such symptom could be sleep disturbances, which often precede cognitive decline in AD and may impair memory consolidation. Through the use of in-home bed sensors, this study aims to explore the association between sleep disturbances and the MCI subtype among the growing community of senior citizens in Singapore.

Methodology: The sleep disturbances of 28 participants with aMCI and non-amnestic MCI (naMCI) were monitored using bed sensors and compared in a cross-sectional study over periods of two months from March 2016 to August 2018. Sociodemographic factors and vascular risk factors were also assessed. Univariate and multivariable logistic regression analyses were used to determine whether sleep disturbance was independently associated with aMCI.

Result: Among those with aMCI, 55.6% (10/18) were assessed as having two or more sleep disturbances per night, as compared to 30% (3/10) among those with naMCI. When adjusting for age, gender, and hypertension, a significant association was found between having two or more sleep disturbances per night and aMCI as compared to naMCI ($p<0.05$).

Conclusion: These results suggest that using bed sensors to determine the frequency of sleep disturbances could be a potential method for detecting those with aMCI who are at risk of developing AD.

00034 Deep Tissue Injuries among Hospitalized Patients: An Explorative Audit Study

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Aims: (1)To study the accuracy of deep tissue injury assessment done by nurses through auditing the nursing care record, (2) To classify the types of error associated with the inaccurate pressure injury (PI) assessment

Methodology: This is a cross-sectional study where an audit of the nursing care assessment record and patients was carried out. Patients with deep tissue pressure injuries (DTIs) were documented under the wound care document by the ward nurses and using the hospital PI dashboard patient's these records were retrieved from August 2022 to February 2023. The study team reviewed these patients and compared their findings against ward nurses' clinical documentation on the assessment of PIs.

Result: This a is preliminary report. A total of 60 patients were reviewed at bedside to determine the accuracy of ward nurses' assessment and documentation. Out of the 60 patients, 92 DTIs were reported. The mean age of these patients were 79 (SD=9.3). Gender was comparable, however most of the patients were of Chinese ethnicity (n=57; 37.5%). Among the 60 patients, n=50; 32.9% of them had community acquired PIs with a total of 50 (83.3%) DTIs were documented on admission. Most of the DTIs were located at the sacral (n=25; 41.7%), followed by the heels (n=17; 28.3%). Among the 92 reported DTIs, only (n=50; 54.34%) were accurately assessed and documented as DTI when compared with the nurse expert review. A total of (n=16; 17.4%) DTIs were not a PI when reviewed. Among the DTIs, (n=27; 29.3%) were wrongly staged, when the actual staging was mostly stage 2 (n=8; 8.7%) and stage 1 (n=6; 6.5%).

Conclusion: Accurate staging and diagnosis of PIs is important as it will help in identifying other conditions with similar morphologic findings. Appropriate education on PI is important to improve nurses' knowledge in PIs.

00035 Score for Emergency Risk Prediction (SERP): Validation of an Interpretable Machine Learning Triage Tool and Addressing Dataset Imbalance

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Aims: Triage in the emergency department (ED) has traditionally relied on subjective clinical judgement which is susceptible to human error. Recently, a machine learning based mortality risk prediction score, the Score for Emergency Risk Prediction (SERP), was developed to facilitate a data-driven approach to triage. While SERP reported good predictive accuracy, it was developed on a dataset consisting only of ED admissions with considerable class imbalance. The primary aim of this study is to validate SERP on a general ED cohort of admissions and discharges. The secondary aim is to determine if addressing class imbalance during model training improves score performance.

Methodology: The Singapore General Hospital (SGH) ED dataset was used, which contains 1833908 ED records between 2008 and 2020. Records between 2008 and 2017 were randomly split into a training set (80%) and validation set (20%). 2019 and 2020 records were used as separate test sets to assess any potential impact of the COVID-19 pandemic on score performance. The area under the receiver operating characteristics curve (AUC) was the primary evaluation metric.

SERP-2d, SERP-7d and SERP-30d were validated on the test sets on the outcomes of 2-day, 7-day and 30-day mortality respectively. In addition, SERP+-2d, SERP+-7d and SERP+-30d scores were developed on the same outcomes using the AutoScore-Imbalance framework to address class imbalance.

Result: The study included 1189321 visits (69.2%) in the training set, 297330 visits (17.3%) in the validation set, 125872 visits (7.3%) in the 2019 test set and 106878 visits (6.2%) in the 2020 test set. The AutoScore-Imbalance framework generated and selected datasets with a minority class ratio of 0.3, 0.35 and 0.5 for the development of SERP+-2d, SERP+7d and SERP+-30d respectively. On the test cohorts, the SERP scores achieved an AUC of between 0.859 (95% CI, 0.848-0.871) to 0.894 (95% CI, 0.878-0.910), while SERP+ scores achieved an AUC of between 0.874 (95% CI, 0.856-0.890) to 0.905 (95% CI, 0.893-0.918).

Conclusion: SERP maintained high predictive performance for mortality outcomes in a general ED population. Accounting for class imbalance during training improved score performance as shown by the SERP+ results. Overall, SERP and SERP+ scores showed good predictive capabilities while achieving parsimony in variable selection. The scores are also inherently interpretable and include only objective measures that are readily available at the point of ED triage. These scores have significant potential to support accurate, data-driven triage decisions at the ED.

00036 Profile and Healthcare Utilisation Patterns of Adolescent Frequent Attenders in Primary Care

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SingHealth Polyclinics

Aims: Frequent attenders (FAs) utilise more healthcare resources and have greater morbidity than non-frequent attenders (non-FAs). Most studies on FAs focus on adults, which may not be applicable to adolescents due to differences in healthcare needs and presentation patterns. This study aims to describe the sociodemographic profile, clinical presentation profile, and healthcare utilisation patterns of adolescents attending polyclinics in Singapore, and to determine the factors associated with adolescent frequent attendance (FA).

Methodology: A 1-year retrospective electronic medical record review of adolescents aged 10-19 attending 8 public primary care clinics in Singapore in 2021 was conducted. Patient data was extracted from electronic databases and de-identified before analysis. Data variables included adolescents' demographic profile (age, sex, ethnicity, and socioeconomic data), clinical presentation profile (category of visits, diagnosis categories by systems, and individual diagnoses), and healthcare utilisation (date of presentation, frequency of visits, medical certificate duration, referral and medication trends). FA was defined as the top 10% of clinic attendees annually.

Result: In 2021, 34,645 adolescents attended the polyclinics for a total of 75,902 visits. The median age was 16 years (IQR=13-18), and majority were males (50.9%) and Chinese (59.8%). 38.2% received financial aid. The visits were for acute (52.8%), chronic (26.2%), and preventive (27.7%) care.

The top 10% of attendees corresponded to an annual visit frequency of $\geq$4 visits. With this definition, 14.4% of adolescents were FAs, constituting 42.5% of all visits. Using logistic regression, FAs were older (OR=1.16, 95%CI=1.15-1.18, p<.001), more likely to be Malays (OR=1.43, 95%CI=1.33-1.54, p<.001) or Indians (OR=1.40, 95%CI=1.27-1.54, p<.001), and received financial aid (OR=1.68, 95%CI=1.58-1.79, p<.001). FAs were more likely to have underlying psychiatric conditions (OR=2.74, 95%CI=2.40-3.12, p<.001), but presented less frequently for psychiatric issues than non-FAs (OR=0.83, 95%CI=0.74-0.93, p<.001). FAs were more likely to have been referred to the emergency department (OR=3.45, 95%CI=3.04-3.91, p<.001) and psychiatry clinics (OR=2.40, 95%CI=2.00-2.87, p<.001), be prescribed potentially addictive medications (OR=4.11, 95%CI=3.82-4.44, p<.001), and had more annual medical leave (7 days(IQR=4-11) vs 3 days(IQR=1-3, p<.001)).

Conclusion: Adolescent FA was associated with non-Chinese ethnicity, lower socioeconomic status, and underlying psychiatric conditions. Despite this, adolescent FAs were less likely to present with mental health issues. Adolescent FAs had higher healthcare utilization with a higher number of clinic visits, longer medical certificate duration, and more referrals to the emergency department and psychiatrists.

Further research is required to explore the reasons for FA, the relationships between the factors associated with FA, and methods of early identification of at-risk adolescents.

00037 Co-developing a Mobile App-based Motivational Interviewing Module with Patients with Type 2 Diabetes to Improve Self-Management: A Qualitative Study

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Aims: Despite the value of motivational interviewing (MI) for diabetes management, few studies adopted automated MI techniques in mobile devices to support patients. This study aimed to explore the perspectives of patients with diabetes on the acceptability of app-based MI and their feedback on specific MI module features to inform future intervention.

Methodology: We conducted semi-structured interviews with patients with type 2 diabetes, recruited from public primary care clinics. All interviews were audio-recorded and transcribed verbatim. Thematic analysis was conducted utilizing NVivo.

Result: In total, 33 patients participated in the study. Participants saw MI as a mental reminder to increase motivation and a complementary care model conducive to self-reflection and behavior change. Yet, there was a sense of reluctance, mainly stemming from potential compromise of autonomy in self-care by the introduction of MI. Compared to in-person MI, app-based MI was viewed as offering a more relaxed atmosphere for open sharing without being judged. However, participants questioned the lack of human touch, which could potentially undermine a patient-provider therapeutic relationship. To sustain motivation, participants suggested more features of ongoing supportive nature such as visualization of milestones, gamified challenges and incremental rewards according to achievements, tailored multimedia resources based on goals, and conversational tools that are interactive and emphatic.

Conclusion: Our findings suggest the need for a hybrid model of intervention involving both app-based automated MI and human coaching. Patient feedback on specific app features will be incorporated into the module development and tested in a randomized controlled trial.

00038 Preceptors' Experience in Precepting Final Year Nursing Students during Their Pre-Registration Consolidated Placement (PRCP) in an Acute Hospital

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Aims: The aim of the study was to explore the experiences of nurse preceptors in precepting final year pre-registration consolidated placement (PRCP) nursing students in an acute hospital.

Methodology: Descriptive qualitative design was adopted to gain insight and understand the preceptors' experience in precepting the final year nursing students.

Purposive sampling was used to recruit staff nurses with at least 2 years of working experience, attended preceptorship course and precepted 1 nursing student.

Face to face interview were conducted using semi-structured questions until data saturation was achieved from 10 participants.

Data was analysed using inductive content analysis. Data belonged to a particular group were grouped according to categories using higher-order headings. Group members achieved consensus on the final themes.

Result: Three main themes were identified:

1. Preceptors' perceived roles and teaching strategies

2. Challenges and needs during preceptorship

3. Outcomes of successfully preceptorship

Participants expressed their emerging roles during this experience as a guide for their preceptees and imparting the skills and knowledge of a future nurse in the clinical setting. They experienced by providing a safe environment, emotional support and building a trusting relationship, preceptees' learning experience were enhanced. By assessing their preceptees' performance and attaining feedback from their colleagues, participants were able to adopt suitable teaching strategies in guiding them.

However, participants also experienced challenges such as managing preceptees' learning attitude, their level of skills and knowledge and role strain. They suggested support from the education department, management and institutions during preceptorship.

Despite these challenges, outcome of the preceptorship experienced by the participants were successful due to the increase in their preceptees' level of competency, achievement of learning outcomes and their sense of fulfilment of being preceptors.

Conclusion: Participants shared their invaluable experience of preceptorship. However, with better preparation and equipped with knowledge of different teaching strategies in guiding their preceptees, pertinent support from the management, education department and institutions could be further explored to enhance the preceptorship experience.

Even though the participants experienced challenges, they were committed to their role in ensuring their preceptees' met learning objectives and assisted them in transition to the role of a future registered nurse.

00039 To Develop a Deep Learning Algorithm (DLA) to Detect Early Chronic Kidney Disease (CKD) from Retinal Images in a Multi-Ethnic Cohort

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Aims: To develop and internally validate a retinal-based deep learning algorithm (DLA) to detect early chronic kidney disease (CKD) in a multi-ethnic population.

Methodology: 9556 retinal images from 4778 adults age >40 years-old from the Singapore Epidemiology of Eye Diseases (SEED) Study, collected from 2004 - 2019 were used to train three DLA models: a retinal image, a risk factor (RF), and retinal images with RF (hybrid) model. Early-CKD (n=2265) was defined as estimated glomerular filtration rate (eGFR) >90mL/min/1.73m² and urine to albumin creatine ratio (UACR) >30 mg/g (corresponding to stage 1 CKD) or eGFR 60-89mL/min/1.73m² and UACR >30 mg/g (corresponding to stage 2 CKD). Controls (n=2513) were defined as eGFR >60mL/min/1.73m² and UACR <30mg/g. RF included age, ethnicity, sex, diabetes, and hypertension. Performance of the 3 DLAs were evaluated using receiver operating characteristic curves (AUC), sensitivity and specificity.

Result: The DLA predicted early-CKD with an AUC of 0.839 for Image model (95% CI 0.827-0.850), 0.792 for RF model (95% CI 0.779-0.804), and 0.866 for hybrid model (95% CI 0.856-0.87). Using four thresholds, at optimum threshold, sensitivity and specificity were: image (65%,88%), RF-only (68%,76%), hybrid (72%,86%). When a prespecified sensitivity of 80% was used, specificity was lowest for Image (67%), RF (61%), and Hybrid (76%) models. When sensitivity was lowered to 75%, specificity increased for all three models: Image (75%), RF-only (68%), and Hybrid (83%). In an analysis where sensitivity and specificity were matched, performances were: Image-only=75%, RF-only=71% while Hybrid was 78%.

Conclusion: Internal validation showed early-CKD detection using retinal image-based DLA has good performance in a multi-ethnic population. Further external validation the DLA would strengthen its robustness.

00040 Pharmacogenetic Testing with Clinical Decision Support in the Primary Health Care in Singapore

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Aims: This study was designed to assess the feasibility of collecting buccal samples by general practitioners at private practices in Singapore within a usual consultation, incorporating use of a pharmacogenomics-based clinical decision support system (CDSS) to guide subsequent drug choice and dosing.

Methodology: Study Design

We used a prospective cohort study design. Seven general practitioners from six private practices recruited 189 patients between October 2020 and March 2021.

Participants

The private general practitioner research collaborators were all members of the Primary Care Research Network (pcRn) Singapore. The study population were adults at least 21 years old and being regularly reviewed by their GP for one or more conditions requiring long term medication.

Pharmacogenetic Test Panel and Clinical Decision Support System (CDSS)

DNA was extracted from patient samples and genotyped using Illumina Infinium Global Screening Array V2.0. Results for the coded samples were then sent to the provider of the CDSS systems (GenXys, Canada) who provided patient-specific drug dosing guidance based on international guidelines. In the present study the genotyping analysis provided information on 46 biallelic SNPs used to guide dosing of 95 drugs. The pharmacogenomic guidance was conveyed to the GPs using a secure link to the GenXys CDSS.

Study Procedures

The GPs identified eligible patients and invited them to participate in the study when they consulted for routine clinical care, review and repeat medication. Consent was taken by the GP and a buccal sample was collected at the baseline visit. The general practitioners discussed the pharmacogenetic findings and medication recommendation with the patient at their next routine visit or when the reports were ready. The software displayed drug options for the conditions selected. The number and nature of each change to medication were recorded.

Result: All patients had at least one actionable variant. The prevalence of patients having two, three or four variants was 37.0%, 32.8% & 12.7% respectively. Potential alterations to medications were

identified using the CDSS. Twelve clinically actionable findings (6.3%) were identified with eight resulting in a modification of the patient's medication. Patients were accepting and the GPs were enthusiastic about the potential of PGx to personalise medicine.

Conclusion: This is the first study in Singapore to demonstrate the feasibility of pharmacogenetic testing in primary care. This study identified a high prevalence of pharmacogenetic variants impacting drugs commonly prescribed in primary care. Physician feedback indicated that wider introduction of pharmacogenetic testing requires clarification of financial issues (patient costs, doctor's reimbursement, impact on the practice's income from prescribed drugs), the development of an integrated clinical decision support that is both robust and easy to use, and a better understanding of patients' concerns and the optimal way to communicate results.

00041 Sofosburvir/ Velpatasvir/ Vocilaprevir for Direct Acting Antiviral-experienced HCV Patients: A Systematic Review and Meta-Analysis

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Aims: About 5% of chronic hepatitis-C virus (HCV) patients treated with direct-acting antivirals (DAAs) do not achieve sustained virological response (SVR12). We performed a systematic review and meta-analysis to evaluate the efficacy and safety of Sofosbuvir/Velpatasvir/Voxilaprevir (SOF/VEL/VOX) as salvage treatment in DAA-experienced HCV patients.

Methodology: Search of major databases were performed from inception to 31st January 2023. Our study outcomes were SVR12 and treatment-related adverse effects. We performed subgroup analysis based on genotype, status of cirrhosis, HCC, prior SOF/VEL exposure and region. Standard meta-analysis methods were employed using the random-effects model.

Result: 24 studies (n=2,887) were included in analysis. All studies had low to moderate risk of bias. 17.2% receive SOF/VEL prior to SOV/VEL/VOX; 24.8% received ribavirin with SOF/VEL/VOX. 42% had pre-treatment RAS testing performed, where mutation was present in 50.5%.

Overall pooled SVR12 was 95.0% (95%CI: 94.0-95.8%), with lower SVR12 in real-world studies than clinical trials. Predictors for SOF/VEL/VOX failure were genotype 3 (OR 0.39, 95%CI: 0.23-0.64, I2=7%), active HCC (OR 0.22, 95%CI: 0.08-0.57, I2=0%) and baseline cirrhosis (OR 0.24, 95%CI: 0.11-0.51, I2=0%), decompensated cirrhosis (OR 0.09, 95%CI: 0.03-0.23, I2=3%) and prior SOF/VEL (OR 0.35, 95%CI: 0.13-0.94, I2=54%). Baseline RAS mutation and ribavirin supplementation in SOF/VEL/VOX therapy were not associated with higher SVR12. Treatment discontinuation due to drug-related problems was uncommon (10 studies, 0.2%).

Conclusion: SOF/VEL/VOX is efficacious and safe for retreatment in HCV patients with prior DAA failure, even with RAS mutation. Our findings support SOF/VEL/VOX as 1st-line rescue treatment for DAA-experienced HCV patients.

00042 Effectiveness of Technology-Use Reminiscence on Cognition and Quality of Life among Elderly with Dementia: A Systematic Review and Meta-Analysis

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Aims: To review the effectiveness of Technology-use reminiscence on cognition and quality of life among elderly persons with dementia

Methodology: A systematic search on 5 databases (PubMed, CINAHL, Cochrane, Embase, PsychInfo) was performed in English. Two independent reviewers assessed quality of studies using Cochrane risk of bias and Grading of Recommendations Assessment, Development and Evaluation. Meta-analysis was conducted using RevMan 5.4, with the overall effect assessed using Cohen d and Z-statistics. Heterogeneity was assessed using I^2 and x2 tests. Sensitivity and subgroup analysis were conducted as additional analyses.

Result: Among the 3969 records retrieved, nine randomised controlled trials involving 580 elderly persons with dementia were included. All trials were rated as high risk of bias and Grading of Recommendations Assessment, Development and Evaluation was rated as very low. Meta-analysis showed medium effect size, favouring Technology-use reminiscence on cognition (Z=2.37, P=0.02, SMD: 0.52, 95% CI: 0.09 to 0.94) and quality of life (Z=2.15, P=0.03, SMD: 0.66, 95% CI: 0.06 to 1.26). Subgroup analyses presented that cognition and quality of life were improved with one hour Technology-use reminiscence (Z=2.21, P=0.03; Z=4.71, P<0.00001). Also, group and individual Technology-use reminiscence favoured cognition (Z=2.44, P=0.01) and quality of life (Z=3.80, P=0.0001) respectively.

Conclusion: In conclusion, Technology-use reminiscence is an effective intervention in improving cognition and quality of life among elderly with dementia. With more novel technology such virtual reality and artificial intelligence, future research should shift towards focusing on exploring the effectiveness and usability of its integration with healthcare interventions. Additionally, with the increasing economic costs of dementia, the need for cost-effective interventions to meet and manage the needs of persons with dementia is warranted. Technology-use reminiscence is also a cost-friendly alternative to traditional reminiscence therapy that improve cognition and quality of life. However, future direction should prioritise on lower risk of bias and higher Grading of Recommendations Assessment, Development and Evaluation of randomised controlled trials which assess the long-term effects as well as effects on caregivers to provide a more holistic dementia care.

00043 Evaluation of Nurse Reported Missed Care in a Post-Anaesthesia Care Unit: A Mixed Method Study

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Aims: This study aimed to:

(i) evaluate the frequency, types and perceived reasons for nurse reported missed care (NRMC) in the Post-anaesthesia Care Unit (PACU)

(ii) evaluate associations between nurse demographic and workload factors with NRMC; and

(iii) explore nurses' perception on care provided, and their evaluation of NRMC in the PACU.

Methodology: A cross-sectional study was conducted in the PACU in a tertiary acute care hospital in Singapore from 23/09/2021 to 31/01/2022. Full-time PACU nurses were conveniently sampled to complete an anonymous survey immediately after their daily shift, across different shifts. It consisted of three sections: (i) nurse demographics; (ii) elements of NRMC; and (iii) reasons for NRMC. Qualitative interviews with PACU nurses employed a semi-structured guide to explore their perceptions and experiences of NRMC. Descriptive, inferential statistics and thematic analyses were applied.

Result: There were 66 survey responses in total. Most were satisfied with working in the PACU (95.2%), and with the level of teamwork (92.4%). However, only 23.0% considered staffing sufficient. Most expressed intention to leave (77.0%). 47.0% respondents indicated at least one NRMC activity during their shift. Communication related activities were most highly missed, followed by documentation. In general, activities closely related to a patient's clinical condition were missed to a smaller degree.

The eight nurses interviewed described assessing and preventing surgery and anesthesia-related events as their main role. Communication was seen as a duty but challenging due to language barrier. Staff shortage and non-clinical workload exacerbate workload. But effective teamwork and documentation facilitates nursing care.

Conclusion: Communication issues and staffing concerns were echoed in both quantitative and qualitative investigations. Although satisfaction levels with teamwork and personal contentment were high, nurses' intention to leave may further aggravate staffing issues.
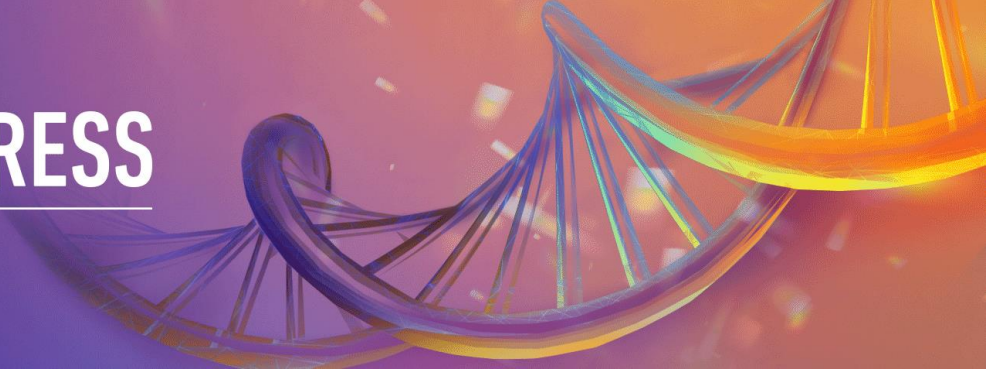
00044 COvid-19 Vaccination in ImmunocompromiseD patients (COVID)

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Aims: To reduce the number of immuno-compromised patients with rheumatic diseases who did not receive the additional third dose of COVID-19 primary series vaccines by the third month after their second dose from 100% to less than 20%.

Methodology: This is a quality improvement project. Patients with rheumatic diseases on immunosuppressants and active follow-up with KK Hospital Rheumatology clinic are recruited. Baseline data was collected to determine the current take-up rate of the additional third vaccine dose and thereafter collected prospectively from September 2021 to August 2022 to track vaccination rate. Root causes analysis was performed for poor vaccine uptake. Solutions implemented include proactive identification of patients requiring a third vaccine dose, education by the Rheumatology team and raising awareness on the need for an additional third dose. Counselling was conducted during

clinic visits, via phone and emails after patients received the second vaccine dose. Patients were either assigned an appointment in KK Hospital or provided a memo to obtain vaccination in the community. Due dates for third vaccine dose were tracked, and patients were followed up if they missed their vaccination.

Result: 197 patients were recruited. From September 2021 to November 2021, none of the patients received a third vaccine dose (Figure 1). The proportion of patients who did not receive the additional third dose decreased to 50% by February 2022 and less than 20% by June 2022.

During the study period, 42.1% of patients had COVID-19 infection, of which 2.4% required admission for observation. There were no adverse events from the additional vaccine dose.
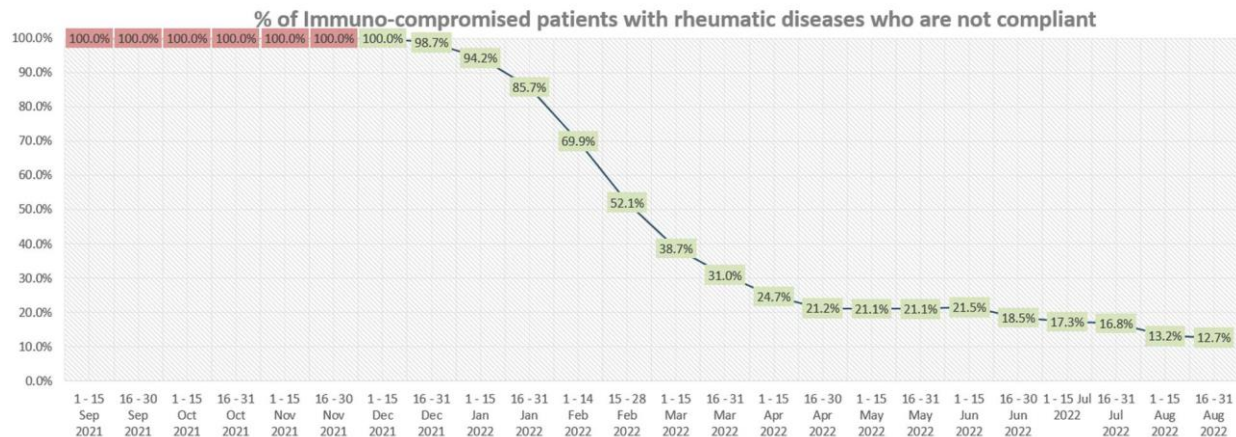
% of Immuno-compromised patients with rheumatic diseases who are not compliant

Figure 1: Immuno-compromised patients with rheumatic diseases who did not receive the 3rd dose of COVID-19 vaccine for primary series by the third month after their 2nd dose (Sept 2021 to Aug 2022)

Conclusion: The solutions and strategies implemented successfully reduced the number of immunocompromised patients who did not obtain a third vaccine dose, aligned with Ministry of

Health's recommendation of three COVID-19 vaccine doses for primary series in immunocompromised patients. The additional vaccine conferred protection against hospital admission and critical illness from COVID-19 infection.

00045 Thyroid Function Monitoring in Patients with Hypothyroidism on Thyroxine Replacement in Primary Care and Associated Factors: A Retrospective Cohort Study

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SingHealth Polyclinics

Aims: Long-term management of patients with primary hypothyroidism on thyroxine replacement requires thyroid function test (TFT) monitoring once in every 6 to 12 months as recommended by clinical practice guidelines. However, various studies have reported suboptimal thyroid control among these patients. This study determined their thyroid function during 2-year follow up visits in primary care, the factors influencing their thyroid status and assessed the optimal interval for TFT.

Methodology: A retrospective cohort study was conducted on patients with clinical diagnosis code of hypothyroidism in their electronic health records from seven polyclinics in Singapore from July 2017 to June 2019. The follow up thyroid status was categorized as under-replacement (TSH >3.70 mU/L), over-replacement (TSH < 0.65 mU/L) or euthyroid (TSH 0.65-3.70 mU/L). Their demographic, clinical and TFT data during 2-year follow up were analyzed using appropriate statistical tests. Stepwise logistic regression analysis identified the factors associated with suboptimal thyroid control. Kaplan-Meier analysis compared their thyroid function status in association with the interval between TFT monitoring.

Result: Data from 5749 eligible patients (mean age 62.1+13.29 years; 79% female; 79.7% Chinese) were analysed. 61.9% of them were euthyroid over two years while 29.5% and 8.6% were under- and over-replaced respectively. However, the thyroid status did not differ significantly with various dose regimens (daily, segmented or alternate days) (p=0.193). Stepwise logistic regression showed that thyroxine under-replacement were significantly associated with male gender (OR=1.32, 95%CI=1.1-1.58, p=0.003), Indian ethnicity (OR=1.46, 95%CI=1.12-1.9, p=0.005), underweight (OR=1.48, 95%CI=1.02-2.14, p=0.039) and obesity (OR=1.34, 95%CI= 1.08-1.66, p=0.007). Every unit (µg/kg body weight) increase in the mean daily thyroxine dose was associated with over-replacement (OR=3.1, 95%CI= 2.28-4.24, p<0.001). Compared to TFT beyond 12 to 24 months, shorter TFT (<12 months) was less likely to diagnose thyroxine under-replacement (OR=0.54, 95%CI=0.42-0.7, p<0.001) and over-replacement (OR=0.6, 95%CI=0.39-0.92, p=0.017). Among the adults with baseline euthyroid status, 22.2%, 41.7% and 59.6% had suboptimal thyroid control after 6, 12 and 24 months respectively (Kaplan–Meier analysis).

Conclusion: About 6 in 10 patients were euthyroid with thyroxine replacement for hypothyroidism in primary care over 2 years. Thyroxine under-replacement were associated with males, Indian ethnic group, underweight and obesity. The proportion of euthyroid patients developing abnormal thyroid function doubled with TFT at 6, 12 and 24-month interval.

00046 Nurse Reported Missed Care and Association with Staff Demographics and Work Environment in Isolation Wards within a Public Restructured Hospital in Singapore

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Aims: This study aims to describe nurse reported missed care (NRMC), reasons for NRMC and evaluate associations between demographics, work satisfaction and workload with NRMC within isolation wards.

Methodology: This was a cross-sectional descriptive study. Purposive sampling was employed to recruit nurses in all isolation wards in a restructured hospital in Singapore. Registered/Enrolled nurses, who worked at least 3 months in isolation wards were invited to complete an anonymous online survey from 09/03/2022 to 07/04/2022. Nurses who were on long term leave of absence or maternity leave were excluded. The MISSCARE survey, a questionnaire of 24 items related to nursing care activities and 18 items related to reasons for missed nursing care was used. Descriptive statistics were used to analyse the demographic data, frequency of NRMC and the reasons for NRMC. Pearson Chi Square test was employed to determine the relationship between the demographics and the top five NRMC.

Result: 133 participants were recruited. Majority of participants were females (n=116, 87.2%) and majority were <35 years old (n= 89, 66.9%). The five highest reported missed care consisted of ambulation three times per day or as ordered (n=111, 83.5%), turning patient every 2 hours (n=92, 69.2%), providing emotional support to patient and family (n=88, 66.2%), attending interdisciplinary care conferences whenever held (n=82, 61.7 %) and providing patient teaching about illness, tests and diagnostic studies (n=79, 59.4%). Inadequate number of staff (n= 125, 94.0%), unexpected rise in patient volume and/or acuity in the ward (n=116, 87.2%), heavy admission and discharge activity (n=111 ,83.5%), unbalanced patient assignments (n=101, 75.9%) and urgent patient situations (n=100 ,75.2 %) were the top five reported reasons for missed care.

Conclusion: This study provides insight into the NRMC in isolation wards along with its commonly reported reasons. With the data gathered, further studies can be done to explore for ways to mitigate the reasons for NRMC in isolation setting. In addition, understanding the unique aspect of isolation nursing and its relation to NRMC ought to be highly considered to manage missed care.

00047 Caregivers' Knowledge, Perceptions, Attitudes, Relating to Oral Care for Stroke Patients in the Community

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Aims: This study evaluated caregivers' knowledge, attitudes, and perceptions about oral health when delivering oral care to stroke patients in the community.

Methodology: Methodology

An observational descriptive study was conducted with primary caregivers of stroke patients in l the stroke rehabilitation ward in an acute care hospital.

Data Collection

A validated questionnaire was used to assess caregivers' baseline knowledge , perceptions and attitude relating to oral hygiene. Patients are assessed using the functional independence measure (FIM) and the revised oral assessment guide (ROAG), and basic demographic information about patients and caregivers are collected.

Data Analysis

Inferential analysis was used to determine association between the knowledge, attitude and perception and patient's outcomes (FIM and ROAG). Qualitative data on the needs and challenges was analysed with descriptive thematic analysis which will inform the content of an oral care training programme needed for our local population.

Result: A total of 19 caregivers were recruited with mean age 64.53 (SD 11.18), mainly female (63.2%).

In the knowledge section, less than half of the caregivers were aware regarding: gingival bleeding represents gingivitis (31.6%); gingivitis can be prevented with brushing and flossing (36.8%) plaque signifies soft deposits on teeth (26.3%); caries influence dental aesthetics (47.4%); tooth brushing needs to be done for 2minutes (42.1%).

Caregivers reported overall positive attitude (mean=66.7%) and good perception (mean=86.8%).

The patient's FIM score were tabulated during admission (mean 12.56, SD 3.49), before discharge (mean 9.88, SD 4.48), and two weeks after discharge (mean 8.73, SD 2.94). Meanwhile, the ROAG score were also collected during admission (mean 58.79, SD 20.27), before discharge (mean 63,53, SD 37.61), and two weeks after discharge (mean 78.31, SD 32.79).

Conclusion: This study identified the gaps in the caregivers' oral health knowledge needs, and provided an understanding on their oral hygiene perception and attitude. At the same time, the findings revealed

the patients' current oral health using the ROAG. A comprehensive oral health education campaign may be beneficial to address the knowledge needs.

00048 Professional Quality of Life and Turnover Intentions of Haematology Nurses in Singapore: Influence of Perceived Job Demands and Resources

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Aims: To assess perceived work demands, levels of social support from colleagues, professional quality of life (ProQOL) and turnover intentions amongst haematology nurses in Singapore, and examine whether demographic and occupational characteristics, perceived job demands and support from colleagues were associated with haematology nurses' ProQOL and turnover intentions.

Methodology: A convenience sample of 60 haematology nurses from two inpatient wards in a Singapore tertiary hospital was recruited. Participants completed an anonymous online survey which measured their perceived job demands, support from colleagues, ProQOL and turnover intentions with the Copenhagen Psychosocial Questionnaire (COPSOQ III), Professional Quality of Life Scale version 5 and Turnover Intention Scale (TIS-6).

Job demands were conceptualised as quantitative, cognitive, and emotional demands in this study. ProQOL was chosen as the work-related outcome to investigate haematology nurses' well-being and the development of work-related strain and motivation, as it provides a balanced perspective of the positive and negative aspects of haematology nursing, including compassion satisfaction and compassion fatigue.

Result: Haematology nurses in Singapore face high cognitive and emotional demands and receive high levels of support from colleagues at work. Majority of the participants reported moderate to high levels of compassion satisfaction (78.3%), burnout (76.7%) and secondary traumatic stress (81.7%). 53.3% of the participants expressed intention to leave. Highest education qualification was significantly associated with compassion satisfaction. Job demands were significant predictors of haematology nurses' ProQOL and turnover intentions. Compassion fatigue also significantly predicts turnover intentions.
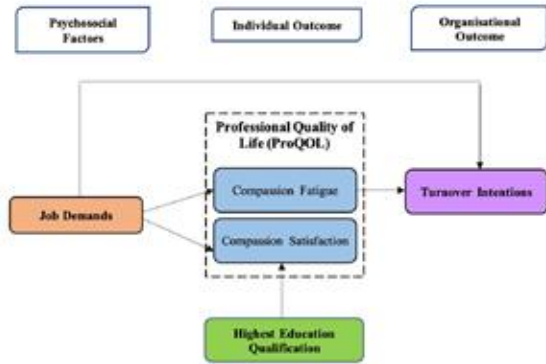
Conclusion: Interventions to reduce or prevent compassion fatigue are needed. Strategies to improve the work environment so that haematology nurses can better cope with work demands are also warranted to improve their well-being and retention.

00049 Good Catch - Keeping Our Patients Safe through Medication Review and Management in the Community

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Aims: To describe and analyse the types of medication errors among community-dwelling patients following their discharge from an acute hospital in Singapore

Methodology: This is a retrospective review of a 'good catch' reporting system from December 2018 to March 2022. Medication-related errors were extracted and analysed.

Result: A total of 73 reported medication-related error incidents were reviewed. The mean age of the patients was 78 years old (SD=9). Most patients handled their medications independently at home (45.2%, n=33) or with help from their family members (32.9%, n=24). The top three common types of medication involved were cardiovascular medication (51.5%, n=50), diabetes medication (15.4%, n=15) and vitamin supplement (9.2%, n=9). Incorrect dosing (41.1%, n=39), omission of medication (23.1%, n=22) and taking discontinued medication (16.8%, n=16) were the most common types of medication error reported in the good catch reporting system. The errors were primarily due to poor understanding of medication usage (35.6%, n=26) and lack of awareness of medication changes following discharge (24.7%, n=18).

Conclusion: The findings provided valuable insights into reducing medication errors at home. More attention must be given to post-discharge care, especially to preventable medication errors. Education on medication management and administration can be emphasised using tools such as teach-back methods.

00050 Robust Monitoring of Vaccine and Drug Safety Using the Self-controlled Case Series

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Aims: The self-controlled case series (SCCS) is a commonly adopted study design in the assessment of vaccine and drug safety. Recurrent event data collected from SCCS studies are typically analyzed using the conditional Poisson model which assumes event times are independent within-cases. This assumption is violated in the presence of event dependence where the occurrence of an event influences the probability and timing of subsequent events. Event dependence is suspected in many medical outcome events in SCCS studies, including stroke, acute myocardial infarction, and venous thromboembolism. When event dependence is suspected in an SCCS study, the standard recommendation is to include only the first event from each case in the analysis. However, it has been previously proven that first event analysis can still yield biased estimates of the exposure relative incidence if the outcome event is not rare. As an alternative to first event analysis, we propose a novel analysis method to reduce bias in SCCS studies with recurrent events and event dependence.

Methodology: This novel analysis method splits the observation period into smaller equal-length partitions and analyzes only the first events in each partition. We then pool together the estimates from the separate partitions using either a fixed effects meta-analysis or a single combined likelihood.

Result: We provide a recommendation for the number of partitions to use, illustrate this recommendation with an SCCS study of the association between beta-blockers and acute myocardial infarction, and demonstrate the superiority of this partitioned analysis over first event analysis by simulation. Our simulations demonstrated that the proposed method with the recommended number of partitions effectively reduces bias in the exposure relative incidence (RI) estimates compared to existing analysis methods across a variety of scenarios, including in the presence of event dependence.

Conclusion: In addition to a reduction in bias, the proposed method has the advantages of easy implementation using standard statistical software, the ability to control for positive or negative event dependence, and broad applicability regardless of number of recurrent events per case.

00051 Why is Cost of Dying High among Cancer Patients?

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Aims: End of life (EOL) inpatient cost for cancer patients is high but its' sources are poorly understood. We aim to understand if high inpatient spending during the last two years of life is driven by admissions with lower cost per day (low-intensity admissions) or those with higher cost per day (high-intensity admissions), and to assess patient characteristics associated with higher inpatient cost for high and low-intensity admissions.

Methodology: We used data from a prospective cohort study in Singapore involving 439 deceased patients with a solid metastatic cancer. Based on cost per day of inpatient admissions, we classified admissions as low- or high-intensity admission. We decomposed the total inpatient cost into cost for different inpatient services. Using two-part models, we assessed patient characteristics associated with higher inpatient cost.

Result: Low-intensity, compared to high-intensity, admissions had a higher proportion of inpatient cost incurred for 'maintenance care' and a lower proportion for surgeries and intensive care unit (ICU) admissions. Towards death, proportion of inpatient cost in 'maintenance care' increased while that for ICU admissions and surgeries decreased within both low- and high-intensity admissions. At the same time, the number of low-intensity admissions increased more steeply than high-intensity admissions, but both types of admissions contributed equally to the share of inpatient cost due to the higher cost per day of high-intensity admissions. Older patients were less likely to have a high-intensity admission (β: -0.01, CI: -0.02, -0.00). Greater preference for life extension (β: 0.06, CI: 0.01,0.12) and inaccurate prognostic belief were associated with higher cost of high-intensity admissions (β: 0.30, CI: -0.01,0.61).

Conclusion: Findings suggest that inpatient costs in last six months of life may be reduced if maintenance care is availed in low-cost settings alongside steps to reduce non-beneficial surgeries and intensive care unit admissions.

00052 Prevalence and Factors of Problematic Smartphone Use among Adult Residents in Eastern Singapore: A Cross-Sectional Study

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Aims: Problematic smartphone use (PSU) is defined as an inability to regulate one's use of the mobile phone, with negative consequences in daily life and these consequences include poor mental health and impaired social functioning. This study aimed to examine the prevalence of PSU and identify factors associated with PSU among adults.

Methodology: A cross-sectional household-to-household survey was conducted from October to December 2022 on individuals aged 21 to 60 years old. Simple random sampling was used for household selection. The survey included questions on PSU (Smartphone Addiction Scale – Short Version), sleep quality (Pittsburgh Sleep Quality Index), depression (Patient Health Questionnaire-9; PHQ-9), and anxiety (General Anxiety Disorder-7; GAD-7) symptoms, social support (Multidimensional scale of perceived social support), smartphone usage, lifestyle (e.g., smoking and alcohol consumption) and demographic variables. Instruments in this study have been validated either internationally, or in Asian populations. Socio-demographic and lifestyle questions were adapted from Singapore's national population health surveys. Based on the literature, threshold scores of 31 for males and 33 for females were used to classify individuals at risk of PSU. Logistic regression was used to identify factors associated with PSU.

Result: A total of 400 individuals were recruited. The sample's mean age was 41.3 years old; males and females were equally distributed (50%). Most had at least secondary level education (93.4%), with majority being Chinese (71.8%), followed by Malays (15.5%), Indians (10.5%) and others (2.3%). The prevalence of PSU in our study population was 34%. After adjusting for socio-demographic confounders, regression analysis found that younger individuals (21 - 30 vs. 51 – 60) [OR: 3.91, p < 0.001], those who reported poor sleep quality (vs. good sleep quality) [OR: 2.94, p < 0.001], mild to severe symptoms of depression (vs. PHQ < 5 points) [OR: 2.68, p = 0.001] or mild to severe symptoms of anxiety (vs. GAD < 5 points) [OR: 2.40, p = 0.001], lower levels of perceived social support (OR: 1.34, p = 0.006), and greater smartphone usage per day (> 4 hours vs. < 2 hours) [OR: 2.96, p = 0.002] were at higher risk of being categorised as PSU. Interestingly, individuals who reported occasional (3 days a month) alcohol consumption (vs. no alcohol consumption) [OR: 0.45, p = 0.017] were at lower risk of PSU.

Conclusion: PSU was reported in approximately one in every three adults aged 21 to 60 years old residing in Eastern Singapore. Evidently, PSU is a potential public health concern in a country like Singapore which has one of the world's highest smartphone use rates. Strategies or interventions that offer early intervention and identification of adults at risk of PSU will be crucial to avert negative

consequences associated with PSU among these adults. The findings from this study highlight the importance of accounting for mental health and social support factors in designing of interventions that can potentially address PSU.

00053 Trends in Ambulatory (P3/4) Attendances at the Emergency Department

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Aims: To describe the trends of attendances by ambulatory (P3) patients at an Emergency Department (ED) of a tertiary hospital in Singapore.

Methodology: A retrospective review for ED attendances between 2019 to 2022 was performed. Information on triage, demographics, referral source and conveyance, arrival day and time, case type, diagnoses, length of stay, and disposition were collected and analysed.

Result: There were 580382 ED attendances – 35061 (6.0%) emergent (P1) patients, 323109 (55.7%) urgent (P2) patients and 183592 (31.6%) P3 patients. The absolute number and proportion of P3 patients decreased from 54364 (39.0%) in 2019 to 43891 (28.8%) in 2022.

Demographics	
Age	
Paediatric (less than 16-year old)	13770 (7.5)
Adult (16- to 64-year old)	149846 (81.6)
Geriatric (65-year old or more)	19976 (10.9)
Gender	
Male	107137 (58.4)
Citizenship	
Singaporeans or Permanent Residents	147835 (80.5)

Majority of patients were not referred to the ED (176471, 96.1%) and came by their own transport (176549, 96.1%). P3 patients had the highest proportion of ED attendances during weekends and public holidays, as compared to P1 and P2 patients. Similarly, P3 patients had the highest proportion of ED attendances during the time periods of 8am-12am.

About a third of patients presented with trauma related complaints (58174, 31.7%). The top three most common diagnoses were upper respiratory tract infection (20280, 11.0%), musculoskeletal pain (17798, 9.70%) and lacerations (7968, 4.34%). The median length of stay was 110 minutes (interquartile range 65 to 168). 19062 (10.4%) patients required admission to the hospital.

Conclusion: While the numbers of P3 patients had fallen, they still accounted for a sizeable patient load at the ED. Measures to reduce ED attendances by this group of patients would require addressing their healthcare needs based on their presentation and also their health seeking behaviour based on their attendance pattern.

00054 Comparison of the ASAS Health Index between Radiological Axial Spondylarthritis and Non-Radiographic Spondylarthritis in Singapore

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Aims: Prior studies reported conflicting results regarding differences in Assessment of SpondyloArthritis (ASAS) Health Index (HI) scores between radiographic axial spondyloarthritis (r-axSpA) and non-radiographic axial spondyloarthritis (nr-axSpA). Country-level variations in disease activity were also observed in international studies. Hence, this study aimed to compare the ASAS HI scores between r-axSpA and nr-axSpA in Singapore, and determine factors associated with poorer ASAS HI scores.

Methodology: This was a cross-sectional evaluation of baseline data from a prospective cohort study in Singapore General Hospital, from January 2018 to March 2023. Patients aged 21 years and above who were clinically diagnosed with axial spondyloarthritis (axSpA) based on the 2009 ASAS criteria were included. Sociodemographic variables, clinical variables (e.g., human leukocyte antigen B27 (HLA-B27)) and patient-reported outcomes (e.g., Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), Bath Ankylosing Spondylitis Functional Index (BASFI), Hospital Anxiety and Depression Scale (HADS), 36-Item Short Form Survey (SF36)) were collected. Univariable and multivariable linear regression were performed to identify variables associated with ASAS HI scores. Variables with a p-value of <0.10 were included in the multivariable regression. A p-value of <0.05 was considered significant.

Result: Of the 331 patients, 265 (80.0%) and 66 (20.0%) had r-axSpA and nr-axSpA respectively. The median (IQR) age in r-axSpA was 40.0 (30.0-53.0) years, higher than nr-axSpA [34.0 (25.0-47.0) years], p<0.01. There was a higher proportion of males in r-axSpA (80.4%) than nr-axSpA (65.2%), p=0.01. Patients with r-axSpA had a longer disease duration [6.8 (1.8-14.0) years] than nr-axSpA [1.1 (0.2-5.4) years], p<0.01. More patients with r-axSpA (90.2%) were positive for HLA-B27 than nr-axSpA (69.7%), p<0.01. Differences in median ASAS HI scores were not statistically significant between r-axSpA and nr-axSpA [4.0 (2.0-6.8) vs 5.5 (1.1-8.5), p=0.12] (Table 1). Post multivariable regression, nr-axSpA (β: 0.70, 95% CI: 0.09, 1.32, p=0.02), BASDAI (β: 0.18, 95% CI: 0.01, 0.35, p=0.04), BASFI (β: 0.47, 95% CI: 0.30, 0.65, p<0.01) and HADS-Depression scores (β: 0.11, 95% CI: 0.01, 0.21, p=0.04) were positively associated with ASAS HI. Higher SF36-PCS (β: -0.11, 95% CI: -0.14, -0.08, p<0.01) and SF36-MCS (β: -0.07, 95% CI: -0.10, -0.04, p<0.01) were negatively associated with ASAS HI (Table 2).

Conclusion: Patients with nr-axSpA were associated with poorer overall health and functioning as compared to r-axSpA. Higher disease activity, poorer physical function, poorer mental health status and more depressive symptoms were associated with worse health and functioning.

00055 Bacteriophage-Antibiotic Combinations as an Alternative Treatment Option for Carbapenem-resistant Pseudomonas Aeruginosa (CRPA)

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Aims: CRPA infections are prevalent in clinics. Bacteriophages or phages, are highly selective natural killers of bacteria and promising therapeutic adjuvants to antibiotics in treating these resistant bacteria. However, phage-antibiotics interactions have not been systematically evaluated. Here, we examine the in vitro activity of a bacteriophage P0413, combined with antibiotics, against 5 clinical CRPA isolates in Singapore.

Methodology: Phage P0413 was isolated and propagated with CRPA PA0314. Its host range was analysed by spot testing on bacterial lawns of clinical CRPA isolates of varying sequence types and resistance mechanisms. Time-kill studies (TKS) were performed with 5 selected phage-susceptible clinical CRPA isolates. 24h TKS were conducted with 106 CFU/mL baseline bacterial inocula against clinically-achievable concentrations of imipenem (IPM), cefepime (FEP), levofloxacin (LVX) and polymyxin B (PMB), singly and in combination with phage P0413 (multiplicity of infection of 100).

Result: The isolation strain PA0314 demonstrated regrowth against phage P0413 alone at 24h. At 24h, P0413 in combination with PMB or FEP, were bactericidal ($\geqslant$ 3 log10 CFU/mL reduction from the baseline inoculum), and both combinations exhibited synergistic activity ($\geqslant$ 2 log10 CFU/mL reduction from the most active single treatment modality) (Table 1). We noted variable in vitro activities for the other four strains. A diverse range of interaction patterns was observed for P0413+IPM and P0413+PMB combinations. P0413+FEP showed synergistic activity and were bactericidal against all strains, except for PA1238 wherein none of the combinations were bactericidal. P0413+LVX were antagonistic for PA0287 and PA0363.

Conclusion: Phage-antibiotic combinations are highly strain-dependent and reliant on partner antibiotic. However, our results suggest that individualised phage-antibiotic combinations are potentially useful compared to phage or antibiotics alone for CRPA infections. Further testing with additional strains is underway, together with the exploration of phage cocktail-antibiotic combinations.

00056 The Effect of a Single Workshop on Learners' Self-reported and Peer-reported Change in Behaviour - An Evaluation Study of the CHEER Programme

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Aims: The Compassion, Humility, Empathy, Encompassing, Respect (CHEER) workshop was developed to instill the right mindset and values among Allied Health professionals (AHPs) in SingHealth institutions. The teaching and learning activities were developed based on the Transformative Learning Theory and Gagne's Nine Events of Instructions. This study aims to examine learners' self- and peer-reported behavioural change before and 3 months after participation in the 4-hour online workshop.

Methodology: Recruitment of study participants began at programme inception in Apr 2021 via email invitation to all workshop registrants. Recruitment of peer-assessors was conducted from Jan to Jul 2022. Participants nominated 3 colleagues as potential peer-assessors, and the study team identified 1 peer-assessor according to an electronically-generated randomisation table. Baseline self- and peer-assessments were collected via FormSG before the workshop. To measure the effectiveness of the workshops, self- and peer-assessments were collected again 3 months after the workshop attendance. Pre- and post-workshop scores of the respective CHEER values were compared using the paired Student T test (IBM® SPSS® Statistic 21).

Result: A total of 219 workshop participants and 38 peer-assessors were recruited and completed the pre- and post-assessments. Table 1 shows the comparisons between pre- and post-workshop scores for practicing the CHEER values.

Our results demonstrate statistically significant improvements in both self- and peer-reported behavioural scores for the values of compassion, humility, and the global score. There was a reduction in the score for encompassing in both self- and peer-assessment.

Table 1

Self-reported Behavioural Scores (n=219)				Peer-reported Behavioural Scores (n=38)			
CHEER values (maximum score)	Baseline	3 months Post Workshop	p value	CHEER values (maximun score)	Baseline	3 months Post Workshop	p value
Compassion (20)	15.23	16.64	**<0.001**	Compassion (20)	16.76	18.13	**0.003**
Humility (25)	19.61	20.98	**<0.001**	Humility (35)	30.18	32.11	**0.003**

Empathy (35)	27.47	29.57	<0.001	Empathy (10)	8.76	9.08	0.123
Encompassing (10)	8.93	8.59	0.002	Encompassing (10)	8.97	8.47	0.153
Respect (40)	32.71	34.25	<0.001	Respect (40)	35.29	35.90	0.300
Global (130)	107.82	114.21	<0.001	Global (115)	99.97	103.68	0.017

Conclusion: Our study demonstrated that the CHEER workshop has effected behavioural change. Some limitations of our study include the small number of peer-assessors who completed the questionnaires, and the imbalance of the number of questions for each CHEER value. Future qualitative studies may be needed to investigate the challenges of incorporating CHEER values into daily interactions among AHP colleagues.

00058 Attitudes, Facilitators and Barriers towards Advance Care Planning Uptake among Community-dwelling Residents with Chronic Diseases in Singapore: A Qualitative Study

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Aims: There were only 18% Advance Care Planning (ACP) completed (133 out of 729 advocated) between April 2019 and June 2022 despite advocacy efforts in the community. This study aimed to explore the attitudes, facilitators and barriers towards ACP uptake among community-dwelling residents with chronic diseases.

Methodology: A descriptive exploratory qualitative study involving face-to-face and semi-structured interviews were conducted from July 2022 to February 2023. Purposive sampling was used to recruit community-dwelling residents aged 50 years and above, with chronic diseases, spoke English, and enrolled in the Singapore General Hospital Community Nursing Programme. Basic sociodemographic data including marital status, living arrangement and number of chronic diseases were collected and analysed using descriptive statistics. Interviews were audio-recorded and transcribed verbatim. Data were analysed using Braun and Clarke's six-step of thematic analysis.

Result: Seventeen participants were recruited and interviewed at either a community nurse post or in their own home. The majority were females (58.8%), Chinese (76.5%), and aged 65 years and above (70.6%). Five themes were identified: 1) Attitudes towards personal health, 2) Past illness and death experiences, 3) Knowledge on ACP, 4) Changing socio-demographics and family dynamics, and 5) Psychological readiness. Participants attributed having more chronic disease(s) and the uncertainty of the COVID-19 infection influenced their attitudes towards personal health and decision to complete their own ACP. Their perceptions towards the importance of ACP were also shaped by past illness and death experiences of loved ones. Receiving guidance from ACP facilitators and media outreach encouraged uptake whereas confusion with advanced healthcare directives hindered uptake. The rise in singlehood and couples without children prompted several participants to contemplate uptake. Positive family dynamics was perceived to promote uptake whereas challenges in family communication deferred uptake. Without psychological readiness, participants felt that ACP evoked fear of the unknown and death anxiety which led to denial and procrastination.

Conclusion: The implementation of ACP needs to address the complexity of factors and target interventions at the individual, system and national level. Brief episodic discussions may improve the psychological readiness of individuals, even during periods of wellness and early stages of chronic diseases. At system level, ACP can be made more accessible through health talks and roadshows to enhance understanding and address confusion. In addition, healthcare organizations can focus on capacity building and train more facilitators to be well versed in ACP, normalize ACP discussions and

initiate timely quality conversations. At national level, government efforts can promote socialization opportunities where family members and close friends can embrace ACP and discuss what matters to them.

00059 Effectiveness of Mindfulness-based interventions Delivered by Technology versus Therapist-facilitated among Patients on Peritoneal Dialysis

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Aims: Mindfulness-based interventions (MBIs) have been recommended to mediate stressful events,

albeit inconsistently. It is also unknown which is the most effective method to teach MBI.

This study aimed to: 1. evaluate the effectiveness of MBI in improving self-efficacy, reducing stress and anxiety among peritoneal dialysis (PD) patients over time; and 2. compare the most effective method to teach MBI.

Methodology: This randomized 3-arms controlled trial recruited first time PD patients. A total of thirty-nine patients were recruited (13 in each group). Patients were randomly allocated to either video-assisted (VAMT), therapist-assisted mindfulness training (TAMT), or treatment-as-usual with no MT (TAU). All groups received 4.5 days of structured PD training at the PD centre, whilst VAMT and TAMT groups were taught additional MBI techniques. Perceived stress scale (PSS), self-efficacy and anxiety (State and Trait Anxiety Inventory) were measured at baseline, 4- and 12 weeks post-randomization, using reliable and valid instruments. General linear model to compare VAMT/TAMT vs TAU at weeks 4 and 12, adjusting for baseline measurement, age, gender, race and Charlson comorbidity index. Linear mixed model analyses were conducted to evaluate the within therapies on improving self-efficacy, reducing stress and anxiety.

Result: All the therapies showed a significant time trend in anxiety (State and Trait Anxiety Inventory). Only TAMT/VAMT showed a significant trend for PSS but not TAU. All therapy X Time interactions were not significant. Patients in TAMT and VAMT groups had reduced PSS compared to TAU at week 12. Overall, the significant reduction in the anxiety trend denotes the possibility of PD patients being less anxious over time as they gain confidence in managing PD at home. TAMT and VAMT also seem to be equally effective methods to conduct MBI, as evident from the reduced PSS at 12 weeks.

Conclusion: This study demonstrated the potential of MBI in improving stress and anxiety among first time PD patients, and VAMT is just as effective as TAMT.

00060 Improving Psychosocial Health of Adolescent with Diabetes (I-PAD) is Integral to Long Term Population Health

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Aims: Among the recommendations in July 2022 mental health initiative along in Healthier SG, there were touchpoints to provide individuals with easy access to mental health support, which is pivotal to youths living with diabetes who presented a greater incidence of psychological distress. This case cohort viability report illustrates the use of a Diabetes Distress Scale (DDS) and the impact of prospective distress scores for a timely psychological intervention.

Methodology: 250 adolescents with diabetes were offered the DDS survey with 149 responded and 97 required interventions, i.e. APN-psychologist joint clinic or receiving diabetes nurse phone consult. All were given a KKH published information booklet titled 'Together, a healthier body and mind' that illustrates the importance of the body, mind, spirit and heart as a holistic approach to a well-balanced and meaningful lifespan. A follow-up DDS at annual review clinic and the scores were compared between 2021 & 2022. Descriptive analysis will be reported.

Result: Out of 97 adolescents, there were 35 at moderate risk and 21 at high risk distress. 17 in the high risk distress group attended a APN-psychologist joint clinic with 70.6% (p<0.05) overall reduction of distress with zero diabetes-related admission. In 2022, a further reduction of 9% in coping on their emotion and 4% in distress related to treatment regimen. The phone consult intervention group had a reduction of 61.5% (p<0.05) and a further reduction of 8% in coping on their interpersonal relationship. There are 67 new adolescents (35% of clinic total) with moderate and high distress score requiring interventions.

Conclusion: Population health paradigm is a state of physical, mental and social well-being (WHO). When the population is young and their health needs are 'lighter', we need to proactively approach population health with integrating psychosocial assessments at annual screening on their diabetes distress on daily burden of self-management in achieving a better mental state in adulthood.

00061 To Establish and Validate the Suitability of Frozen Serum Stored in Serum Separator Tubes for Serological Tests in Antenatal Care

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Aims: To establish and validate storage conditions of frozen serum stored in serum separator primary collection tubes by comparing results obtained with fresh samples and frozen serum in secondary polypropylene tubes for selected virology assays which are useful in antenatal care setting.

Methodology: Thirty positive residual serum samples each from Rubella IgG (RUG), Cytomegalovirus IgG (CMVG), Parvovirus IgG (PBG) and Varicella Zoster IgG (VZG) assays were used in this study. The standard operating procedures for sample processing were applied. This included an aliquot of serum into a polypropylene secondary tube which is then kept at 2-8°C before batch testing within 7 days. After testing, both the primary serum separator tubes (SST) (containing serum, gel and cell blood layer) and the secondary tubes of positive tests were stored at -20°C for a year. After this storage period, samples in both primary and secondary tube were thawed to room temperature and transferred into 2mL centrifuge tubes for centrifugation at 10,000g for 10 minutes. Both samples in primary and secondary tubes are then retested in pairs at the same time and results were analyzed.

Result: 1. Even though 49.2% of the sera kept frozen in SST showed varying degree of haemolysis, no samples showed quantitative result misclassification when compared to original results and to samples stored in the secondary tubes.

2. There was total agreement (100%) between all qualitative results for RUG, CMVG and VZG assays. One low positive sample showed a change in qualitative result for PBG, from positive to equivocal when compared to the fresh sample result. As this difference was observed in both samples stored in primary and secondary tubes, it is not an effect of being frozen on the gel separator layer tube per se.

3. All samples but one tested on the various assays exhibited less than 15% difference (within the acceptable limits) in index values between the samples stored in SST and secondary tube. This sample for RUG had 15.3% difference which is just slightly above the acceptable limits, where the sample in the secondary tube actually had a higher reading when compared to both the original result and sample stored in SST.

Conclusion: While the transfer of blood cells through the gel layer occurred in half of the samples stored in SSTs, results were not affected in this study. No clinically significant differences were observed for both qualitative and quantitative results obtained in this study that can be attributed to storage of samples in SSTs.

The ability to store samples in SSTs has the following advantages:

1. Reduce manpower and consumables required for sample storage.

2. Avoid technical errors such as mislabelling of secondary tubes.

3. Reduce biohazard exposure risks to staff from handling samples unnecessarily.

4. Facilitate storage of antenatal screening samples for retrospective testing where primary congenital infection is suspected or after occurrence of exposure events.

00062 Critically Ill Children on Prolonged Mechanical Ventilation Are at High Risk of Mortality and Morbidity: A Single-Center Cohort Study

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Aims: With increasing complexity of disease, the number of children requiring prolonged mechanical ventilation (PMV) in the pediatric intensive care unit (PICU) is increasing, however, there is limited data on their epidemiology.

We report the characteristics and outcomes of children on PMV in a multidisciplinary PICU in Singapore.

Methodology: PICU patients admitted between September 2019 to February 2022 requiring PMV (defined as [>/=2 weeks non-invasive or invasive mechanical ventilation (IMV)] were recruited. Demographic, clinical and outcome data during the PICU stay were collected, analyzed, and summarized.

Result: A total of 91/1201(7.7%) patients over the study period requiring PMV were included with median age and Pediatric Index of Mortality 3 score of 0.8 years (interquartile range (IQR) 0.3, 4.9) and 4.3 (1.6, 9.4) %, respectively. Many patients had comorbidities 82/91 (90.1%), most common being respiratory [46/82 (56.1%)], cardiovascular 43/91 (47%) and neurological 42/91 (46%) in nature. Home respiratory support was required in 28/91 (30.8%). The most common admission categories were respiratory 40/91 (44.0%) and cardiac surgical 15/91 (16.5%), with 24/91 (26.4%) being elective admissions. IMV was required in 74/91 (81.3%) patients with a median duration of 13.5 (7.0, 31.0) days. Of these, high frequency oscillation was used in 24/74 (32.4%) patients and 14/74 (18.9%) eventually required new tracheostomy creation at a median of 44 (26, 79) days of IMV. In survivors [73/91 (80.2%)], the need for any respiratory support at PICU discharge was 67/73 (91.8%), of which 41/73 (56.2%) were newly acquired.

Conclusion: Though the prevalence of children on PMV was not high, the rate of mortality and acquired respiratory morbidity in this group were exceedingly high. Further studies are required to identify risk factors for poor outcomes and methods to prevent them.

Table 1: Characteristics of patients requiring prolonged mechanical ventilation

Characteristics	Overall (n=91)
Age, years	0.8 (0.3, 4.9)
Pediatric Index of Mortality 3, %	4.3 (1.6, 9.4)
Male	51 (56.0)
Comorbidity (any)	82 (90.1)
Respiratory comorbidity	46 (50.6)
Cardiovascular comorbidity	43 (47.3)

Neurological comorbidity	42 (46.2)
Elective	24 (26.4)
Admission category	
Cardiac surgery	15 (16.5)
Cardiac non-surgery	7 (7.7)
Respiratory	40 (44.0)
Neuro non-surgery	7 (7.7)
Surgical non-cardiac	10 (11.0)
Others	12 (13.2)
Home respiratory support	28 (30.8)
None	63 (69.2)
CPAP	16 (17.6)
BiPAP	8 (8.8)
Tracheostomy/ IMV	4 (4.4)
High frequency oscillation	24 (26.4)
Outcome	
Discharged	65 (71.4)
Died	18 (19.8)
Transferred	8 (8.8)
Tracheostomy new	14 (15.4)
Invasive ventilation duration, days	13.5 (7, 31)
Intensive care duration, days	18 (5, 34)
Hospital duration, days	53 (21, 117)
Non-invasive ventilation duration,	3 (1, 7)

Median, IQR

Counts, %

00063 ChatGPT for Human-level Scoring of American Society of Anaesthesiologists Performance Status

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Aims: ChatGPT is a Large Learning Model (LLM) with main strengths in text comprehension and summarization. We assessed whether it was able to correctly assign the American Society of Anesthesiologists (ASA) Physical Status class to patient case histories, which is a common standardized task in anesthesiology.

Methodology: We assessed GPT-3.5's ability to categorize patients according to the ASA Classification System. We used ten standardized hypothetical patient scenarios from prior studies in the literature. Fleiss' Kappa was used to determine the agreement between different iterations for each script. Mann Whitney U test was used to compare the performance of ChatGPT and historic human anaesthesiologist scores.

Result: ChatGPT yielded generally clear and comprehensible responses. Responses were consistent - Fleiss' kappa 0.62 for Set 1 (unmodified sample scripts), 0.73 for Set 2 (scripts with modified phrasing, but similar content) and 0.60 for Set 3 (scripts with modified demographic and laboratory parameters, without a change in the ASA class). There was no significant difference compared to historic performance by human anaesthesiologists.

Conclusion: ChatGPT was able to accurately and consistently assign the ASA score of standardized patient scenarios, attaining human level performance.

00064 Systems Modelling as an Approach for Eliciting the Mechanisms of Hip Fracture Recovery among Older Adults in a Participatory Stakeholder Engagement Setting

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Aims: Using system dynamics methodologies, this study aims to: (1) develop a comprehensive qualitative model to systematically map the causal pathways that promote or inhibit hip fracture recovery, (2) describe the dynamic mechanisms of factors that relate to recovery and their associated linkages, and (3) to identify potential leverage points that can improve the recovery trajectories of hip fracture patients. Leverage points allow for interventions to be applied strategically to promote the recovery trajectories of patients and to reduce or mitigate recovery inhibiting processes.

Methodology: The research team conducted 2 half day group model building (GMB) sessions with 20 key stakeholders consisting of clinicians, orthopedic specialists, rehabilitation nurses, patients, and caregivers. Based on each participant's own personal experience as a patient or health practitioner, each participant were asked to: (i) generate a list of salient factors that may promote or inhibit hip fracture recovery, through an iterative and interactive discussion with other participants, referring to a preliminary concept model of functional loss and recovery; and to (ii) expand upon the preliminary concept model, by developing a causal loop diagram (CLD) based on the factors elicited, by linking and connecting the factors in a causal way, indicating pathways that can improve or inhibit recovery.

Participants were either (a) Hip fracture patients who have had a hip fracture operation, and who have undergone the recovery and rehabilitation process, or (b) are healthcare practitioners who have had extensive experience providing care, support, and rehabilitation to hip fracture patients, from the acute or community hospital (SGH, CGH, OCH, and SACH). The GMB sessions were conducted by 5 researchers, who developed a participatory stakeholder script describing the steps of each session using system dynamics methodologies.

Result: Participants identified mechanisms within 4 broad domains that affect hip fracture recovery, they are: (1) Expectation Formation, (2) Rehabilitation, (3) Affordability/Availability, and (4) Resilience building.

Conclusion: A novel approach is needed to understand how a complex interplay of factors can promote or hinder hip fracture recovery, so that interventions can be aligned in a way that accounts for both upstream and downstream effects that influence the overall recovery trajectory of hip fracture patients. The CLDs connects a broad spectrum of psychological, social and economic factors together in relation to functional loss and recovery, that can allow for the identification of feedback loops, leverage points, and specific domains that are both distinct and causally interconnected. This can assist in the development and formulation of effective policies and interventions that can enhance recovery, reduce

inhibitory factors, and serve as a valuable complement to existing empirical studies on functional recovery.

00065 Online Nutrition Screening Training (ENST): A Novel, Effective and Time-saving Training

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Sengkang General Hospital

Aims: In Sengkang General Hospital (SKH), all nurses traditionally undergo a face-to-face nutrition screening training by a dietitian in order to identify patients at risk of malnutrition. Competency assessments are conducted individually after each training. However, this training mode is time-consuming and labour intensive. Additionally, in-person training sessions were also suspended or limited during the COVID-19 pandemic. As such, SKH Dietetics developed a novel asynchronous Online Nutrition Screening Training (eNST). This study aimed to evaluate the effectiveness of the course by evaluating the completion and competency assessment passing rates, as well as the time savings for dietitians and nursing administrative staff.

Methodology: The eNST was developed using the SingHealth Learning Management System (LMS) and included a competency assessment with a passing rate of 80%, for which nurses had a maximum of 3 attempts. SKH nurses were enrolled to eNST across 6 enrolment cycles from February to November 2022 and were given 2 months to complete the course. Reminder emails were periodically sent out to nurses and their respective supervisors. From the LMS reports, the competency assessment passing rates were obtained and course completion rates were tracked from 1 month to 3 months post-enrolment. Based on the enrolment rate in 2022, the time savings per year was calculated by comparing the estimated time taken for training and administrative tasks for the traditional versus the novel approach.

Result: A total of 414 nurses were enrolled to the eNST. The average course completion rate across the enrolment cycles was 87% (78-93%). The completion rate increased from an average of 56% to 87% from 1 to 3 months across the enrolment cycles. The average passing rate for the competency assessment was 85% (72- 96%). The estimated yearly time savings post-implementation was 6240 minutes (from 6450 min to 210 min), which is equivalent to 13 dietitian working days.

Conclusion: The eNST has shown to be an effective training mode with high completion and competency assessment passing rates. It has also resulted in significant time savings for dietitians and nursing administrative staff. The eNST has allowed nurses to have the flexibility to complete the training in their own time, which is especially beneficial for shift workers. The eNST is versatile to scale up to other healthcare professionals within and beyond the hospital walls, so that more people are upskilled to identify and prevent malnutrition.

00066 Enhancing Nutrition Care at Home through an Effective Online Nutrition Course for Community Nurses

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Sengkang General Hospital

Aims: SKH Dietetics developed a 4-module asynchronous online nutrition course 'ENHANCE Nutrition' which focused on empowering community nurses with nutrition knowledge to bridge the gap in nutritional care between the hospital and home setting to optimize health outcomes and minimize healthcare costs. This study aimed to evaluate the effectiveness of the course by assessing the completion and quiz passing rates, and through a post-training evaluation form.

Methodology: 'ENHANCE Nutrition' modules addressed 4 key topics on malnutrition, boosting nutritional intake, oral nutritional supplements, and tube feeding based on previous feedback from nursing agencies. Each interactive module encompassed a post-module quiz to assess knowledge and an evaluation form to determine the usefulness of the course and their likeliness of recommending the course to their colleagues. Community nurses from Singapore General Hospital, Changi General Hospital and TOUCH Community Services were enrolled between January to February 2023 via the SingHealth e-learning platform (LMS). The completion rate, quiz passing rate, and evaluation form results were obtained from the LMS reports.

Result: A total of 182 nurses were enrolled. The average completion rate and quiz passing rate across the 4 modules were 78% and 100% respectively. 83% passed the quizzes by the third attempt. An average of 96% agreed that the respective module was useful in increasing their knowledge in managing nutrition-related issues in the home setting (35% strongly agreed, 61% agreed). An average of 97% agreed that the respective module was useful to their daily practice (32% strongly agreed, 66% agreed). 98% were likely to recommend it to their colleagues.

Conclusion: 'ENHANCE Nutrition' has shown to be an effective course with high completion and quiz passing rates. It is also shown to be a useful course in improving the nutritional knowledge of community nurses, with relevant content that can be applied to their practice. The use of the e-learning platform also allows more convenient and accessible trainings, especially for nurses who are based in various areas of the community. With many in-person trainings suspended during the COVID-19 pandemic, this also allows more training opportunities for community nurses. With the lack of community dietetics services and nutrition training for community nurses, 'ENHANCE Nutrition' aligns with the Healthier SG move to support community partners in improving the health goals of our population, and can be expanded to more community partners who are involved in home care.

00067 Expert Level Sleep Scoring with Deep Learning and Its Impact on Provider Productivity

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Aims: The current gold standard for measuring sleep disorders is polysomnography (PSG), which is manually scored by a sleep technologist. Scoring a PSG is time-consuming and tedious, with substantial inter-rater variability. A deep-learning-based sleep analysis software module can perform autoscoring of PSG. The primary objective of the study is to validate the accuracy and reliability of the autoscoring software. The secondary objective is to measure workflow improvements in terms of time and cost via a time motion study.

Methodology: The performance of an automatic PSG scoring software was benchmarked against the performance of two independent sleep technologists on PSG data collected from patients with suspected sleep disorders. The technologists at the hospital clinic and a third-party scoring company scored the PSG records independently. The scores were then compared between the technologists and the automatic scoring system. An observational study was also performed where the time taken for sleep technologists at the hospital clinic to manually score PSGs was tracked, along with the time taken by the automatic scoring software to assess for potential time savings.

Result: Pearson's correlation between the average manual scores of the hospital and third-party sleep technologists and automatically scored apnea–hypopnea index (AHI) was near-perfect at 0.962. For sleep staging, the highest agreement was obtained for wake and REM sleep staging with Cohen's kappa of 0.853 and 0.790 respectively, while N3 and N1 sleep staging showed the least agreement with Cohen's kappa of 0.695 and 0.436 respectively when autoscores were compared with the sleep technologists. The autoscoring system took an average of 42.7 s to score each record compared with 4,243 s for manual scoring. Following a manual review of the auto scores, an average time savings of 38.6 min per PSG was observed, amounting to 0.25 full-time equivalent (FTE) savings per year at the Changi General Hospital.

Conclusion: Automatic scoring was shown to be accurate and reliable when compared to manual scoring. The findings also indicate a potential for a reduction in the burden of manual scoring of PSGs by sleep technologists and may be of operational significance for sleep laboratories in the healthcare setting.

00068 Asthma Control Test Score, Healthcare Utilization, and Use of Oral Prednisolone in Adult Patients with Asthma on Corticosteroid Versus Combined Inhaler

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SingHealth Polyclinics

Aims: To compare asthma control test (ACT) scores, rescue therapy, healthcare utilization, and prescribed oral Prednisolone in patients using inhaled corticosteroid (ICS) versus combined (ICS and long acting beta blocker) inhaler of adult patients in SingHealth Polyclinics (SHP).

Methodology: This was a retrospective cohort study with data retrieved from electronic health records between 2018-2019. We included adult patients aged above 21 managed at SHP for at least six months, and made at least two visits during the study period with two ACT scores. Patients were on the same medication and inhaler type for six months from the index visit within the study period. The ICS inhalers used are Beclotide (Beclomethasone), Pulmicort (Budesonide) and Flixotide (Fluticasone). The combined inhalers are Symbicort (Budesonide-Fomoterol) and Seretide (Fluticasone-Salmeterol). Outcomes measured were ACT scores, prescribed oral Prednisolone, rescue therapy, and healthcare utilization. Descriptive statistics was used to describe the participant profile, ACT score, and oral Prednisolone dose. To compare between inhaler types, chi-square test was used for categorical data, and ANOVA for continuous variables. Logistic regression was performed to obtain the odds of prescribing of combined therapy, with significant factors (p<0.2) in bivariate analysis taken as confounders.

Result: 4947 patients were included in the study. There were 2931 (59.2%) females and 2016 males (40.8%), with (44.8%) on ICS and 2730 (55.2%) on combination inhaler. Significant difference was found between inhaler type and ethnicity (p=0.008), with fewer Malays prescribed combination inhaler compared to Chinese and Indian. Patients on combination inhaler had more need for rescue therapy (p<0.001), and emergency department visits (p=0003). However, they received lower dose of steroid compared to ICS (p<0.001). Patients on ICS had more polyclinic visits (p=0.002). Increased referrals to the emergency department was associated with higher odds of being on combined therapy compared to ICS (OR = 1.33, 95%CI = 1.2-1.49, p < 0.001). There was no significant difference in gender (p=0.993), marital status (p=0.237), and ACT scores (p=0.128) for patients on both types of inhalers.

Patients who were prescribed combination therapy consumed higher doses of Prednisolone over the two years (p=0.001). The mean Prednisolone dose prescribed for patients was 287 mg for patients on ICS and 401 mg for patients on combination. For every unit (150mg) increase in sprint of prednisolone dispensed, patients had an odds ratio of 1.02 being treated with combined inhalers (95%CI = 1.01-1.05, p = 0.024).

Conclusion: Patients on combination therapy required more rescue therapy, had more emergency department visits, and required higher oral Prednisolone required doses compared to those on ICS. Increased use of Prednisolone and emergency department visits results in higher odds of being given combined inhalers. There was no difference in ACT scores between both groups.

00069 Real-Time Prediction Model for Inpatient Length of Stay with Diagnostic Test Results: A Machine Learning Approach

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Aims: Early discharge planning of inflight inpatients is crucial to ensure timely discharge of these patients. This study aims to develop a real-time predictive model to alert the ward staff when an inflight inpatient is expected to be discharged within the next 3 days.

Methodology: We conducted a retrospective cohort study of inpatient admissions to CGH between 1 Jan 2016 to 31 Dec 2017. Since discharge prediction of an inpatient within the next 3 days could be made whenever any new diagnostic test results become available during an inpatient day, a prediction episode would be possible on such a day. The retrospective data was split into 2 groups with non-overlapping case numbers: 75% for training and 25% for testing. An Extreme Gradient Boosting (XGB) classifier was trained on the training data. Another set of inpatient admissions to CGH in 2018 was used for external validation. Two predictive models were developed in this study. First, a Baseline predictive model was trained using patient profile (age, gender, race, resident status, flat type), admission profile (admit specialty, admit day of week, admit time of day, source of referral, ambulance type, bed assignment category) and the inpatient days to date. The second model, also known as DTR model was trained like the Baseline model with the addition of up-to-date diagnostic test results (DTR) of 547 commonly performed tests (including blood tests, X-ray, MRI and others) at every prediction episode.

Result: From 2016-2017, there were 89,429 inpatient admissions with a total of 433,195 prediction episodes for the prediction of discharge within the next 3 days. In 2018, there were 45,401 inpatient admissions with 206,457 prediction episodes. Based on retrospective test data, AUROC of the DTR model is 0.794 (95% confidence interval [CI]:0.791, 0.797) compared to 0.739 (95% CI: 0.736, 0.742) of Baseline model. AUPRC of the DTR model is 0.762 (95% CI: 0.757, 0.766), compared to 0.700 (95% CI: 0.694, 0.704) of Baseline model. Using the external validation data, AUROC of 0.789 (95% CI: 0.787, 0.791) vs 0.736 (95% CI: 0.734, 0.739), AUROC of 0.780 (95% CI: 0.777, 0.783) vs 0.723 (95% CI: 0.720, 0.726) was noted with the DTR and Baseline models respectively. Overall, the top 3 diagnostic tests which are predictive of discharge within the next 3 days in DTR model were Full Blood Count – WBC count, Chest x-ray, and Antibody screening.

Conclusion: Using the machine learning approach, we are able to develop real-time predictive models for impending (3 days) inpatient discharge with good performance. We have demonstrated the feasibility of including DTR data to enhance performance (AUROC and AUPRC) of the model by more than 5 percentage points. Evidently, the DTR model has the potential of being deployed operationally at inpatient wards as decision support tool to assist ward staff in prioritizing inpatients for discharge planning.

00070 Likelihood of Inpatient Admissions from an Emergency Department: What Are and What Are Not the Risk Factors in a Singapore Tertiary Hospital?

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Aims: This study aims to identify factors associated with Emergency Department (ED) inpatient admissions in a tertiary hospital in Singapore.

Methodology: We conducted a retrospective cohort study of all eligible visits to the aforementioned ED between 1 January 2019 and 31 December 2019. The outcome measure was inpatient admission from ED.

Using a multivariable mixed-effect logistic regression model, we studied the factors associated with inpatient admission. The variables accounted for in the regression were attendees' demographics; triage category; arrival mode; referral source; time (including hour, day, and month) of ED visit; discharge diagnosis; and ED occupancy levels. ED occupancy levels were defined by the number of patients registered and awaiting bed or have not been discharged from ED at each hour (number of inflight ED patients), which were categorised by quintiles at 20-percentile intervals to five different levels.

Result: In 2019, there were 141,719 visits to the ED, with 42,238 (30%) of these visits resulting in inpatient admissions.

Factors associated with increased odds of inpatient admission include increasing age, males, ethnicity (Malay and others as compared to Chinese), higher patient acuity, non-self-referred attendees, attendees conveyed by ambulances, ICD categories (disease of the circulatory system, digestive system and skin and subcutaneous tissue as compared to disease of the respiratory system), hours of visit to the ED (7 pm to 9 pm as compared to 10 am), and months of 2019 (November and December as compared to March). Factors that were not associated with inpatient admissions were the ED occupancy levels and the days of the week attendees visited the ED.

Our model saw that the highest odds of inpatient admission were attributed to the patient's acuity, followed by attendees' age. The odd ratios for all other variables with significantly increased odds of admission were modest, ranging from 1.12 to 4.18.

Conclusion: Our study has revealed several factors significantly associated with increased odds of inpatient admission among ED attendees. The results also suggested that that ED physicians' decisions to admit attendees were independent of the ED occupancy and days of the week. These findings offer invaluable insights into possible follow-up studies that will be crucial in shaping new policies or designing new interventions. The latter policies and interventions could potentially enhance current preventive health or healthcare delivery systems so that the growth in inpatient bed demand among ED attendees can be curtailed over time.

00071 Social Prescribing and the Role of Wellbeing Coordinators in the Primary Care Setting

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SingHealth Polyclinics

Aims: Social prescribing is an approach that connects people to activities, groups, and services in their community to meet the practical, social and emotional needs that affect their health and wellbeing. Social prescribing has been widely introduced in the UK and is being piloted in Canada, Australia and Singapore. We will like to share our experience in the implementation of social prescribing in SingHealth Polyclinics (SHP).

Methodology: Medical and / or nursing staff in SHP identify suitable patients and refer them to a Wellbeing Coordinator (WBC) to evaluate their psychosocial context and issues that surround their healthcare and social aspects. WBCs build relationships through ongoing conversations on 'the issues that matter most' at home visits and at the polyclinic. WBCs also provide information, signposting and referrals to a range of community activities and groups. Tools such as the Patient Activation Measure (PAM) score and UCLA Loneliness Scale were used to measure the effectiveness of social prescribing.

Result: 391 patients have been referred for social prescribing from 2 polyclinic sites at Tampines Polyclinic and Outram Polyclinic since October 2020. There is a higher proportion of females (63% females and 37% males), and 86% of patients referred are elderly (60 years old and above).

There are various interventions tailored to the needs of the patients including health coaching for behavioral change, stress management, exploring new hobbies and connecting patients with assets in the community. Amongst the patients who received intervention by a WBC, 49% of them reported an improvement in the PAM score (n=41), and 23% of the patients reported an improvement in the UCLA Loneliness Scale (n=26). Qualitative outcomes include improvement in self-confidence, greater motivation in the management of their chronic diseases and acquisition of new interests. Patients with interventions also reported satisfaction with the social prescribing service.

Conclusion: Social prescribing has improved various aspects of a patient's social determinants of health such as community engagement and social integration. WBCs are able to improve the holistic care for our patients via collaboration with the multi-disciplinary primary care healthcare team and community partners.

00072 Caregivers' End-Of-Life Care Goals for Persons with Severe Dementia Change over Time

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Aims: Family caregivers make end of life (EOL) decisions for persons with severe dementia (PWSDs). It is not known whether the family caregivers' goals change over time. We aim to assess caregivers' EOL care goal for PWSDs and change in these goals over time.

Methodology: Using a prospective cohort of 215 caregivers of PWSDs, we assessed the proportion of caregivers whose EOL care goal for PWSDs changed between two consecutive time points. Multivariable regression models assessed factors associated with caregivers' EOL care goals for PWSD (maximal, moderate, minimal life extension); and change in EOL care goal from previous time point.

Result: 21% of the caregivers had a goal of maximal life extension for their PWSD, and 59% changed their EOL care goal at least once over a period of 16 months. Caregivers of PWSDs with lower quality of life (RR: 1.05, CI: 1, 1.10), who were less optimistic about PWSDs' remaining life expectancy (RR: 3.80, CI:1.18, 12.23) and who had an advance care planning discussion (RR:3.32, CI: 1.44, 7.65) were more likely to have a goal of minimal life extension for PWSD. Caregivers with higher anticipatory grief (RR: 0.97, CI: 0.95,1) were more likely to have a goal of maximal life extension. Change in PWSDs' quality of life and change in caregivers' anticipatory grief were associated with change in caregivers' EOL goals.

Conclusion: Caregivers' EOL care goals for PWSDs change over time with change in PWSD and caregiver related factors. Findings have implications regarding how health care providers can engage with caregivers.

00073 Re-Expansion and Pregnancy Potential of Fully Hatched Frozen Day 6 Blastocysts

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Aims: Retrospective analysis on the re-expansion and pregnancy rates of D6 hatched blastocysts following vitrification freezing, thawing and transfer, as compared to D6 non-hatched blastocysts.

Methodology: Retrospective data from 2020 to 2022 will be retrieved from patients who only had Day 6 hatched blastocyst frozen, thawed and transferred in our centre, Centre for Assisted Reproduction, Singapore General Hospital. Freezing and thawing processes will only be done via vitrification. We will be looking at the re-expansion and pregnancy rate of these blastocysts, which will then be compared to the overall Day 6 frozen embryo transfer (FET) data in our centre within the same years.

Result: From 2020 to 2022, our centre had 195 FETs where only Day 6 embryos were transferred. 6 of these FETs froze, thawed and transferred hatched blastocysts, with a 100% survival rate. These patients range from ages 32 to 41. 3 out of these 6 patients had their embryos re-expanded successfully before it was transferred, placing the re-expansion rate at 50%, which is comparable to the general D6 FET re-expansion rate of 54.2%. 1 of the blastocysts was biopsied for Pre-implantation Genetic Screening(PGS) and has been tested to be an euploid embryo. However it is noted that the pregnancy rate of D6 hatched blastocyst transfers is 0%, while the overall D6 FET pregnancy rate is 37.9%.

Conclusion: The Zona Peullucida (ZP) has been shown to serve an important role in resisting the mechanical stress from possible ice formation during vitrification. Freezing and thawing a hatched blastocyst could prove to be damaging to the embryo due to the lack of the ZP. Although the re-expansion rate of hatched blastocysts are comparable to non-hatched embryos, the pregnancy rate has shown significant differences. This suggests that hatched blastocysts may be more fragile, especially after the vitrification and warming processes, increasing the susceptibility to potential cellular damage prior to the transfer of the blastocyst, thus resulting in a lower pregnancy success rate.

It is a common practice in our centre, during a patient's FET cycle, to select the most advanced embryo to thaw and transfer first to try and reduce the patient's time to pregnancy. Although a fully hatched blastocyst is more advanced than a non/partially hatched blastocyst, the increased risk of cellular damage to hatched blastocysts suggests that selecting a non/partially hatched blastocyst first might prove to be more beneficial. However, it is to be noted that the sample size of the hatched blastocyst FET is extremely small, a larger sample size will be required to further evaluate.

00075 Understanding the Use of Evidence-based Medical Therapy in Patients with Peripheral Artery Disease: A Qualitative Study Using the Tailored Implementation for Chronic Diseases Framework

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Aims: The global burden of peripheral artery disease (PAD) has been increasing. Guidelines for PAD recommend evidence-based medical therapy (EBMT) to reduce the risks of cardiovascular events and death but the implementation of this is highly variable. This study aimed to understand the current practices regarding EBMT prescription in PAD patients and the key barriers and facilitators for implementing PAD guidelines.

Methodology: A qualitative study was conducted in the largest tertiary hospital in Singapore from December 2021 to March 2023. The participants included healthcare professionals and in-patient pharmacists involved in the care of PAD patients, as well as patients with PAD who had undergone a lower limb angioplasty revascularisation procedure. Data were collected through in-depth, individual semi-structured interviews conducted face-to-face or remotely by a trained research assistant. Interviews were audio-recorded, transcribed, and systematically coded using Nvivo 12. The Tailored Implementation for Chronic Diseases (TICD) framework was used to guide the interviews and analysis.

Result: A total of 12 healthcare professionals (4 junior consultants, 7 senior consultants, and 1 senior in-patient pharmacist) and four patients were recruited. Nine themes in seven domains emerged (**Table 1**). Only a small proportion of doctors were aware of the relevant guidelines, and the generalizability of guidelines to patients with complicated conditions was the doctors' main concern. Other barriers included cost, frequent referrals, lack of interprofessional collaboration, not being patients' long-term care providers, short consultation time, and patients' limited medication knowledge.

Table 1 TICD Framework analysis

Theme 1	Although the healthcare professionals were familiar with patients' risks, symptoms, and PAD treatment, their awareness of the relevant guidelines was limited
Theme 2	The responsibilities of managing PAD were shared by different departments since patients have comorbidities and multiple risk factors
Theme 3	Not involved in patients' long-term care, doctors had concerns about implementing EBMT in PAD patients with polypharmacy and comorbidities

Theme 4	Doctors expressed mixed opinions on following the guidelines
Theme 5	Patients claimed that they were adherent to taking medications despite a limited understanding of their conditions and medications
Theme 6	Cost and lack of time were barriers to implementing EBMT
Theme 7	Collaborative care, with the involvement of nurses or pharmacists, was advocated to improve interprofessional communication and patient education to facilitate EBMT practice.
Theme 8	Internal sharing was suggested to improve the prescription rate of EBMT on the departmental level.
Theme 9	Education should be done in the community to raise patient's awareness of healthy behaviors

Conclusion: Findings from this study may inform strategies for improving healthcare professionals' adherence to guidelines and patients' medication adherence.

00076 How Can Older Adult Care Recipients and Their Older Informal Caregivers Be Adequately Supported by Healthcare and Community Services: A Qualitative Study

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Aims: This study aims to understand 1) the **challenges faced by older adults who require caregiving and their older informal caregivers**, 2) **their suggestions for improvement** to services and policies, and 3) **their attitudes towards technology-enabled caregiving support.**

Methodology: A qualitative descriptive approach was used and **in-depth semi-structured interviews were conducted with 43 older adults** of diverse ethnic and socio-economic backgrounds (age range 60 – 95 years old) who were providing care (27 females, 8 males) or receiving care (4 males, 4 females). Interviews were audio-recorded and transcribed verbatim, followed by thematic analysis using the framework method.

Result: Three main themes were identified: 1) **Unmet healthcare needs** 2) **Unmet socio-emotional needs** and 3) **Technology-enabled caregiving support** (refer to Figure 1). Challenges include lack of information for referrals, frequent changes in healthcare providers, cost concerns, and inconvenient service locations. Caregivers also prioritised caregiving over self-care (e.g. delaying treatment and screenings for themselves, lacking time to participate in physical and social activities) and expressed concern about imposing others for help with caregiving. Suggestions for improvements included tailored financial assistance, having the same healthcare provider for follow-ups to develop therapeutic bond and help for caregivers who are less proficient in technology. Caregivers found mobile apps and wearables beneficial for managing appointments and locating family members with dementia, and telehealth to be convenient for follow-ups. However, some caregivers faced challenges in using apps and completing online forms, and preferred in person appointments.

Conclusion: The study contributed to a more detailed understanding of challenges faced and support desired by older informal caregivers and their care recipients. These findings can **inform healthcare and community-based service providers and policymakers on how to address unmet needs and care gaps** among these older adults.

Financial difficulties

Lack of information

Accessibility issues

Lack of time

Inconsistent service provider

Concern for the future

Fear of being a burden

Lack of recreational activities

1 2
3

+
Location tracking (dementia)

+
Appointment management apps

+ / -
Tele-consultation

-
Online forms
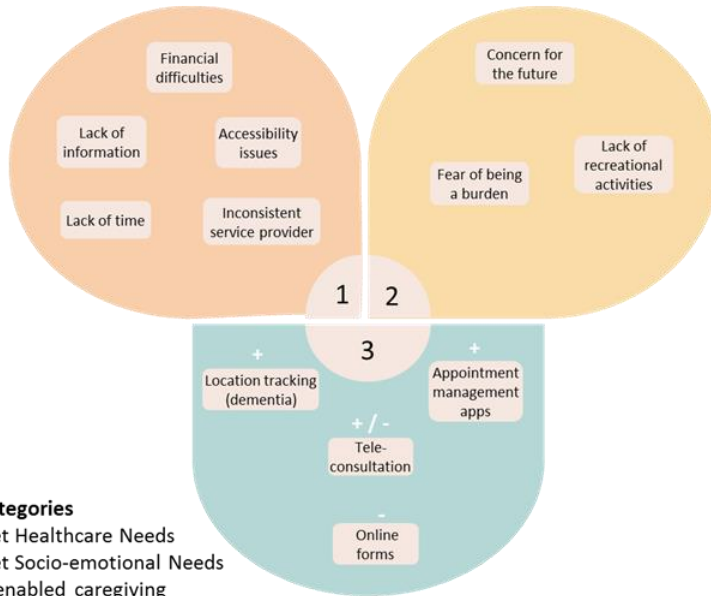
Main categories
1: Unmet Healthcare Needs
2: Unmet Socio-emotional Needs
3: Tech-enabled caregiving
(CR: care-recipient; +: positive experience;
-: negative experience)

00077 Development of a Novel Asian-Specific Panel That Enables Quantification of Donor-Derived Cell-Free DNA in Peripheral Blood for Renal Allograft Rejection Monitoring

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Aims: Allograft rejection in kidney transplant patients is a major complication after transplantation which has to be monitored regularly to enable early detection and timely intervention. Serum creatinine and urinary protein are current clinical monitoring tools. The gold standard of histology analysis of allograft biopsies is invasive and carry significant procedural risks and complications. Recent studies have demonstrated that levels of donor-derived cell-free DNA (dd-cfDNA) in the blood plasma correlates with allograft rejection risk. Majority of these studies reviewed have been done in Caucasian patients. Commercially available kits that are in clinical use focus heavily on Caucasian polymorphisms (SNPs). A multi-ethnic Asian population approach with the consideration of organ size and genetic disparities may be important to dd-cfdna in Asian organ transplant patients. Our study looks at the use of a customized panel in a transplant programme of a tertiary centre.

Methodology: Based on existing population databases and in-house filters for SNP selection, we developed a next-generation sequencing (NGS) panel consisting of primers targeting 1562 SNPs. cfDNA extracted from blood plasma were extracted using the QIAamp Circulating Nucleic Acid kit and libraries for sequencing were constructed using the Illumina Trusight NGS platform. To validate the performance of the panel, spiked-in controls at serial dilutions of 1.0%, 0.5% and 0.1% of two healthy donors were first evaluated to determine the detection limit of the assay. This was followed by analyses of a preliminary set of transplant patient samples with and without display of cellular rejection and antibody-mediated rejection (ABMR) on blood samples collected at varying timepoints after transplantation. An in-house developed bioinformatics pipeline was used for quantification of ddcfDNA.

Result: Preliminary results showed correlative quantification of the spiked-in controls and detection at as low as <0.5% donor to recipient ratio. With the incorporation of unique molecular identifiers (UMI) in the panel, we were also able to quantify the ddcfDNA with better resolution and lower background sequencing noise. Correlations of ddcfDNA level detected in the patient samples with clinical and biopsy results are performed.

Conclusion: Our customized dd-cfDNA panel seems promising in the monitoring of allograft health in kidney transplant patients, reducing the need for invasive biopsies. With this, we might be able to develop a reliable alternative laboratory test that is able to accurately detect transplant injury earlier. This may then translate to more timely treatments, which in turn may extend the function of kidney transplants.

00078 Impact of White Matter Hyperintensities on Domain-Specific Cognition in Southeast Asians

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Nanyang Technological University

Aims: Dementia affects 55 million people worldwide, with 60% of the burden in Asia. White Matter Hyperintensities (WMH) is a key marker of small vessel disease, with high prevalence in Asian populations with prodromal and clinical dementia. WMH is described as: Deep White Matter Hyperintensities (DWMH), Periventricular Hyperintensities (PVH) or Fazekas-Total (DWMH and PVH).

However, the association between WMH topography and performance in specific cognitive domains remains unexplored. Thus, this study aims to characterize the impact of Fazekas-Total, DWMH and PVH on different cognitive domains.

Methodology: 304 participants (mean age = 60.6, mean education years = 14.2) from Biomarkers and Cognition Study, Singapore (Dementia Research Centre (Singapore)) met the inclusion criteria.

Eight domains of cognition were tested: global cognition, learning and memory, language, executive function, complex-attention, perceptual-motor, social-cognition, and processing speed.

Normality tests, correlation analysis and stepwise regression (with Benjamini and Hochberg False Discovery Rate correction) were performed to understand association between Fazekas-Total, DWMH, PVH on domains of cognition tested, accounting for age, education, and gender.

Two approaches were used for data analysis: (1) by grouping participants as Mild Cognitive Impairment (MCI), Subjective Cognitive Decline (SCD) and Cognitively Normal (CN) as per the National Institute on Aging-Alzheimer's Association (NIA-AA) criteria and (2) by grouping participants' WMH as confluent (DWMH $\geq$2 and PVH $\geq$3) and non-confluent.

Result: Higher Fazekas-Total was associated with slower processing speed (p=0.0255, R=-0.039) in prodromal participants (MCI and SCD). Higher PVH was associated with slower processing speed in MCI (p=0.017, R=-0.32) and CN (p=0.017, R=-0.663). Higher PVH was significantly associated with poorer learning and memory (p=0.045, R=-0.043) in SCD. Higher DWMH was significantly associated with poorer learning and memory (p=0.017, R=-0.765) in CN.

Conclusion: These results demonstrate differential association between PVH, DWMH and cognitive domains, thus the location of WMH determines the affected cognitive domains. Therefore, it is worthwhile to assess PVH and DWMH in clinical cognitive outcomes separately and to understand the upstream pathobiology of DWMH and PVH.

Furthermore, higher Fazekas-Total was strongly associated with slower processing speed in prodromal participants and could be a marker of cognitive decline.

00079 Patients' Experiences Living with Chronic Pain and Their Perceptions of Virtual Reality-based Therapy in Pain Management

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Changi General Hospital

Aims: Chronic, non-cancer pain (CNCP) is a challenging condition for both patients and healthcare providers to manage. Due to the subjective nature of pain, multiple underlying causes, and limited treatment options, patients face many difficulties in seeking care. Recent advances in non-pharmacological pain management using virtual reality (VR) technology have shown potential to help patients suffering from CNCP. Given the complex biopsychosocial dynamics of CNCP, interventions need to be well-suited to address patients' multifaceted needs.

The aim of this study is to examine the experiences of patients suffering from CNCP, and their perceptions of using VR technology for pain therapy.

Methodology: We conducted semi-structured interviews with 15 adult patients, who had CNCP for at least 3 months, and seeking treatment from an outpatient pain clinic at an acute hospital. Interviews were conducted in-person. Interview recordings were transcribed verbatim, and analysed thematically.

Result: 3 main themes emerged from participants' experiences living with CNCP; (i) a sense of losing control, (ii) struggles of seeking care, and (iii) moving forward. The experience of living with chronic pain was debilitating for many participants, resulting in diminished bodily functions, disrupted routines, and feelings of hopelessness and anger. Perceived apathy and dismissiveness of some healthcare providers, as well as difficulties with navigating the healthcare system frustrated participants. While medication brought temporary relief to participants, they preferred to minimise reliance on it. Some participants also stigmatised psychotherapy, associating it with mental illness. Despite these challenges, participants were able to move on by accepting pain as part of their lives, adopting various coping strategies, and drawing on the support and care of their loved ones.

Most participants were open to using VR for pain therapy. Participants expected that VR therapy could help reduce pain by providing immersive distraction in customisable, pleasant virtual environments. However, they expressed concerns about its long-term efficacy and comfort during use.

Conclusion: Our study provides insight into patients' experiences and challenges living with CNCP, and their perceptions of VR technology for therapy. These findings emphasise the need for a multidisciplinary approach to caring for patients with CNCP. To help patients accept and effectively manage CNCP, healthcare providers need to be better equipped to communicate with patients, collaborating with them to develop personalised approaches to living with pain.

Our study also highlights that most participants were receptive to using VR in pain therapy. These findings can help guide the development of acceptable VR interventions for pain management.

00080 Landscape Study of Stroke Services in Southeast Asia

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Aims: Despite the high stroke burden in Southeast Asia (SEA), there is a paucity of data on stroke epidemiology and care processes in the region. This study aims to survey the stroke epidemiology and care processes in eight SEA countries, alongside determining regional patterns, and identifying areas for regional stroke care services improvement.

Methodology: Aspects of stroke care services were reference from the World Stroke Organisation (WSO) roadmap. Data were collected for country demographics, stroke epidemiology and care services. Preliminary data from a literature search were reviewed with country experts via virtual meetings to verify information, supplement missing data, and provide expert opinions.

Result: Stroke incidence varies widely. Stroke mortality is lowest in the two high-income countries (Singapore, Brunei). Vascular risk factor data in the general population is not recent and is limited in the stroke population across the region. There are no or limited emergency medical services (EMS) in most countries. Less than 5% of SEA population have access to stroke unit care. Imaging is widely available, but intravenous thrombolysis access is less than 20% except in Singapore and Brunei, and endovascular thrombectomy utilization rates are low except in Singapore. Only two countries have mandatory national-level stroke registry data. Rehabilitation data is limited to expert opinion.

Conclusion: The paucity of data supports the need for a regional registry. Increasing access and utilisation to stroke unit care is particularly important given the low current rates. There is wide disparity of stroke care services especially for EMS, stroke unit and intravenous thrombolysis, with higher access and utilisation rates in countries with higher gross domestic product (GDP). Given these disparities, there is potential for regional collaboration to improve the level of stroke care services across the region.

00081 Clinical Review of EmbryoGlue® in In-vitro Fertilisation Cycles

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Aims: This retrospective study aims to determine the effectiveness of Embryo Glue as an embryo transfer medium on the clinical pregnancy outcomes in patients who had previous failed ART cycles at our IVF centre.

Methodology: EmbryoGlue® is a hyaluronan-enriched embryo transfer (ET) medium which aids in implantation of embryos, hence, improves pregnancy rates in in-vitro fertilization cycle. A total of 257 FET cycle patients and 95 fresh cycle patients in 2022, with previous failed cycles were analysed. Out of which, 38 FET and 40 fresh ART cycle patients used EmbryoGlue® as the ET medium, whereas the remaining patients from both the fresh and FET cycles used the conventional blastocyst culture medium for ET.

In 78 patients using EmbryoGlue® as the transfer medium, embryos were equilibrated in EmbryoGlue® for a minimum of 10 minutes to 4 hours at 37°C in a 6% CO_2 incubator prior to transfer. Patients who had previous failed ART cycle and did not use EmbryoGlue® were used as the control. Data were analysed with the chi-square test.

Result: The clinical pregnancy rate in the control group for FET cycle was 10% higher than the study group. In contrary, the study group in the fresh cycle was 14% higher than the control group. However, the differences were not statistically significant of ($p=0.26$) and ($p=0.087$) respectively.

10% (n=4/40) and 42% (n=16/38) of the study group in fresh and FET cycle were tested clinically pregnant after using EmbryoGlue® as the embryo transfer medium respectively. For the control group in fresh and FET cycles, 24% (n=13/55) and 52% (n=114/219) of the patients had successful implantation.

Conclusion: The results have shown that EmbryoGlue® has no significant effect in aiding the patients with previous failed cycle in both fresh and FET cycles to be clinically pregnant. However, it may be considered as a useful transfer medium in patients with recurrent implantation failure.

00082 Functional Role of Matrisome-related Gene MAMDC2 in Head and Neck Squamous Cell Carcinoma

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[1]National Cancer Centre Singapore, [2]A*STAR, [3]Raffles Institution, [4]Duke-NUS Medical School

Aims: The matrisome comprises extracellular matrix-related proteins that are frequently dysregulated in cancer. We previously described a 29-gene Tumor Matrisome Index (TMI) that predicted clinical outcomes across different cancers. One of the 29 genes is mamdc2, which encodes for MAM-domain containing protein 2 that is overexpressed in breast cancer but downregulated in lung cancer. Despite the differential expression in tumor versus normal tissue, the function of MAMDC2 in tumour progression is poorly defined. Focusing on Head and Neck Squamous Cell Carcinoma (HNSCC), we will test if MAMDC2 affects key processes of tumor progression and identify gene targets regulated by MAMDC2.

Methodology: Using the TCGA-HNSC dataset, we examined mamdc2 expression and performed survival analyses. We used qRT-PCR to compare the endogenous expression of mamdc2 in patient-derived HNSCC lines and a normal squamous epithelial cell line Het1A. To gain insight into the function of MAMDC2, we examined the expression pattern and subcellular localization using immunofluorescence. We also carried out MAMDC2 overexpression and siRNA knockdown studies, and assessed the effects on tumor cell proliferation, migration and invasion. To identify potential gene targets regulated by MAMDC2, we searched for interacting candidates of MAMDC2 and examined how MAMDC2 knockdown affected the expression of these candidates by qRT-PCR.

Result: In the TCGA-HNSC cohort, mamdc2-high group demonstrated shorter progression free survival and poorer overall survival than mamdc2-low group. Relative to the normal squamous epithelial cell line, mamdc2 was downregulated in HN26 (derived from a patient without distant metastasis) and upregulated in HN1, HN19, HN43, HN64, HN90 (derived from patients with distant metastasis). Overexpression of mamdc2 in HN26 significantly enhanced tumor cell proliferation. siRNA-mediated knockdown of mamdc2 significantly reduced the migration and invasion of HN43 and HN90 cells. Furthermore, immunofluorescence showed that MAMDC2-FLAG is localized to the cytoplasm and nucleus of HNSCC cells, suggesting possible transcriptional function. MAMDC2 knockdown significantly increased the expression of FLNA, which encodes Filamin A protein that regulates motility and cytoskeleton dynamics.

Conclusion: Collectively, the results suggest that high mamdc2 expression promotes tumor progression and associates with poorer survival outcomes in HNSCC. MAMDC2 may promote HNSCC cell motility through interaction with FLNA and the work is still ongoing to ascertain this interaction.

00083 An Exploration of Contexts and Mechanisms Underpinning Decision Process for Enrolling into a Home-based Palliative Care Programme Using the Realist Approach: Patients' and Caregivers' Perspectives

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[1]Changi General Hospital, [2]SingHealth, [3]St. Andrew's Community Hospital

Aims: With increasing needs for palliative care for those with life-limiting non-cancer conditions, the Violet Programme (ViP) was developed to provide care for non-cancer patients and support caregivers at homes. Patient referral and utilisation of palliative care services are usually delayed until late in the disease trajectory. This is due to the patients' and their family members' feeling unprepared for the changes in the patients' condition and their unwillingness to discuss end-of-life (EOL) care. Hence, to ensure that ViP reaches appropriate population in need in a timely manner, our study aims to understand the contexts and mechanisms underpinning healthcare users' decisions for enrolling into ViP.

Methodology: Using purposive sampling, we conducted semi-structured interviews with 34 healthcare providers involved in ViP, 21 caregivers of ViP patients, and 3 ViP patients. Using the realist approach, interview findings were used to validate the initial programme theories and were synthesised to derive context-mechanism-outcome (CMO) configurations underpinning healthcare users' decisions for enrolment into ViP. Context (C) is defined as the elements in the environment of an intervention while outcome (O) refers to the effects of the intervention. Mechanism (M) is the responses of stakeholders elicited by the context that generate the outcomes.

Result: Healthcare users' financial situations (C) and perceived affordability of the ViP (C) were identified to be the reasons for declining ViP service. Users were concerned about its affordability when they compared ViP service with other free home hospice services (M). Several other contexts that underpinned healthcare users' decision to enrol into ViP were also identified; such as the convenience offered by ViP, a pressing need for round-the-clock care at home, users having clear EOL care goals, recommendation for ViP services, and having access to healthcare subsidies (e.g., MediSave) and means-tested charges. These contexts assured users that ViP could provide appropriate EOL care for their loved ones (M), and highlighted the value of ViP (M).

Conclusion: This study provided insights into the contexts and mechanisms that facilitate patients' and caregivers' decisions to enrol into ViP. Patients and caregivers are more open to enrolling into home palliative care programmes when they are affordable, offer convenience and round-the-clock care at home. These insights can potentially help policy makers and referring providers communicate effectively when sharing information about ViP to identified patients and caregivers. This can increase their interest to enrol into ViP and increase programme uptake.

00084 Potential of Serious Games as a Competency Assessment Tool for Acute Care Nurses on the Blood Transfusion Procedure

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[1]Singapore General Hospital, [2]Southern Illinois University, [3]University of Chicago

Aims: Blood transfusion is a life-saving treatment that requires comprehensive knowledge and compliance to safety, administration, and management of blood transfusion process. It is a core competency for a registered nurse. Competency assessments are routinely conducted as regulatory requirement and for quality assurance. Prior to using serious games, competency assessment involved an online learning module followed by a face-to-face assessment. The aim of this study was to assess whether serious game for blood transfusion administration can be a valid and reliable nursing competency assessment tool through capturing and analysis of in-game empirical data.

Methodology: The nursing department from Singapore General Hospital (SGH) developed a serious game for blood transfusion administration. The game modules were developed to match the actual procedure with established learning objectives at each stage. A full trial was conducted with 1,985 registered nurses within SGH. The game's content validity was assessed by four external subject-matter-experts. Gameplay data of 1093 play-learners were available for testing of construct validity, internal-consistency reliability, and criterion validity of the game.

Result: I-CVI ranged between 0.75 to 1, while S-CVI/Ave was 0.99. 6 factors and 82 game actions were obtained using principle factor analysis. Most game actions had a communality value ($h2$) above 0.5. The Inter-factor correlations between the six factors ranged from 0.2 to 0.45. Internal consistency reliability estimates (α) (together with their 95% CIs) for the stages were greater than 0.75, with an overall of 0.96 for the 82 game actions. Linear association between each predictor and the criterion were below 0.25.

Conclusion: Based on the empirical data collated, we conclude that the serious game is a valid competency assessment tool for nurses in SGH. For future work, we propose to conduct similar trials in other hospitals to further support that SG is a valid and reliable competency tool for multi-step complex procedural clinical skills.

00085 Nurse Reported Missed Care and Association with Staff Demographics and Work Environment Before and During Covid-19 in Singapore

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Aims: Nurse reported missed care (NRMC) is standard care that is not completed, incomplete or seriously delayed. With the onset of the COVID-19 pandemic, there were numerous healthcare shift from administrative, resources to manpower allocation within Singapore General Hospital (SGH), one of which were the creation of isolation wards dedicated for patients with COVID-19. It was of interest to assess and compare NRMC before and during COVID-19 in SGH

Methodology: A correlation study using convenience sampling was conducted. Inpatient nurses before COVID-19 in 2019 were recruited. Similarly, 133 nurses from the isolation wards were recruited from March to April 2022. The MISSCARE survey was used for both studies. Descriptive statistics was applied to analyse demographics and satisfaction variables. Pearson Chi square test was applied to analyse correlation between NRMC and demographic or staff-related factors.

Result: A total of 314 participants were recruited in 2019, while 133 participants were recruited in 2022. Most nurses were between 25 to 34 years old for both pre- COVID (n = 203, 64.9%) and isolation wards (n= 133, 43.6%). The top commonly missed care before and during COVID-19 were similar: ambulation, emotional support, attending interdisciplinary meetings and 2- hourly turning being. There was a decline seen in nurses' satisfaction from isolation wards as compared to pre-COVID. Younger age, greater experience in role and current ward, inadequate staffing and teamwork, poor satisfaction with current role and being a nurse, and plans to leave were significant factors (p < 0.05) associated with greater missed care before COVID-19.

Conclusion: While most NRMC and reasons are somewhat similar, there are notable difference in their prevalence. Further research into the impact of COVID-19 on NRMC and nurses will be valuable.

00086 Rapid Health Technology Assessment of Hydrogen Breath Testing for Small Bacterial Intestinal Overgrowth (SIBO) or Lactose / Fructose Intolerance

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Aims: Hydrogen breath tests are established modalities for the diagnosis of small intestinal bacterial overgrowth (SIBO) or lactose or fructose intolerance. A rapid health technology assessment was carried out to inform a decision on whether to procure a hydrogen breath test analyser and provide testing services in our hospital. The research question for the rapid review was: What is the clinical accuracy (e.g. sensitivity and specificity) of hydrogen breath testing for the diagnosis of SIBO or lactose/fructose intolerance?

Methodology: The following databases were searched for systematic reviews, health technology assessment reports, reviews, consensus statements, policies and clinical practice guidelines:

• PubMed (MEDLINE)

• Cochrane Database of Systematic Reviews

• Epistemonikos database

• Guidelines International Network guideline library

Unstructured searches were also carried out on Google.

Articles that appeared to have relevant titles or abstracts were retrieved in full text for further evaluation. The AMSTAR2 instrument was used to critically appraise systematic reviews. No formal critical appraisal instruments were used for guidelines or consensus statements. The findings were summarised in a narrative synthesis.

Result: The supporting evidence for the clinical accuracy of breath tests is heterogeneous. Two systematic reviews of critically low quality show a wide range of sensitivity and specificity for diagnosis of SIBO. The most recent systematic review (2020) covered 14 diagnostic accuracy studies and had a range of sensitivity of 20-93% and specificity of 30-100% for glucose-substrate hydrogen breath tests to diagnose SIBO; and a range of sensitivity of 24-68% and specificity of 44-100% for lactulose-substrate hydrogen breath tests.

No systematic reviews were found on the clinical accuracy of breath tests for lactose/fructose intolerance.

European expert consensus guidelines (2021) state that an established indication for hydrogen breath testing is the presence of intolerance symptoms without evidence of organic disease and in whom

carbohydrate intolerance is considered a possible or likely cause. With regard to SIBO, until a true gold standard is established, hydrogen breath testing can be used for the diagnostic evaluation of SIBO. The North American expert consensus (2017) suggests breath testing in the diagnosis of SIBO and carbohydrate maldigestion syndrome.

Conclusion: In conclusion, while hydrogen breath testing may be an established modality for diagnosis of SIBO and lactose/fructose intolerance, the evidence for clinical accuracy is low quality and heterogeneous.

The decision on whether to procure an analyser or provide testing services will rest on cost and cost-effectiveness considerations. In a setting with low workload, alternatives may be to refer to another centre already providing such service for testing, or to consider trial of treatment, in the case of lactose/fructose intolerance.

00087 Multi-disciplinary Weight Management Programme at Changi General Hospital: Retrospective Analysis

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Aims: Obesity is a major public health problem globally and is associated with an increased risk of developing several chronic metabolic disorders. A weight loss of 5-10% in obese people can achieve significant health benefits. The aim of this research was to assess the effectiveness of an evidence-based Weight Management Programme over a period of 6 months.

Methodology: A retrospective analysis was performed using 400 participants enrolled from April 2015-March 2021 in the multi-disciplinary weight management programme. Participants were males and females ≥16years with a baseline body mass index of ≥25 kg/m2, who also provided at least one weight measurement beyond baseline. The program offered two packages: a classic package that consisted of 12 sessions and a deluxe package that included 20 sessions. Both packages assessed the change in weight at 8-9 months after completing the program. Any participant who missed ≥2 sessions during the program was categorized as a non-completer. A linear mixed-effect model was utilized to compare the percentage of weight loss and clinically significant weight loss (i.e. a reduction of ≥5% from the baseline level) between two groups: programme completer vs. non-completers, and classics vs. deluxe package.

Result: The study included 400 participants with a mean age of 42.6 years (SD,14.4 years), of which 44% were female, 58% were Chinese, 23% were Malay, and 12% were Indian. Among these participants, 345(86%) enrolled in the classic package and 227(57%) completed the program. The results showed a significant difference in weight change at 8-9 months between program completers and non-completers, with a mean weight loss of -5.3 kg(-6.4,-4.3) in the completer group and -1.5 kg(−2.7,-0.4) in the non-completer group (p < .001). Program completers were more likely to achieve clinically significant weight loss (OR=5.12, p<0.0001). The difference in waist change between the completer and non-completer groups was -4.8 cm(-5.7, 3.8) and -1.77 cm(-2.8,-0.7), respectively. In addition, the participants who enrolled in the deluxe package (n=55) and had a completion rate of 57% experienced a more notable reduction in weight of -4.8 kg(-6.9,-2.7) in contrast to those who selected the classic package (n=345) and had a completion rate of 57%, achieving a weight loss of -3.4 kg (-4.2,-2.5). Similarly, the deluxe group achieved more significant weight loss (OR=2.74, p<0.001). The deluxe group participants also achieved a more significant waist change of -5.7 cm(-7.6,-3.8) compared to the classic group, whose waist change was -3.1 cm(-3.8,-2.3).

Conclusion: This retrospective analysis demonstrates that individuals in the deluxe package or completed the programme and resulted in a small but statistically significant weight loss at 8-9 months.

Further research is needed to understand the generalizability, scalability, and durability of these findings.

00088 Reliability of Preoperative Self-Assessment Questionnaires for Eye Surgery

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Aims: This study aimed to compare acceptability between digital versus manual approach of self-assessment of health questionnaire. Digital approach can be launched vis Short Messaging Link (SMS), Quick Response (QR) code. The second aim was to examine the reliability of pre-operative assessment versus outcomes performed by a nurse.

Methodology: The preoperative assessment questionnaires were designed by Anesthetists to screen for the presence of numerous preoperative comorbidities. Patients scheduled for cataract surgery were given preoperative questionnaires. The questions in the domains are physical function, medical history with treatments in relation to respiratory, cardiology conditions and sleep apnea assessment.

Data was collected from August to October 2021.The first group of patients received a SMS, 10 working days prior to their pre-assessment in-clinic visit. A hyperlink within the SMS will link the patients to the digital copy of the pre-operative questionnaires.

The second group of patients who did not manage to complete the questionnaires through SMS, scanned the QR Code when they were present in clinic for their pre-surgery assessment appointment using their mobile devices.

The third group of patients were recruited on the day of the pre-surgery appointment. Paper and pen were provided to complete the pre-operative questionnaire while they were waiting for appointment.

Acceptability was measured through the number of completed responses. Completed self-assessment questionnaires from 3 groups were compared against the Pre Surgery Nurses' assessment using similar set of questions. While Kappa agreement was used to conduct reliability of self-assessment on pre-operative questionnaires were tested for three methods: through SMS, QR Code, and Manual entry.

Result: A total of 738 patients' assessment records were reviewed for this project. A total 486 patients' data are used for analysis, as 252 were excluded due to incomplete entry.

Both Kappa agreement scores for SMS Versus Nurses and Manual versus Nurses were 0.32 which suggested poor agreement, while the Kappa score for QR Code versus Nurse was 0.46 suggested moderate agreement.

The acceptability is higher in the QR group of patients, which may have coincided with national statistics of increasing older generations accessing smartphones and broadband. QR code facilitated easier and convenient way connect between traditional and online accessibility, keeping it user-friendly to wider variety of audience.

No intraoperative complications were reported for these patients, probably due to eye surgery is low risk surgical procedure.

Conclusion: This project concludes that the new preoperative questionnaire can be moderately reliable to measure health status of eye surgery patients. With limited instructions and practice, the patients requiring low risk eye surgery can successfully use the self-assessment questionnaire to report their medical comorbidities.

00089 The Impact of Human Cadaveric Dissection on Professional Identity Formation in Medical Students

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Aims: As technology advances, some schools are moving away from human cadaveric dissection to teach anatomy, leading to concern regarding the possible loss of a professional identity building experience. This study explored the role of dissection in students' professional identity formation (PIF).

Methodology: A mixed-methods study was conducted using survey methodology and semi-structured interviews of medical students at an American-style graduate-entry medical school in Singapore. The questionnaire adopted the conceptual framework of the Ring Theory of Personhood and included measures thought to be associated with PIF: motivation toward learning, learning environment, empathy, mentorship, and hours of human dissection experience which varied considerably year-to-year due to COVID-related curriculum adaptations where dissection was not an option. The MacLeod-Clark Professional Identity Scale was used to measure professional identity. Semi-structured interviews of 12 students were audio-recorded, transcribed, and analyzed using reflexive thematic analysis.

Result: Survey respondents (n=69; 24%) were representative of the student body in age and year of study although slightly more female dominant. Multiple regression analysis indicated that only female gender and more favorable views of the learning environment were positively associated with PIF, however, the number of hours of dissection was not. Despite these findings, semi-structured interviews revealed two notable themes related to the dissection experience: 1) Feelings toward self (e.g., deepened sense of humanistic values); 2) Feelings about patients (e.g., enhanced notions of patients' personhood). Interestingly, students who did not dissect did not express these themes and instead focused on anatomy knowledge.

Conclusion: While our findings do not suggest that dissection strongly impacts students' PIF, the impact is not negligible either as students expressed that the experience produced desirable values of self and views of patients important for the developing physician.

The development of professional identity is a nuanced and complicated process. While dissection may not strongly impact the PIF, students shared thought-provoking experiences which suggests some level of its contribution to PIF. Careful consideration of this phenomenon should be exercised prior to removing dissection in favor of technological alternatives.

00090 The Expression of Adenosine Pathway Marker CD39 in Microsatellite Stable Colorectal Cancer

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Aims: Extracellular adenosine triphosphate (eATP) is a major biochemical component in tumour microenvironment (TME). As part of physiological state or in response to stress and death-inducing condition, a variety of cells release ATP into extracellular space, where it regulates tumour cell metabolism, proliferation, motility, and tumor-immune interaction. The exact biological function, however, depends on its concentration, the expression of specific P2 receptors, and the level ectonucleotidases that quickly hydrolyse eATP to adenosine, a potent immunosuppressive metabolite, to protect tumour cells from immunosurveillance. CD39, a transmembrane protein mainly expressed on tumour-infiltrating immune cells, is the rate-limiting ectonucleotidase governing eATP-adenosine conversion. High level of eATP promotes tumour proliferation, invasiveness and metastasis via P2 receptors.

Colorectal cancer (CRC) is one of the most common and most deadly cancer worldwide. Microsatellite stable (MSS) CRCs make up of 85-95% of all the CRC cases, with limited treatment options. In this study, we evaluated the role that adenosine signaling plays in MSS CRC by examining the expression of CD39 and the association with tumor development and stages.

Methodology: Extracellular adenosine triphosphate (eATP) is a major biochemical component in tumour microenvironment (TME). As part of physiological state or in response to stress and death-inducing condition, a variety of cells release ATP into extracellular space, where it regulates tumour cell metabolism, proliferation, motility, and tumor-immune interaction. The exact biological function, however, depends on its concentration, the expression of specific P2 receptors, and the level ectonucleotidases that quickly hydrolyse eATP to adenosine, a potent immunosuppressive metabolite, to protect tumour cells from immunosurveillance. CD39, a transmembrane protein mainly expressed on tumour-infiltrating immune cells, is the rate-limiting ectonucleotidase governing eATP-adenosine conversion. High level of eATP promotes tumour proliferation, invasiveness and metastasis via P2 receptors.

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Result: Of the 35 study subjects, the median age was 63 years(IQR 59-69), 16 (45.7%) were male, and 12 (34.6%) had Stage I & II CRC. Compared to the normal tissue, CRC tumours had less number and lower density of CD39+ cells (716 vs 435, P=0.006; 2530/mm2 vs. 1539/mm2, P=0.0000), and less proportion of PanCK+ cells and macrophages expressing CD39 (3.9% vs. 1.0%, P= 0.001; 67.6% vs. 42.3% P=0.000). The density of CD8+CD39+ T cells, CD39+ macrophages and PanCK+CD39+ cells in tumor were significantly lower than the normal (CD8+CD39+ 188/mm2 vs. 109/mm2, P=0.0297; CD39+macrophages 2269/mm2 vs. 1720/mm2, P=0.03; PanCK+CD39+ 200 vs 96, P=0.0145). Significantly lower density of CD8+CD39+ T cells were observed in Stage III&IV tumours compared to stage I & II tumours (172/mm2 vs.95/mm2 , P=0.044).

Conclusion: The density of CD39 expressing cells is lower in MSS CRC. Low density of CD39+CD8+ T cells is associated with higher tumour stages. Elevated eATP could play an important role in CRC development and progression.

00091 Assessment of Implementation Experience of Tele-Dentistry Supported Oral Care for Seniors (TDOCS) Residing in Nursing Homes Using the Consolidated Framework for Implementation Research (CFIR)

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Aims: Poor oral health among seniors is a significant public health concern. This is because it increases risk of frailty and may precipitate other medical conditions such as pneumonia, diabetes, nutritional deficiencies and cardiovascular diseases. Seniors in Singapore have relatively poor oral health. A nationally representative survey of community dwelling seniors found that 38% had less than the 20 natural teeth required for adequate chewing function, whilst 31% were completely edentulous. This phenomenon can be largely attributed to difficulties in accessing dental care within the community and seniors' limited ability for oral care. Thus, leveraging on information and communication technology, a tele-consultation model, TDOCS, was developed to facilitate access to an oral examination through remote detection and monitoring of oral conditions of seniors residing in nursing homes. To facilitate improvements, this study aims to determine the barriers and facilitators to the implementation of TDOCS

Methodology: We conducted semi-structured interviews with purposive sampling of 21 providers and 8 seniors from Vanguard Nursing Homes (NH). Providers interviewed included remote dentists, tele-assistants, and nursing home administrators. Topic guide was developed based on the Consolidated Framework of Implementation Fidelity (CFIR) and was used for all interviews. All interviews were audio-recorded, transcribed verbatim and subsequently analyzed according to CFIR.

Result: TDOCS was perceived to have a relative advantage of being convenient for seniors, providing easy access to dental check-up within the comfort of their residence. It was regarded to be useful and efficient for screening of a large population and beneficial for seniors. Not surprisingly, recruitment of patients into TDOCS was also relatively easy because TDOCS was provided free of charge to seniors. Despite initial anxiety, seniors were impressed by the professionalism and compassion of TDOCS team. For beneficiaries whom always believed in the importance of oral care and hygiene, TDOCS reinforced their good practices. However, challenges related to insufficient training of providers, initial difficulty in handling the intra-oral camera, unpredictable behaviour issues of seniors, and conflicting existing agenda and long lead time for post-screening follow-up within NHs were identified. In the instances where follow-up treatment was suggested after the review of scans, adherence to recommended treatment remained low.

Conclusion: Our study supports the potential of TDOCS as a great opportunity for improving dental access for seniors residing in the nursing homes. However, barriers to implementation exist. Strategies to overcome operational challenges related to providers training, resource allocation and integration of

TDOCS into existing processes are required for further development of TDOCS. Follow- up effort to ensure seniors receive appropriate dental treatments is also necessary.

00092 Haematopoietic Stem Cell Transplantation During Acute Coronavirus Disease 2019 in a Highly Vaccinated Population – Real World Transplant Outcomes from Singapore General Hospital

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Singapore General Hospital

Aims: To assess the outcomes of patients undergoing haematopoietic stem cell transplantation (HCT) immediately after or during Coronavirus disease 2019 (COVID-19).

Methodology: We conducted a retrospective analysis of consecutive patients admitted to Singapore General Hospital, for planned HCT between September 2021 and April 2022, when COVID-19 community transmission was high. Written informed consent was obtained. Patients diagnosed with COVID-19 by positive SARS-CoV-2 PCR within 120 days prior to HCT were included.

Result: 10 allogeneic and 1 autologous HCT patients were reviewed. Median interval between diagnosis of COVID-19 to HCT was 53 days (range 1-118). Median duration of COVID-19, defined by time to negative PCR, was 20 days.

All, except for 1 unvaccinated patient, had 2 doses of COVID-19 mRNA vaccine prior to COVID-19. COVID-19 severity by WHO guidelines was mild in 9, moderate in 1 and critical in 1 patient. 8 patients received antivirals; 5 had concurrent monoclonal antibodies (sotrovimab, n=4; casirivimab-imdevimab, n=1).

Median age was 53 years (range 26-70); 64% of patients had low-risk HCT-comorbidity index, 45% were male, and 55% were of high-risk by the disease risk index. 50% received myeloablative conditioning. A median of 5.5 x 106 CD34+ cells/kg (range 2.9-10.1) were infused.

Median time to neutrophil and platelet engraftment was 10 (range 10-17) and 12 days (range 10-20), respectively, comparable to that of non-COVID-19 cohorts. 2 patients died of non-relapse pulmonary complications on days 43 and 50 post HCT. 2 patients developed grade II acute GvHD of skin, with none developing grade III-IV GvHD. Median follow up was 103 days (range 43-208), and GvHD-free, relapse-free survival among surviving patients at D+100 was 78%. There was no evidence of COVID-19 reinfection or late complications, or increase in viral reactivation of CMV, EBV and HHV6.

Conclusion: Our study suggests that timely HCT can be safely performed with favourable transplant outcomes following or during COVID-19 in a fully vaccinated cohort. Viral therapeutics and a careful disease risk-benefit assessment also play a crucial role.

Table 1: Individual patient characteristics and outcomes

Patient	Haematological Diagnosis	Interval between COVID-19 and HCT (Days)	SARS-CoV-2 IgG (RBD) AU/mL (at COVID-19 diagnosis)	Type of HCT	Donor Source for Allogeneic HCT	Conditioning Regimen	ANC Engraftment (Days)	Platelet Engraftment (Days)
1	Multiple myeloma	99	NA^	Autologous	NA	Mel	10	13
2	Ph+ B-ALL	57	809.6	Allogeneic	MSD	Flu, Mel	10	10
3*	Ph+ B-ALL	54	515.0	Allogeneic	MSD	Cy, TBI	15	16
4*	AML	1	178.3	Allogeneic	MUD	Flu, Bu, ATG	10	10
5*	AP-CML	3	2244.7	Allogeneic	Haplo - PTCy	TT, Flu, Mel, PTCy	26	30
6*	AML	5	1514.0	Allogeneic	Haplo - Depleted	NA #	NA	9
7	AML	28	> 40000	Allogeneic	Haplo - Depleted	TT, Flu, Mel, TNI	11	10
8	SAA	51	4294.0	Allogeneic	MSD	Flu, Cy, Campath	10	14
9	Hodgkin Lymphoma	53	2836.4	Allogeneic	Haplo - PTCy	Flu, Cy, TBI, PTCy	22	41
10	AP-CML	73	1088.0	Allogeneic	MUD	Bu, Cy, ATG	17	20
11	Myelofibrosis	118	71.9	Allogeneic	Haplo - PTCy	FLAMSA, Mel, PTCy	18	19

Ph, Philadelphia chromosome; ALL, acute lymphoblastic leukaemia; AML, acute myeloid leukaemia; AP-CML, accelerated phase chronic myeloid leukaemia; SAA, severe aplastic anaemia; HCT, haematopoietic stem cell transplantation; MSD, matched sibling donor; MUD, matched unrelated donor; Haplo- depleted, haploidentical with ex-vivo TCR alpha-beta depleted grafts; Haplo - PTCy, haploidentical with post transplant cyclophosphamide; Mel, melphalan; Flu, fludarabine; Cy, cyclophosphamide; TT, thiotepa; Bu, busulphan; ATG, anti-thymocyte globulin; TBI, total body irradiation; TNI, total nodal irradiation; PTCy, post-transplant cyclophosphamide; ANC, absolute neutrophil count; NA, not applicable
*Patient's clinical progress illustrated in figure 1; ^Patient was unvaccinated
#Patient 6 (relapsed AML) received haploidentical TCR alpha-beta depleted graft without conditioning regimen

00093 Exploring the Impact of Covid-19 on the Learning Experiences of Nursing Students in the Course of Clinical Attachment in Singapore

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Singapore General Hospital

Aims: The aim of this study is to gain insights on nursing students' learning experiences in the course of clinical attachment due to COVID-19.

Methodology: An exploratory, descriptive qualitative method was adopted for this study. Purposive sampling was used to select nursing students from various academic institution and levels. Researchers conducted semi-structured interviews to gather and analyzed the data using thematic analysis. The interviews were conducted face-to-face, recorded and transcribed verbatim. Researchers verified the transcript with participants, and similar codes were categorized into themes and subthemes.

Result: 5 themes and 14 subthemes were generated from research findings.
Theme 1: Students' clinical experience during pandemic
- Subthemes
  - ✓ Sense of belonging
  - ✓ Decision making
  - ✓ Impact on learning
  - ✓ Emotional responses

Theme 2: Motivation to be a nurse
- Subthemes
  - ✓ Inspiration
  - ✓ Increase motivation

Theme 3: Impact of covid-19 measures
- Subthemes
  - Vigilant with Acute Respiratory Infection (ARI) symptoms
  - Adhere to infection control practices
  - Adaption of challenges

Theme 4: Facing new challenges
- Subthemes
  - ✓ Deferred or called off clinical attachment
  - ✓ Different learning experience
  - ✓ Manpower shortage

Theme 5: Strengthen clinical education
- Subthemes
  - ✓ Bridging theory to practice
  - ✓ Comprehensive clinical orientation

Research findings show, majority of the students were motivated to join nursing profession due to their family members' positive experiences. COVID-19 pandemic increased their motivation to be in nursing team. Some students felt a sense of belonging in the clinical area. Multiple factors, such as stricter infection control practices and movement restrictions, affecting participants' decision-making in nursing as a career. Other challenges mentioned by students are shortened or postponed clinical attachments, limited exposure to different patient conditions, lack of opportunities to practice skills, and a shortage of manpower. However, the nursing students demonstrated adaptability and a positive learning attitude during their clinical attachments.

Conclusion: COVID-19 outbreak had a significant impact on nursing students' learning in this study. However, students demonstrated resilience and adaptability in achieving their clinical learning objectives. They suggested interventions like detailed orientation, comprehensive questioning techniques, and small group discussions with clinical educators to enhance their clinical learning and patient outcomes. Research findings shows, the current orientation program and clinical teaching strategies can be enhance to meet the students' needs. Further research may be useful in examining different supportive measures to enhance the learning experience.

00094 Correlation of Serial Fibrosis 4 (FIB 4) Score with Serial Liver Stiffness Measurement in Patients with Non-Alcoholic Fatty Liver Disease

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Aims: Non-alcoholic fatty liver disease (NAFLD) affects one in four people globally. Risk stratification of NAFLD using non-invasive test such as Fibrosis-4 index (FIB-4) and Vibration-Controlled Transient Elastography (VCTE) is important to identify at-risk patients without overwhelming the tertiary care. Current guidelines recommend repeating FIB-4 among low-risk NAFLD patients every 2-3 years. However, there are limited data on how changes in serial FIB-4 correlates with liver fibrosis progression. Here, we evaluated associations between changes in FIB-4 and liver stiffness measurement (LSM) in NAFLD patients with serial VCTE studies.

Methodology: This retrospective study included 311 consecutive NAFLD patients from USA and Singapore with at least two VCTE studies, spaced at least two years apart. We excluded patients with advanced cirrhosis at baseline (LSM $\geq$20 kPa). The primary predictor was change between follow-up FIB4 (FIB4-2) and initial FIB4 (FIB4-1), which we call delta-FIB4. The primary outcome was a $\geq$25% increase (delta-LSM) in the follow-up LSM (LSM-2) relative to baseline LSM (LSM-1). The secondary outcome, which was only applied to patients with LSM-1 < 8 kPa, was disease progression as defined by a $\geq$25% increase in delta-LSM and new advanced fibrosis (LSM-2 $\geq$ 8 kPa).

Result: Among the 311 patients, median age was 54 years, 53% were male, and 84% were white. Median follow-up time between VCTE was 38.6 months. On follow-up, 30% of patients had a $\geq$25% increase in LSM, 24% had a $\geq$25% decrease, and 46% had a <25% change. 15% of NAFLD patients developed incident advanced fibrosis (LSM-2 $\geq$ 8 kPa and $\geq$ 25% increase). Delta-FIB4 correlated strongly with delta-LSM: r=0.31 (p<0.001). Among patients with $\geq$25% increase in LSM, FIB4 increased over time (delta-FIB4 = 0.15, p=0.025). In contrast, among patients with no LSM change or with LSM decrease, FIB4 did not change (delta-FIB4 = 0.02, p=0.61). As for patients with baseline LSM <8 kPa, those with disease progression had increase of FIB4 over time (delta-FIB4 = 0.31, p=0.044), but those with no disease progression had no change in FIB4 (delta-FIB4 = 0.04, p=0.31).

Conclusion: Changes in FIB-4 correlate strongly with changes in LSM in NAFLD patients. These findings has important implications as it supports the current guidelines in obtaining serial serum non-invasive tests in low-risk NAFLD patients.

00095 Factors Associated with Favorable Neurological Outcomes in Elderly Out-Of-Hospital Cardiac Arrests

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Aims: With more elderly presenting with Out-of-Hospital Cardiac Arrests (OHCAs) globally, neurologically intact survival (NIS) should be the aim of resuscitation. We aimed to study the trend of OHCAs amongst elderly in a large Asian registry to identify if age is independently associated with NIS, and the factors associated with NIS in the elderly.

Methodology: The Pan-Asian Resuscitation Outcomes Study (PAROS) registry was searched for emergency medical services-attended OHCA patients aged ≥18 years from April 2010 to December 2019 in Singapore. Cases pronounced dead at scene, transported via private ambulance, traumatic OHCAs and OHCAs in ambulances were excluded.

A retrospective analysis was conducted. Patient characteristics and outcomes were compared across four age categories (18-64, 65-79, 80-89, ≥90). Multivariable logistic regression analysis determined the factors associated with NIS.

Result: 19,519 eligible cases were analyzed. OHCA incidence increased steadily from 44/100,000 (2011) to 86/100,000 (2019). Incidence grew with age, almost doubling in octogenarians (from 312/100,000 in 2011 to 652/100,000 in 2019) and tripling in those ≥90 years (from 458/100,000 in 2011 to 1,271/100,000 in 2019). The proportion of patients with NIS improved over time for the 18-64, 65-79 and 80-89 years groups, with greatest improvement in the youngest age group and little improvement in those ≥90 years. NIS decreased with each increasing year of age and minute of response time. Females had lower chances of NIS. NIS increased in arrests of presumed cardiac etiology, witnessed and bystander CPR ('best-case scenario'). For such cases, NIS was above the futility cut-off of 1% chance of survival, even up to 115 years old. For non-best-case scenario arrests, NIS was <1% after 84 years of age.

Conclusion: Though age is associated with survival in OHCAs, survival with good outcomes increased, even amongst the elderly. With good-quality CPR, NIS is possible, highlighting the importance of CPR, regardless of age. Additionally, end-of-life planning is a complex yet necessary decision that should be done, through qualitative exploration with the elderly, their families and care providers.

00096 Performance of Novel Technologies for Fall Risk Assessments among Cognitively Impaired Older Adults: A Systematic Review

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Aims: Older adults with cognitive impairment (OCI) are twice as likely to experience falls than cognitively intact older adults. While cognitive impairment is a known risk factor for falls, it is important to understand the specific underlying causes of falls in this population. Unfortunately, traditional tools used for fall risk prediction may not be suitable for OCI due to their reliance on attention, recall, and decision-making. Therefore, the use of novel technologies may be particularly useful in aiding our understanding of fall risk among OCI. The objective of this systematic review is to characterize and evaluate the performance of current technologies used in fall risk assessments for older adults with cognitive impairment.

Methodology: To identify relevant literature, we systematically searched PubMed, Embase, IEEE Xplore, Cochrane, Web of Science, and Scopus. In order to ensure broad inclusion criteria, keywords regarding neurologic and neuromotor diseases were also searched for, and no restrictions were placed on the type of studies included.

Result: Out of 848 articles, a total of 21 met the criteria for inclusion, with a total of 3487 participants (mean age: 61.6 – 81.7). The majority of articles included participants with dementia. Technologies identified included wearable sensors with tri-axial accelerometers, gyroscopes, and magnetometers; mobile applications; machine learning; and GAITRite carpets. Additionally, fall risk assessments were largely conducted in the community, with some elements in a laboratory setting. In recent times, more studies have included the continuous monitoring of free-living older adults in community settings. In addition, abnormal gait characteristics were hypothesized as independent variables of prospective falls. However, indicators such as fall history remained as one of the best independent predictors in multiple studies; suggesting that novel technologies would be useful when complementing traditional methods for a robust prediction of an older adults' risk of falls. Furthermore, specific functional tests and the associated technologies have been mapped out in this review, which may be valuable for clinicians and researchers interested in integrating such novel technologies into practice in the future.

Conclusion: In conclusion, this systematic review has provided an overview of novel technologies utilized for fall risk assessments among older persons with cognitive impairment. Future work on a meta-analysis of the performance characteristics of such technologies is warranted once these technologies are further developed for this population of older adults.

00097 The Impact of Elective Surgery Postponement During Covid-19 on Emergency Bellwether Procedures in Singapore

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Aims: The COVID-19 pandemic drove many healthcare systems worldwide to postpone elective surgery to increase healthcare capacity, manpower and reduce infection risk to staff. The aim of this study was to assess the impact of an elective surgery postponement policy in response to the COVID-19 pandemic on surgical volumes and patient outcomes for 3 emergency bellwether procedures.

Methodology: A retrospective cohort study of patients who underwent any of the 3 emergency procedures (Caesarean section (CS), laparotomy (EL) and open fracture (OF) fixation) between 1 January 2018 to 31 December 2021 was conducted. The volumes and outcomes of each surgery were compared across 4 time periods: pre-COVID (January 2018 – January 2020), elective postponement (EP) (February – May 2020), recovery (June – November 2020) and post-recovery (December 2020 – December 2021).

Result: There were a total of 3886, 1396 and 299 EL, CS, OF, respectively. There was no change in monthly volumes of CS and OF fixations across the 4 time periods. However, the volume of EL increased by 43% (95% CI: 23 – 67%) and 48% (95% CI: 21 – 80%) in the recovery and post-recovery period, respectively. Outcomes did not worsen throughout the 4 time periods for all 3 procedures and actually improved for EL from EP onwards.

Conclusion: Elective surgery postponement in the early COVID-19 pandemic did not affect volumes of emergency CS and OF fixations but led to an increase in volume for EL after the postponement without any worsening of outcomes.

00098 The Role of a Novel Kidney Disease Index (KDI) in the Association between Arterial Stiffness and Decline of Cognitive Function in Asians with Type 2 Diabetes

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Aims: Decline in renal function potentially compromises systemic clearance of amyloid-beta which characterizes Alzheimer's Disease. Albuminuria, a marker of endothelial damage, potentially causes blood-brain barrier disruption. The joint effect of low renal function and albuminuria on cognitive function is, however, unknown. Arterial stiffness, a hallmark of vascular aging, adversely affects the brain with high pulsatile flow damaging cerebral micro-vessels. We aimed to construct a kidney disease index (KDI), a composite index of estimated glomerular filtration (eGFR) and urinary albumin-to-creatinine ratio (uACR), and examine its role on association between arterial stiffness and cognitive function in type 2 diabetes (T2D).

Methodology: This was a longitudinal study of participants from the Singapore Study of Macro-angiopathy and Micro-vascular Reactivity in Type 2 Diabetes. Cognitive function was assessed using Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). Pulse wave velocity (PWV), an index of arterial stiffness, was measured using applanation tonometry method. Kidney Disease Index (KDI) was calculated as geometric mean of 1/eGFR and natural log-transformed (uACR*100). Linear regression was used to examine cross-sectional association between KDI and baseline RBANS score. Linear mixed model was used to examine longitudinal association between KDI and follow-up RBANS score. We adjusted for demographics, education, depression, APOE ε4 allele and clinical parameters in the analyses.

Result: There were 1303 participants with mean age 61.3±8.0 years. In cross-sectional unadjusted analysis, natural log transformed KDI (LnKDI) was associated with lower RBANS total score (indicative of lower cognitive function) with coefficient -5.59 (95%CI -6.97 to -4.20; p<0.001). The association remained in fully adjusted analysis with coefficient -2.83 (95%CI -4.30 to -1.35; p<0.001). 590 participants were followed up over a mean period of 5.0±1.1 years (up to 8.6 years). In longitudinal unadjusted analysis, LnKDI was associated with reduced RBANS total score with coefficient -5.71 (95%CI -7.70 to -3.71; p<0.001). The negative association between LnKDI and RBANS total score persisted in fully adjusted analysis with coefficient -2.22 (95%CI -4.39 to -0.06; p=0.044). The negative association between LnKDI and RBANS score was also observed in domains of visuo-spatial/ construction and attention with corresponding coefficients -3.61 (95%CI -6.59 to -0.63; p=0.018) and -4.75 (95%CI -7.81 to -1.69; p=0.002). Mediation analysis revealed that LnKDI accounted for 21.0% of the association between PWV and decline in RBANS total score.

Conclusion: KDI was independently associated with cognitive decline globally and in domains of visuo-spatial/construction and attention in T2D. KDI mediated the association between arterial stiffness and cognitive decline. Our novel findings highlight the importance of monitoring and controlling renal function and albuminuria in the prevention of cognitive impairment.

00100 FLASH: A Study of the Feasibility, Ability and Acceptability of Self-Testing of Hba1C Before Consultation

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SingHealth Polyclinics

Aims: This study aims to assess patients' acceptance level and ability to perform self-testing of HbA1c levels within the clinic before consultation, as well as the feasibility of the implementation of self-testing by patients in our primary healthcare setting.

Methodology: The study was conducted in Tampines Polyclinic in early 2022. The team recruited 30 diabetic patients at the polyclinic lab waiting to test their HbA1c levels prior to their routine follow up consultation to participate in the study. A Point-of-Care (POC) HbA1c analyzer similar to those in our clinic laboratory was set up at a self-service station with a demonstration video providing step-by-step instructions to guide users through the entire test process to run a HbA1c test in the analyzer.

Each participant was shown the demonstration video before they performed the test. A study team member was on hand to provide guidance where needed. The HbA1c test require 5 minutes to run, after which the result will be displayed and printed out. During this time, participants were required to answer a questionnaire to rate each step for the entire procedure on a 5 and 6 point Likert Scale to assess their ability and acceptance on self-testing. Questions answered include ease of performing each step, ability to understand, and follow the instructions from the video demonstration. The results obtained were tabulated and analyzed to understand the feasibility of implementing such self-service technology and issues they encountered. The total time taken to complete the test and number of replay of each step of the demonstration video was also recorded.

Result: Participants who completed the questionnaire showed a positive reception and perception towards self-service technology of hbA1c testing. 100% of participants were able to understand and perform the HbA1c test by themselves by following the video demonstration, and were also willing to perform self-testing of HbA1c if self-test stations are available in the future. 90% will recommend this option to others if it is available in the polyclinics.

The main challenge in the self- testing was the step involving the insertion of the reagent pack into the cartridge, pushing the cartridge into the analyzer and removal of cartridge, with 40% of the participants expressing difficulties during these steps.

Conclusion: This study has shown that instead of the conventional way of having to get a lab appointment for HbA1c level tested by the phlebotomists, we can provide our diabetic patients the option of performing the test themselves at a self-test station in the polyclinic before their routine follow-up consultation. The video demonstration will have to be updated and improved to address the concerns raised by the participants.

Other potential use cases include having this self-testing HbA1c as an alternative screening test of diabetes mellitus in population-level screening; and sharing this self-testing model and the knowhow with GPs in their management of their diabetic patients.

00101 Association of Body Mass Index, Metabolic Health Status and Prognosis in Acute Myocardial Infarction Patients: A National Registry-based Study

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Aims: Obesity is an important risk factor for acute myocardial infarction (AMI), but the interplay between metabolic health and obesity on AMI mortality has been controversial. In this study, we aimed to elucidate the risk of short- and long-term all-cause mortality by obesity and metabolic health in AMI patients using data from a multi-ethnic national AMI registry.

Methodology: A total of 73,382 AMI patients from the national Singapore Myocardial Infarction Registry (SMIR) were included. These patients were classified into four groups based on the presence or absence of metabolic diseases, diabetes mellitus, hyperlipidaemia, and hypertension, and obesity: (1) metabolically-healthy-normal-weight (MHN); (2) metabolically-healthy-obese (MHO); (3) metabolically-unhealthy-normal-weight (MUN); and (4) metabolically-unhealthy-obese (MUO).

Result: MHO patients had reduced unadjusted risk of all-cause in-hospital, 30-day, 1-year, 2-year, and 5-year mortality following the initial MI event. However, after adjusting for potential confounders, the protective effect from MHO on post-AMI mortality was lost. Furthermore, there was no reduced risk of recurrent MI or stroke within 1-year from onset of AMI by the MHO status. However, the risk of 1-year mortality was higher in female and Malay AMI patients with MHO compared to MHN even after adjusting for confounders.

Conclusion: In AMI patients with or without metabolic diseases, the presence of obesity did not affect mortality. The exception to this finding were female and Malay MHO who had worse long-term AMI mortality outcomes when compared to MHN suggesting that the presence of obesity in female and Malay patients may confer worsened outcomes.

00102 A Novel Pharmacist-Nephrologist Collaborative Care Model for Haemodialysis Patients

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Aims: Collaborative Prescribing by pharmacists was introduced since 2018 to improve our care to patients through a holistic team-based care. Pharmacists are rigorously trained and provided with the autonomy to manage patients, particularly in prescribing and optimising medication.

CGH pharmacist-managed renal service expanded in December 2020 to include haemodialysis (HD) patients who often face medication related problems. Due to the heavy demand on hospital resources, the standard care (SC) model for stable HD patients comprises of hospital nephrologist's review in 9-month intervals, with dialysis centre nephrologists titrating medications every 1-2 monthly. With a complex medication regimen and multiple care teams managing their medications, HD patients often face complex and potentially confusing medication regimens. Since medication management is the main activity during each nephrologist's consult, we aim to right-site the care of stable HD patients through the novel collaborative care (CC) model between nephrologists and pharmacists.

In this new CC model, nephrologists identify and schedule stable HD patients for a review by the renal pharmacist in 6 months. Pharmacist independently conducts a medication review in conjunction with patient's clinical status and their community HD centre's records. Pharmacists optimise and prescribe their medications based on the collaborative prescribing framework. The subsequent review will be with the nephrologist in 6 months.

The aim of this study is to evaluate safety and care providers' acceptance of the new CC model, with the incidence of ED visits and all-cause unplanned admissions as the primary outcome.

Methodology: We conducted a retrospective study of 104 patients enrolled in the CC model and 342 patients in SC model in January 2021 – June 2022. The patients are matched by the nearest propensity scores, modeled using a multivariate logistic regression adjusted with baseline variables including age and comorbidities. The number of all-cause unplanned admission and ED visits were compared between the two groups using a difference-in-difference approach and a negative-binomial mixed effect model.

Result: Median incidence of ED visit was 0 (IQR 0–0) for the CC group, and 0 (IQR 0-0) for the SC group (P=0.741). For the median incidence of unplanned admissions, it was 0 (IQR 0–1) for the CC group and 0 (IQR 0–1) for the SC group (P=0.545).

The incidence ratio (IRR) of ED attendances for the CC model was 0.98 (95% CI: 0.21–4.61) as compared to the SC model. Unplanned admissions for the CC model had an IRR of 1.03 (95% CI: 0.59-1.78) as compared to the SC model. The differences were not statistically significant.

The interval between the hospital nephrologist visit remained as per the planned CC model, with an average of 380 days.

Conclusion: Our study results support the safety of this novel CC model to allow timely clinical review by the hospital care team for the key issue of medication titration. This novel CC model was effectively implemented with no differences in primary safety outcome measures.

00103 Empowering Patients with Chronic Pain Management

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Aims: Improve patient's ability to self-manage chronic pain, and thereby extending the interval duration between clinic visits by 100% in 6 months.

Methodology: A cause and effect diagram was used to identify gaps in patient's self-efficacy in chronic pain management. With key causes identified such as lack of medication education and missing dedicated staff to follow up, team introduced the following 3 approaches to address the issue. 1. A nurse-led telephonic with periodic interval to follow up on patients. 2. Nurses to provide pain and medication education as well as vital communication channel between patient and doctor for clinic visits. 3. Patients are referred to appropriate community nursing teams and resources.

Result: Timeliness of our intervention has helped to extend the average time interval between clinic visitation from 5.36 to 15.29 weeks (185% improvement).

Average Interval Between Clinic Visits
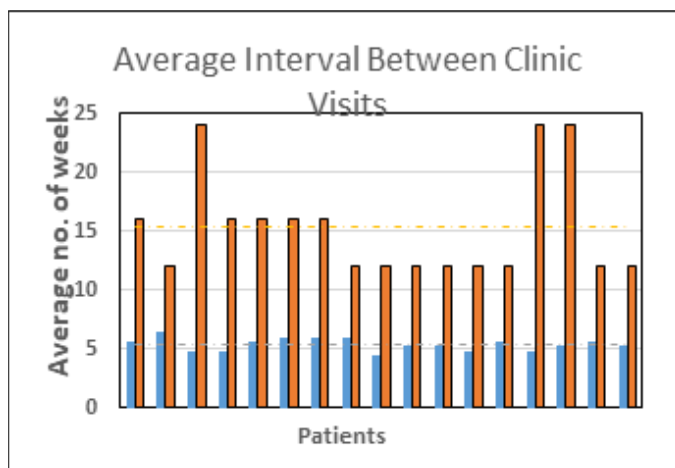
Patient's pain relief percentage increases from a median of 24.6% during pre-intervention to 44.17% after interventions. MedTake Score has also increased from 87% to 100% over the same period.

From the recruited 17 patients, 765mins consultation time was reduced and $2,091 cost saved for patients. All 8 patients who took part in the howRwe questionnaires have reported good to excellent experiences. Patients are very grateful of this initiative and reported that they are more empowered in managing their own pain.

Conclusion: The nurse-led telephonic initiative demonstrated improved patient satisfaction and self-efficacy in managing their pain medications. With the extension of time interval between clinic visits, physicians can therefore free out slots for new consultations. Other patients can be seen and assessed

earlier so as to prevent potential visits to Emegency Department (ED) for pain. By deterring patients with chronic pain from clinic visit through empowerment of pain management, these would help to yield better patient outcome, satisfaction and cost saving. The overall healthcare system too benefits from lesser straining on the limited healthcare resources.

00104 To Optimise Pain Control for Patient Underwent Hip Fracture Surgery Leading to Better Rehabilitation Experience for a Period of 6 Months in Orthopaedic Wards

Jeslyn Foo Jie Ling, Wong Yoke Hui, Chen Xiaozhen, Shanelle Tan Wan Yi

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Aims: 1. To optimize pain control for patients who underwent hip surgery in orthopedic wards by increasing the rate of administering breakthrough doses to patients by 30% within 6 months.
2. To increase the rate of early ambulation by 20% for patients who underwent hip surgery on Post-Operative Day (POD) 2.

Methodology: A cause-and-effect diagram was used to identify gaps in optimising patient pain control following hip fracture surgery. With key causes identified such as lack of knowledge in administration of breakthrough doses and inconsistent ways of communication within Allied Health Professionals on therapy session, team introduced the following 2 approaches to address the issue. 1. Implementation of timed analgesia before therapy session. 2.Education session to orthopaedic ward nurses.

Result: The number of breakthrough doses given shown an increased in median percentage from 17% to 38%.
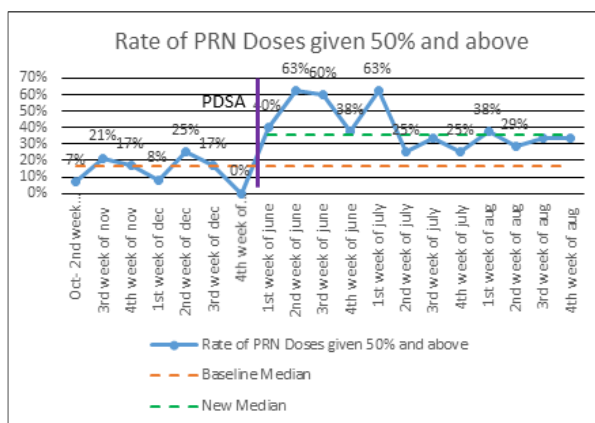
With the increased administration of breakthrough doses, led to an improved pain control for patients. These results have shown an increased median percentage of 50% to 71% for patients being ambulated by POD 2.

Conclusion: These combined interventions have helped patients in significant pain reduction and lead to better participation and experience in rehabilitation session. Early ambulation post operatively has proven to have good patient outcomes such as minimize risk of hospital acquired infection that can lead to prolong hospitalization stay. This resulted in healthcare cost reduction and minimize healthcare burden.

00105 The Experience of Patients Using Bedside IPad-based Education in a Tertiary Hospital of Singapore: A Cross-Sectional Study

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Aims: Patient education is an essential component of a patient's recovery journey to support them to self-manage their health condition, understand their plan of care and adhere to treatment plans. With the introduction of technology, handheld devices such as iPad are increasing being used to deliver patient education in the inpatient environment. In a tertiary hospital in Singapore, iPad is provided at the bedside (hereafter known as bedside iPad) of the orthopaedic unit to deliver education to patient. The study aimed to investigate joint replacement patients' experience of using bedside iPad as a tool to access patient education independently and its association with their inpatient experiences. Research Question: What is the patients' experiences of using bedside iPad to access education in the orthopaedic unit of a tertiary hospital in Singapore?

Methodology: A cross-sectional quantitative study was conducted to examine the experiences of patients using bedside iPad to access education. Convenient sampling was used to recruit patients who have undergone a joint replacement surgery in Singapore General Hospital (SGH). Thirty participants completed the survey questionnaires which consist of the System Usability of the application (SUS) and Picker Patient Experience Questionnaire (PPE-15). The collected data were analysed using the descriptive analysis method. The results of this study demonstrated their positive experiences of the usability of using iPad as a tool to receive education and their positive and negative inpatient experiences related to receiving education.

Result: The SUS tool was used to measure the primary outcome on patients' experience of using iPad to access patient education. 80% of the patients agreed that most people would learn to use the iPad quickly and this demonstrates that it is a very easy tool to use for them to receive education. Inpatient experience outcome was measured using PPE-15 tool. Overall, in terms of inpatient experiences, majority of participants responded with positive outcomes in relation in using Ipad during the hospitalization stay.

Conclusion: The findings from this quantitative study contributed knowledge which were categorized as positive experiences of using iPad as a tool in receiving education and inpatient experiences related to patient education and recommendations for future research. Thereby to ensure a positive inpatient experience while conducting patient education, using iPad as a tool in receiving patient education contributes to positive experiences in patients such as increased independence in learning, increased confidence levels and increased participation in own learning.

00106 Facilitators and Barriers to the Implementation of Surgical Safety Checklist (SSC): An Integrative Review

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Aims: The aim of this integrative review was to summarise and evaluate the use and implementation of SSC, focusing on facilitators and barriers at the individual, professional, and organisational levels.

Methodology: This review followed closely the integrative review method by Whittemore and Knafl. An English literature search was conducted across three electronic databases (PubMed, CINAHL, and EMBASE) and other hand search references. Keywords search included: "acute care", "surgical", "adult patients", "pre-operative", "intra-operative" and "post-operative". A total of 816 articles were screened by two reviewers independently and all articles that met the pre-specified inclusion criteria were retained. Data extracted from the articles were categorised, compared, and further analysed.

Result: A total of 34 articles were included with the majority being observational studies in developed and European countries. Checklists have been adopted in various surgical specialities. Findings indicated that safety checklists improve team cohesion and communication, resulting in enhanced patient safety. This resulted in high compliance rates as healthcare workers expressed the benefits of SSC to facilitate safety within operating theatres. Barriers include manpower limitations, hierarchical culture, lack of staff involvement and training, staff resistance, and appropriateness of checklist.

Conclusion: Common facilitators and barriers at individual, professional and organizational levels have been identified. Staff training and education, conducive workplace culture, timely audits, and appropriate checklist adaptations are crucial components for a successful implementation of the SSC. Methods have also been introduced to counter barriers of SSC.

00107 Prognostic Factors for Mortality After Hip Fracture in Singapore: A Retrospective Cohort Study

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Aims: A surge in morbidity and mortality related to osteoporotic hip fractures are expected in countries with ageing populations. Identification of prognostic factors for mortality following hip fracture allows for risk stratification and can guide clinical decision making to provide targeted and precise care for patients at risk. These factors may be unique to a country's epidemiological and demographic profile. We aimed to identify clinical and biochemical markers to predict mortality in a cohort of patients with hip fracture in Singapore and establish clinical threshold for risk prediction.

Methodology: 493 consecutive hip fracture adult patients, from October 2017 to November 2021, who met the inclusion criteria of the Sengkang General Hospital electronic hip fracture pathway were studied. They all had solitary hip fracture (with no other presenting fracture) and underwent proximal femoral nail antirotation, bipolar hemiarthroplasty, dynamic hip screw, intramedullary/interlocking nail, cancellous screw fixation or total hip replacements. All patients as per protocol had eGFR, albumin, creatinine, PTH, T4, TSH, 25-Hydroxyvitamin D, ALP, haemoglobin, height and weight recorded. Survival was calculated from the date of entry to the hip fracture pathway. Survival was censored at end of study on 1 Jan 2022. Clinical and biochemical variables were selected for survival analyses using Cox regression from univariate and multivariate analyses. ROC curves were plotted to determine specific cut off values.

Result: During the follow up period until Jan 2022, 48 patients (9.74%) died, overall lower compared to most reported in previous studies. CKD stages $\geq$3 (aHR, 5.564; 95% CI, 2.757－11.227), albumin <40 g/L (aHR, 3.988; 95% CI, 1.960－8.112) and underweight BMI (aHR, 2.636; 95% CI, 1.356－5.126) were found to be significant risk factors for mortality following hip fracture. Critical values for albumin and BMI were identified as 36.5 g/L (AUC 0.728; 95% CI, 0.640－0.816) and 19.585 (AUC 0.596; 95% CI, 0.505－0.686) respectively. The presence of any one of these three parameters identified 94% of total deaths in our hip fracture cohort.

Conclusion: Our study adds to the limited literature regarding predictive factors for mortality following hip fracture in a Singaporean population. Knowledge of patients' renal function, albumin level and BMI could aid clinicians in assessing prognosis prior to surgery and guide implementation of preventive strategies post-surgery to reduce the mortality burden of hip fractures.

00108 Use of Continuous Electrical Stimulation in Chronic Leg Ulcer: A Local Experience

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Aims: Electrical stimulation (ES) is one of the most evidence-based technologies used as a therapeutic modality, effective in accelerating healing in multiple wound types and reducing wound pain. The aim of this evaluation was to assess the electrical stimulation (ES) response on a non-healing chronic leg ulcer.

Methodology: The portable automatic, continuously active, disposable low-voltage pulsed microcurrent ES device (Accel-Heal) was applied in a patient with a 19-month chronic venous ulcer stalled in healing despite months of multilayer compression and venous surgery. ES was applied for 12 days under compression bandaging. Patient was taught to change the portable ES device every 4 hrs. Compression was changed weekly as per normal.

Result: On Day 6 of therapy, wound bed showed reduction in fibrinous slough and deep red granulating base. After 12-day electrical stimulation under compression bandaging, within 2 weeks, there was reduction of fibrinous slough and pain and nil eczematous plaques flare over periwound or lower limb. Ulcer size reduced 50% within 3 weeks post electrical stimulation. Patient also reported his skin status improved and he did not experience the occasional flare from discoid eczema. We observed that the wound proliferation slowed down after 12 weeks. The wound took about 23 weeks to closure.

Conclusion: The quick turnaround in clinical signs towards healing suggest ES was responsible for changing the physiology of the wound and that reparative processes were in motion. ES can be used adjunctively with standard care to enhance wound healing rates. Furthermore, with the ability to allow patients to receive electrical stimulation therapy at home, this device will be able to greatly expand the access of patients to this ES therapy.

00109 Pepsin in Saliva for the Diagnosis of Erosive Esophagitis Post-Sleeve Gastrectomy: A Prospective Observational Study

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[1]Duke-NUS Medical School, [2]Singapore General Hospital

Aims: Background

The development of post-op erosive esophagitis (EE) is one of the major limitations of Laparoscopic Sleeve Gastrectomy (LSG), requiring regular post-operative endoscopic surveillance for early detection of Barrett's or esophageal adenocarcinoma. Given the popularity of LSG as the most common metabolic-bariatric surgery performed worldwide, the volume of cases requiring routine endoscopic surveillance with esophago-gastroduododenoscopy (EGD) can strain our limited healthcare resources. Hence, there is a need for a more non-invasive yet precise tool for screening EE in post-LSG patients.

Objectives

Our study evaluates the potential of salivary pepsin concentration as a marker for esophageal injury/EE and therefore as an alternative to endoscopic surveillance post-LSG.

Methodology: Twenty-patients on routine post-LSG endoscopic surveillance between June-September 2022 were recruited for this correlational pilot study. These scopes were part of the routine EGD post-LSG at 1 year and subsequently every 2–3 as recommended by the IFSO EGD guidelines in 2018. Proton pump inhibitor and H2 antagonist therapy were discontinued at least 3 days before. Under supervision, fasting and post-prandial saliva samples were collected and analyzed by Peptest lateral flow device. Patients also completed a validated 25-items QoLRAD questionnaire. The findings from endoscopy were then compared with pepsin salivary concentration as well as symptoms elicited by our questionnaire.

Result: We found a significant correlation between positive endoscopic findings of EE and salivary pepsin concentrations. The normal-group had a lower mean fasting pepsin level (13.13 ng/mL ± 18.97) versus the EE-group (90.55 ng/mL ± 81.28) ($p = 0.009$) and lower mean post-prandial pepsin level (30.50 ng/mL ± 57.72) versus the EE-group (135.09 ng/mL ± 130.17) ($p = 0.02$). The predictive probabilities from the binary regression of fasting and post-prandial pepsin concentrations yield AUC of 0.955 ± 0.044 (95% CI, 0.868 to 1.000, $p < 0.001$).

Conclusion: Our study distinctively identified salivary pepsin to have excellent sensitivity and negative predictive value in EE. This could potentially help reduce the need for post-LSG EGD in asymptomatic patients with low salivary pepsin.

00110 Use of Artificial Intelligence (AI) to Predict Hearing Outcomes after Myringoplasty

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Changi General Hospital

Aims: There are approximately 13,000 basic hearing tests (audiometry) performed annually at the specialist outpatient Ear-Nose-Throat (ENT) clinic when patients present with symptoms of hearing loss. One clinical problem statement involves perforation of the eardrum where post-surgical hearing outcomes are controversial and widely debated due to varying factors. Hence, there is an unmet need to use deep neural network in artificial intelligence as a novel method to answer this clinical question. The objective of this study is to predict post-operative hearing using deep neural network, which first requires a decision tree algorithm for automated classification of hearing loss severity and type.

Methodology: Retrospective analyses of 125 patients who underwent surgical repair of the eardrum with available pre- and post-operative audiograms were included in this study. The aims of the research study: (1) classify hearing loss severity and type using 125 patients' data, (2) predict post-operative audiometric results using 99 patients' data, using decision-tree algorithm and trained neural network respectively.

Result: Decision tree algorithm can automatically classify hearing loss type and degree based on numerical values as an input with an approximate accuracy of 70%. Regression neural network was able to successfully predict post-operative air-bone gap within ±20dB. The top three predictors were age, size of perforation and pre-operative air-bone gap.

Conclusion: The algorithm can be integrated with our medical system through a graphical user interface (GUI) where clinicians can then counsel patients on post-operative hearing outcomes and empower patients to make a more informed decision on surgery.

00111 Adopting Machine Vision Augmentation to Detect Detrusor Overactivity in Overactive Bladder: A Frontier of Artificial Intelligence Application in Functional Urology

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[1]Singapore General Hospital, [2]*Endosiq Technology Singapore*

Aims: Overactive bladder (OAB) is an increasingly prevalent urological condition. Routine urodynamics study (UDS) is invasive, inconsistent and simply impractical in every outpatient setting. We aim to prove that detrusor instability in OAB can be identified based on keypoint movements of the vascular network of the detrusor using our novel cystoscopy based machine vision software.

Methodology: We prospectively collected 158 cystoscopy videos, 38 with detrusor instability (DI) and 120 without, and processed them in a specific framework as follows: The images are processed and de-noised to remove frames with blood, bubbles and dead pixels. The resolution is then enhanced to optimize the vascular network for analysis. Thereafter, mosaic stitching is performed to reconstruct the extracted 2D images into a 3D bladder map. UNet segmentation is performed to extract keypoints based on the vascular network for further analysis. Motion differences of these keypoints are analyzed using Keypoint motion spectra. Motion differences of the key points across timeframes are tracked as a surrogate for areas of detrusor instability.

Result: Results demonstrated a greater amount of movement of keypoints in the OAB group as compared to the non-OAB group. Poincare graphs similarly demonstrated a greater displacement of keypoints in both X and Y axes in the OAB as compared to non-OAB group. This was also numerically represented by a corresponding greater standard deviation in the keypoints in the OAB group.
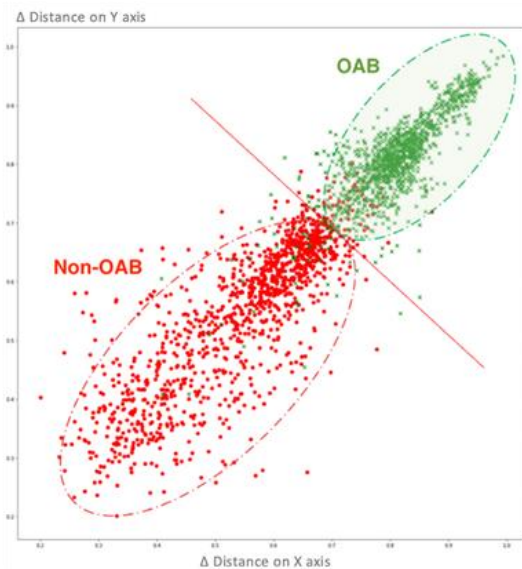
Conclusion: Our novel machine vision augmentation model yields promising results in identifying DI in OAB patients, using movements of keypoints on the blood vessel network in our cystoscopy based software. Differentiating this degree of movement can potentially allow for diagnosis of OAB using a cystoscopy based tool in the future, as well as allow for targeted areas of intra-detrusor treatment to minimize side effects and maximize efficacy of drugs.

00112 Risk Factors for Acute Acquired Comitant Esotropia in Children and Young Adults: A Systematic Review

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Singapore National Eye Centre

Aims: Acute acquired comitant esotropia (AACE) is a rare subtype of esotropia that occurs after infancy. The exact pathogenesis of AACE remains unknown with aetiologies ranging from benign conditions to serious underlying neurological diseases being reported. Given the elusive characteristic of AACE, diagnostic and management guidelines remain unclear. This systematic review aims to contribute to this field by summarising the risk factors for AACE reported thus far.

Methodology: A systematic review was conducted with papers found in CINAHL, MEDLINE, Cochrane library and PubMed databases and other sources. Eligible studies investigating the risk factors for and clinical features of AACE in children and young adults were critically appraised before relevant data were extracted and discussed via a narrative summary.

Result: 12 studies were included in the final review with benign and non-benign risk factors for AACE being reported in six and eight papers respectively. Identified benign risk factors varied among studies, while non-benign risk factors were associated with intracranial pathologies, multiple sclerosis and head trauma.

Conclusion: Given the low generalisability of study findings, no definitive conclusions can be drawn on the significance of each risk factor on AACE development. Further prospective research with more objective measurements of 'near work', larger sample sizes and control groups is required to better ascertain any cause-effect relationship, refine the diagnostic criteria for each AACE subtype and advise on appropriate management guidelines for AACE.

00113 Synergistic Impact of Visual and Cognitive Impairments on Health-related Quality of Life in a Multi-Ethnic Asian Population

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Aims: The concomitant impact of visual impairment (VI) and cognitive impairment (CI) on health-related quality of life (HRQoL) in older adults is unclear. We aimed to determine the synergistic effect of baseline VI and CI on HRQoL decline at 6 years in multiethnic Asians.

Methodology: We included multiethnic Asians aged $\geq$60 years from the Singapore Epidemiology of Eye Diseases Study. HRQoL decline was defined as the difference in the composite European Quality of Life-5 Dimensions (EQ-5D) scores at baseline and 6-year follow-up and deemed clinically meaningful if the reduction was equal to or larger than the minimal clinically important difference (MCID). Multivariable linear regression assessed the independent associations and synergism ((-interaction) between baseline VI (presenting visual acuity >0.3 LogMAR) and CI (defined using the validated Abbreviated Mental Test) on EQ-5D decline.

Result: Of the 2,433 participants at baseline, 559, 120, and 151 had VI only, CI only, and both impairments, respectively. HRQoL decline in individuals with baseline comorbid VI-CI was clinically meaningful and was 2.0 times ((= -0.044, 95% confidence interval: -0.077 to -0.010) and 3.7 times ((= -0.065, 95% confidence interval: -0.11 to -0.022) larger than those with VI only and CI only, respectively. Importantly, there was a significant synergism ((-interaction = -0.048, 95% confidence interval: -0.095 to -0.001) between baseline VI and CI as predictors of HRQoL decline, suggesting that individuals having both conditions concurrently had a greater HRQoL reduction than the sum in those with VI alone and CI alone. The affected HRQoL domains included mobility and usual activities.

Conclusion: Concomitant VI-CI potentiated HRQoL decline to a greater extent than the sum of individual contributions of VI and CI, suggesting synergism. Rehabilitative interventions like the use of mobility aids and occupational therapy are needed to maintain HRQoL in older adults with concomitant VI-CI. Moreover, preventive interventions targeting at early detection and management of both VI and CI are warranted.

Table:

Associations between Visual Impairment, Cognitive Impairment, or Both at Baseline and Change in EQ-5D Index Score at 6-year Follow-up (N = 2433)				
Variable	Adjusted Marginal Mean ± SE	β[*] (95% Confidence Interval)	P-value	Ratio of Marginal Means[$]
Neither Impairment	-0.029 ± 0.005	Reference		Reference

VI Only	-0.046 ± 0.008	-0.017 (-0.035 to 0.001)	0.058	1.6
CI Only	-0.024 ± 0.017	0.005 (-0.030 to 0.039)	0.796	0.8
VI-CI Interaction	NA	-0.048 (-0.095 to -0.001)	0.044	NA
Both Impairments	-0.090 ± 0.016	-0.061 (-0.093 to -0.029)^	<0.001	3.1
Adjusted R^2		0.379		

Abbreviation: EQ-5D, European Quality of Life-5 Dimensions; VI, visual impairment; CI, cognitive impairment; SE, standard error; BMI, body mass index; NA, not applicable

* Adjusted for baseline age, gender, ethnicity, socioeconomic status, living alone, current smoking status, alcohol use, number of chronic medical conditions, BMI, and EQ-5D index score

$ Ratio between the model marginal mean (estimated absolute change in EQ-5D) to that in in the reference group (for example, the ratio of means of both impairments is equal to the marginal mean of both impairments divided by that of neither impairment ($3.1 = \frac{-0.090}{-0.029}$))

^ Significantly greater compared to baseline VI only (β = -0.044, 95% confidence interval: -0.077 to -0.010, p = 0.011, ratio of means $= \frac{-0.090}{-0.046} = 2.0$) and CI only ($\beta$ = -0.065, 95% confidence interval: -0.11 to -0.022, p = 0.003, ratio of means $= \frac{-0.090}{-0.024} = 3.7$)

The multiple linear regression model is represented as:

$$EQ5D_{t1} - EQ5D_{t0} = \beta_0 + \beta_1 \times VI + \beta_2 \times CI + \beta_3 \times VI \times CI + \beta_i \times covariate_i$$

From this equation, the VI-CI interaction term is $\beta_3 \times VI \times CI$. On the other hand, the term of both impairments is $\beta_1 \times VI + \beta_2 \times CI + \beta_3 \times VI \times CI$. Thus, the coefficient for VI-CI interaction is β_3 and the coefficient for both impairments is $\beta_1 + \beta_2 + \beta_3$.

00114 A Quality Improvement Project on Motor Sensory Assessment after Postoperative Spine Surgery

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Singapore General Hospital

Aims: Neurological observation following spinal surgery is a crucial part of post-operative care. A change of neurological observation is usually the first warning that the spinal cord function is suboptimal. There are several potential causes for loss of spinal cord function. The most common cause is either hematoma or over correction of spinal deformity. Early identification and prompt intervention are vital to prevent irreversible complications and minimize the risk of permanent spinal cord damage.

The goal is to improve the recognition of deteriorating neurology so that prompt intervention can prevent further deterioration of neurological function. The ultimate aim of this project is to increase the timely recognition of deteriorating neurology function in post spine surgery patients by 60% within 6 months.

Methodology: Using Plan-Do-Study-Act (POSA) quality improvement methodology, a multidisciplinary team was created to review early identification of patients. The team use evidence based practice to facilitate the development of policy, guideline and educational programme related to motor sensory assessment for nurses. The educational programme consists of online power point education module, quiz and self-learning video. Nurses who completed the online learning module were enrolled to practical assessment. The practical assessment involved the team on clinical teaching and competency assessment. Nurses deem competent once completed online learning and logged 3 cases.

Result: With the implementation of nurse led motor sensory assessment, 5 cases were identified from November 2022 to March 2023. All cases were identified within 24 hours by nurses. Out of 5 cases, 4 cases underwent surgical intervention. All of them have full neurological recovery.

Conclusion: Empowering the nurses to perform motor sensory assessment significantly increase the ability of them to identify any abnormal neurological findings. Ultimately, this improved patient outcome.

00115 Caregiver Education and Cognitive Stimulation Therapy for Patients with Dementia: A Preliminary Evaluation Study

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Changi General Hospital

Aims: The rapidly ageing world has contributed to an increasing prevalence of dementia and a need for dementia-related services. CGH's Engage programme is comprised of an evidence-based Cognitive Stimulation Therapy (CST) for patients with dementia (PwD), and dementia-related education for their caregivers (CPwD). These two interventional components are concurrently conducted. This study aimed to conduct a process evaluation of Engage.

Methodology: A pre-post study design was utilized to collect data at baseline and 6-week for PwD who had mild to moderate dementia, and CPwD enrolled in Engage. The CST comprised of six, two-hour weekly in-person themed (e.g., food) sessions of physical and cognitive group activities for PwDs. The CPwD education was designed to encourage a person-centred care approach to dementia-related matters, and comprised of six, two-hour weekly Zoom sessions on dementia topics that were delivered by a multidisciplinary healthcare team. The following questionnaires were administered at baseline and 6-week; Mini-Mental State Examination (MMSE) for assessment of cognitive impairment (higher scores indicated better cognitive functioning), the Zarit Burden Interview (ZBI) (higher scores indicated greater caregiver burden), and self-developed forms used capture CPwD' knowledge of dementia-related topics, and efficacy in engaging and managing their PwD symptoms (higher scores suggest greater levels of self-efficacy/knowledge). Additionally, a feedback form was administered to CPwD at 6-week. Nonparametric Wilcoxon signed rank test was used to compare pre and post measurements, and effect sizes (ES) were calculated. Using Cohen's suggested rule of thumb, ES were interpreted as small (d = 0.2), medium (d = 0.5), and large (d = 0.8).

Result: Overall, 22 PwD were enrolled, and 16 (72.7%) completed the programme (attended $\geqslant$ 3 sessions). Data of 16 patients and 8 caregivers who completed all baseline, and 6-week assessments were analysed. There was a trend towards more positive cognitive functioning (MMSE mean difference: 0.8, 95% CI: -0.6, 2.2, ES: 0.16). While caregivers reported improvements in dementia knowledge (knowledge mean difference: 1.5, 95% CI: 0.3, 2.7, ES: 0.15), self-efficacy (self-efficacy mean difference: 131.3, 95% CI: -49.5, 312.0, ES: 0.6), and decreased caregiver burden (ZBI mean difference: -2.5, 95% CI: -9.8, 4.8, ES: 0.3). All CPwD surveyed would recommend Engage to others, all felt the educational content was useful, and enjoyed the sessions.

Conclusion: Our preliminary findings suggest that the Engage programme may provide benefits for patients' cognitive functioning, with the potential to reduce caregivers' burden through enhancement of

dementia knowledge and self-efficacy. Additionally, Engage was well received among CPwD. However, strategies are needed to improve CPwD completion rates in future implementation. The current findings suggest that it might be useful to conduct a larger scale outcome evaluation in the future to conclusively determine the programme's effectiveness.

00116 Real-World Outcomes of Patients Receiving Different DES Platforms for PCI

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Aims: Current generation polymer-based zotarolimus-eluting stents (Resolute Onyx, Medtronic) have been shown to be an effective choice for PCI, including in high bleeding risk patients as well as in left main PCI. Data comparing clinical outcomes between different DES platforms however is limited. We aim to compare real-world clinical outcomes of patients who had received zotarolimus-eluting stents versus non-zotarolimus-eluting stents during PCI.

Methodology: Using a non-randomized, non-blinded observational registry, we compared the clinical outcomes of a real-world population of patients who had received zotarolimus-eluting stents during PCI to patients who had received non-zotarolimus-eluting stents during PCI from January 2020 to December 2021. We included all comers who had received DES during PCI at our centre. Patients who received only zotarolimus-eluting stents in the same vessel were recruited into the zotarolimus-eluting stent arm of the registry. Patients who received only non-zotarolimus-eluting stents in the same vessel were recruited into the control arm of the registry. Patients who received both within the same vessel were excluded. Patients were only recruited after PCI was completed and were followed up for a total of 12 months from the index procedure. Data was collected via electronic health records.

The primary endpoint was defined as target vessel failure (TVF), target vessel revascularization (TVR) or angiographically significant re-stenosis in a previously treated segment. The secondary endpoint was a combination of death, myocardial infarction, stent thrombosis and TVR at 30 days, 6 months and 12 months.

Result: Within the study period, 528 patients underwent PCI at our centre who fulfilled inclusion criteria. 219 patients belonged to the zotarolimus-eluting stent group while 309 patients belonged to the control group. Mean age was 60.3 ((11.6) years and 79.5% were male. Diabetes mellitus, hypertension and hyperlipidemia were present in 43.8%, 66.4% and 65.7% respectively. 3.2% had known congestive cardiac failure while 11.7% had known chronic kidney disease. There was no significant difference in baseline characteristics between the two groups.

Our registry demonstrated low rates of stent failure and major adverse cardiac events at one year. There were low rates of stent related complications and no differences in TVF and TVR between the two groups. There was one case of stent thrombosis in the zotarolimus-eluting stent group (0.5%) and two cases in the control arm (0.6%). Between the two groups, there were also no significant differences in the rates of all-cause mortality (2.9% vs 2.8%, p = 0.91, HR 1.06 [0.39-2.84]) and myocardial infarction (0.8% vs 0.9%, p = 0.90, HR 0.89 [0.15-5.33]).

Conclusion: Our study demonstrated low rates of major adverse cardiac events and no significant differences in clinical outcomes between patients receiving zotarolimus-eluting stents versus non-zotarolimus-eluting stents for PCI at one year.

00117 Supporting Self-Management: Understanding the Attitudes and Perceptions of Self-Management in Patients with Venous Leg Ulcers

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Aims: Venous leg ulcers (VLUs) are a rising problem in Singapore, with both its chronicity and increasing occurrence. One way of managing this population's wounds and reducing the burden on Singapore's healthcare system would be via self-management (SM). The aim of this research was to explore the attitudes, perceptions, and challenges towards SM among people with VLUs.

Methodology: A qualitative exploratory approach was adopted. Participants with active VLUs were recruited from the outpatient clinics in an acute care hospital via purposive sampling. Interviews were conducted with a semi-structured interview guide, exploring their motivations for health, perceptions of self-management and support-seeking behaviour. Braun and Clark's thematic analysis was used to analyse the audio recorded data.

Result: A total of 10 participants aged 50-75 were interviewed to reach data saturation. Four main themes emerged: Challenges of SM, Motivations behind SM, Adapting and Relationship with healthcare providers (HCPs). Challenges included physical limitations from pain or itch, restricted lifestyles from financial and physical constraints, and psychosocial impacts. Motivations for performing SM were focussed on acute symptoms, and participants were simply following instructions from HCPs rather than being motivated to perform SM themselves. Negative to neutral attitudes towards SM were also found, influenced by knowledge deficits and perception that treatment for VLUs were acute rather than chronic. However, most participants also showed a sense of responsibility for their wounds. Types of relationships with HCPs also affected patient's uptake of treatment, with positive relationships positively influencing patients and vice versa.

Conclusion: Current and future management of VLUs could place greater focus on the following areas: (i) reframing of patient's education to shift focus of treatment from "wound healing" to "living with ulcers", (ii) building trusting and supportive relationships to help patients better self-manage, and (iii) research into different educational interventions to reframe and increase knowledge of disease for patients.

00118 Evaluating the Risk Factors and Management of Urinary Catheter Leaks in Hospitalised Adult Patients: A Literature Review

Nanthakumahrie D/O Gunasegaran, Raden Nurheryany Binte Sunari, Fazila Aloweni, Teo Kai Yunn, Juriyah Yatim, Ang Shin Yuh

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Aims: To evaluate on the risk factors and recommended measures to prevent urine catheter leak in hospitalised adult patients

Methodology: Indwelling urine catheter associated leakage or catheter bypassing is a frequently experienced problem which requires appropriate healthcare intervention. A literature review was conducted. PubMed, UptoDate, and Medline were searched. International hospital guidelines, systematic reviews and primary studies that fit the inclusion criteria, and were published between 2010 and 2020 were retrieved. Exclusion criteria included dissertations, articles, editorials and research in a language other than English. Keywords and phrases used in the searches included: (i) adult patients on urine catheter; (ii) urine catheter leak; (iii) urine catheterisation in hospital.

Result: A total of 20 articles were retrieved, but only 16 met the inclusion criteria. The review identified various risk factors resulting in urine catheter leak or bypassing which include: (i) A large balloon may cause spasm, , pain, hematuria and possible erosion of the bladder wall; (ii)catheter blockage due to debris, blood clots or constipation, obstructed urine catheter (to check for kinks); (iii)Bladder spasm that caused bladder contractions due to UTI, irritation of the bladder due to using larger size urine catheter or concentrated urine (dehydration), or caused by diuretic medications; and (iv)overactive bladder or bladder stones. Recommended measure include: (i) not to deflate and re-inflate the balloon for troubleshooting, e.g., leakage, bypass of urine; (ii)urine catheter balloons should only be filled in line with manufacturers' guidelines. ; (iii) the smallest catheter size is recommended to reduce risk of bladder spasms, catheter bypassing and trauma; (iv) prevent overfilling the balloon which can cause leakage, discomfort and possible occlusion of the catheter eye; and (v) choosing the right urine catheter size according to patient's gender, the catheter's purpose, and the patient's anatomy.

Conclusion: It is important for healthcare professionals to be aware of the various risk factors that may result in the significant urinary leak and potential complications. Recommended measures can be integrated into the patient nursing care to prevent future urinary complications.

00119 Treatments to Prevent and Manage the Urinary Side Effects of Patients Receiving High-Dose Methotrexate: A Literature Review

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Singapore General Hospital

Aims: To examine the recommended treatments to prevent and manage the urinary side effects from the use of high dose methotrexate. 105,572,623,226

Methodology: High-dose of methotrexate has been used to treat a range of oncological malignancies. One of the common side effect is renal failure. A literature review was undertaken. PubMed, UptoDate, and Medline were searched. All international clinical practice guidelines, systematic reviews and primary studies that fit the inclusion criteria, and were published between 2010 and 2020 were retrieved. Exclusion criteria included dissertations, articles, editorials and research in a language other than English. Keywords and phrases used in the searches included: (i) high dose Methotrexate (MTX); (ii) urine toxicity; and (iii) urine pH abnormalities from use of high dose MTX.

Result: A total of 25 articles were retrieved, but only 14 met the inclusion criteria. The findings identified recommended treatment strategies: (i) patients with elevated serum creatinine or calculated Glomerular Filtration Rate (GFR) below 60 mL/min should not receive high dose MTX; (ii) avoid concomitant use of drugs that may inhibit renal elimination of MTX, such as non-steroidal anti-inflammatories (NSAIDs), salicylates and sulfa drugs; (iii) assess urine pH before starting MTX, and if pH < 7, continue alkalinizing regimen until urine pH > 7 before starting MTX; (iv) the MTX infusion must not start until the urine pH is above 7; and (v) maintain the urinary pH throughout the MTX infusion until the MTX level is 0.1micromol/L or below.

Conclusion: High dose of Methotrexate increased the risk of acute kidney injury. Close monitoring of MTX level throughout the administration, serum creatinine, urine pH and urine output are crucial during the therapy to monitor the side effects on the patients' kidney function.

00120 Monitoring the Risk of Hypoglycaemia and Hyperglycaemia Post Hyperkalaemia Treatment: A Literature Review

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Aims: To evaluate hyperglycaemia and/or hypoglycaemic effect post treatment of hyperkalaemia

Methodology: Hyperkalaemia treatment allows the shifting of potassium inside the cells. The most common approach is by administrating intravenous insulin and dextrose which may cause an increase or decrease in serum glucose levels. A literature review was undertaken. PubMed, Medline, CINAHL, Cochrane Library and UptoDate were searched. All clinical protocol and international hospital guidelines, systematic reviews and primary studies that fit the inclusion criteria, and were published between 2010 and 2020 were retrieved. Exclusion criteria included dissertations, articles, editorials and research in a language other than English. Keywords and phrases used in the searches included: (i) hypoglycaemia and hyperkalemia; (ii) hyperglycaemia and hyperkalaemia and (iii) adult patients receiving treatment for hyperkalaemia.

Result: A total of 30 articles were retrieved, but only 18 met the inclusion criteria. The review identified he risk factors of hypoglycaemia related to hyperkalemia treatment which include: non-diabetic status (no diabetes history and no diabetic medication), low body weight, older age >60years old, low pre-treatment blood glucose and patients with renal impartment. Recommended guidelines include: (i) blood glucose and other monitoring such as potassium level, ECG and urine output should be monitored after the treatment of hyperkalemia; (ii) Special precaution must be taken for patients with chronic kidney disease and patients with no prior history of DM (greater insulin insensitivity); (iii) monitor capillary blood glucose immediately after administration of the hyperkalemia kit, then 15 and 30 minutes, subsequently hourly interval for the next 6 hours, or close monitoring of blood glucose for a least 3 hours.

Conclusion: Hypoglycemia is a recognized complication of this treatment whereas, hyperglycemia from glucose infusions can drive potassium out of the intracellular space, leading to hyperkalemia. Therefore, nurses have to be cautious and monitor blood glucose level as per recommendation.

00121 Neurovascular Assessment and Management of Patients on Casts or Backslab - An Evidence-based Review

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Singapore General Hospital

Aims: To evaluate the neurovascular assessment and management of patients on casts/backslab.

Methodology: Neurovascular deficit can have significant effect on the patient's functional ability and overall outcome with severe risks such as limb amputation. PubMed, Medline, and UptoDate were searched in this review. International hospital guidelines, systematic reviews and primary studies that fit the inclusion criteria, and were published between 2013 and 2022 were retrieved. Exclusion criteria included dissertations, articles, editorials and research in a language other than English. Keywords and phrases used in the searches included: (i) patients on casts/backslab; (ii) neurovascular assessment in patients on casts/backslab; and (iii) neurovascular abnormalities and/or pressure injury related to casts/backslab.

Result: A total of 30 articles were retrieved, but only 18 met the inclusion criteria. The components of the neurovascular assessment include: (i) pulses, capillary refill, skin colour, temperature, sensation, and motor function; (ii)Pain and oedema are also assessed during this examination; and (iii)comparison of bilateral extremities. The frequency of neurovascular assessment must be performed prior to the application of cast/backslab, hourly for the first 24 hours' post-application. Subsequently, if there is no change to a patient's condition, neurovascular assessments can be done every 4 hours or increased in frequency ½ hourly if abnormalities are suspected. During handover, nurses should perform a neurovascular evaluation together. The skin under and around a medical device, such as a cast or backslab, should be inspected at least twice daily forsubtle changes in skin appearance and action to be taken to prevent these changes from progressing to major harm. If removing the casts/backslab is not possible, patients should be asked about any altered sensation or pain in the area underneath the casts. Documentation based on the assessment frequency and when any deviation occurs is vital.

Conclusion: Neurovascular assessment is vital and must be performed prior application of cast/backslab and continued during the period of use. Immediate actions are required if abnormalities are suspected.

00122 Guidelines of Extravasation of Non-Cytotoxic Vesicant Drugs - A Literature Review

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Aims: To evaluate the recommended management guidelines of extravasation of non-cytotoxic vesicant drugs.

Methodology: Extravasation of non-cytotoxic drugs is a complication of intravenous administration through central and peripheral venous catheters. This can result in serious complications affecting patients physically and psychologically. A literature review was undertaken. PubMed, UptoDate, and Medline were searched. All international clinical practice guidelines and systematic reviews that fit the inclusion criteria, and were published between 2011 and 2021 were retrieved. Exclusion criteria included dissertations, articles, editorials and research in a language other than English. Keywords and phrases used in the searches included: (i) intravenous (ii) non-cytotoxic drugs; and (iii) management of extravasation from IV non-cytotoxic drugs.

Result: A total of 20 articles were retrieved, but only seven met the inclusion criteria. The findings identified recommended management guidelines: (i) When extravasation of an irritant or vesicant drug is suspected the following initial management is recommended: stop the infusion immediately, do not flush the line, and avoid applying pressure to the extravasated site, for peripheral sites (peripheral cannula, midline); (ii)for peripherally inserted central catheters, elevate the affected extremity and do not remove the catheter/needle immediately. It should be left in place to attempt to aspirate fluid from the extravasated area and to facilitate the administration of an antidote to the local area, if appropriate, and if an antidote is not injected into the extravasation site, the peripheral catheter/needle can be removed after attempted aspiration of the subcutaneous tissues; (iii) topical application of ice or cold packs is recommended as it reduces local inflammation and pain. Cold compress should be done 15 minutes four times daily for three days; (iv)heat is generally recommended for the usage of vinca alkaloids or epipodophyllotoxins. Local heating results in localized vasodilation and increased blood flow, thereby enhancing the early, distributive phase of drug removal.

Conclusion: When extravasation occurs, healthcare staff should stop the intravenous infusion immediately and refer to the grading system for appropriate management. Immediate management and close monitoring is critical to prevent further complications.

00123 Oral Care Practices of Conscious and Highly Dependent Patients in the Acute Care Setting: An Evidence Review

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Aims: To examine on the oral care practices for conscious but dependent patients in the acute care setting.

Methodology: Effective oral care is important for hospitalized patients to maintain healthy oral cavity. It may be difficult to ensure oral care for dependent patients. PubMed, UptoDate, and Medline were searched in this review. International clinical practice guidelines, systematic reviews and primary studies that fit the inclusion criteria, and were published between 2007 and 2021 were retrieved Exclusion criteria included dissertations, articles, editorials and research in a language other than English. Keywords and phrases used in the searches included: (i)oral suctioning to remove excess secretion or removing food particles in the mouth and providing oral hygiene; (ii) use of oral airway during oral care; (iii) alternatives use to mouth guards; and (iv) complications or adverse effects (vomiting, gagging, broken teeth, trauma); (v) effectiveness of oral care.

Result: A total of 25 articles were retrieved, but only 17 met the inclusion criteria. Recommended strategies included engaging in role-play to practice problem-solving of common challenging behaviours such as limited mouth opening, exaggerated bite and gag reflex. Oropharyngeal suctioning is indicated for removing secretion in patients with poor or an impaired cough reflex. This includes patients who have an altered conscious state, are weak, or neurologically impaired. However, nasopharyngeal suctioning may be a better option if access to the mouth is difficult. The use of devices such as finger guards and bite blocks may also be used to assist patients who clench their jaws or bite toothbrushes; however, health care providers must be trained to use and choose the right type of mouth props. Alternatively, a towel, swab or foam stick can be used if the patient cannot open the mouth.

Conclusion: Health care providers need to be trained in providing oral care to patients with cognitive impairment or behavioural complexity. In general, a thorough assessment by physiotherapist, speech therapist, occupational therapist, dentist, and nurses is paramount in determining the risk of aspiration and the device for effective and safe oral care.

00124 Recommended Guidelines on Serving Oral Cytotoxic Medication for Patients on Nasogastric Tube in the Acute Care Setting: A Literature Review

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Aims: To evaluate on the oral cytotoxic medications which cannot be crushed or cut for patients on nasogastric tube. 93,655,882,308

Methodology: Crushing, cutting and administering oral table chemo-drugs via the enteral tube is classified as a high risk exposure to healthcare workers. A literature review was carried out. PubMed, UptoDate, and CINAHL were searched. International hospital guidelines, systematic reviews and primary studies that fit the inclusion criteria, and were published between 2010 and 2020 were retrieved. Exclusion criteria included dissertations, articles, editorials and research in a language other than English. Keywords and phrases used in the searches included: (i) patients on NGT prescribed with oral tablet chemo-drugs; (ii) methods of administration of oral tablet chemo-drugs; (iii)maintain drug effectiveness and staff's safety when handling oral tablet chemo-drugs.

Result: Crushing, cutting and administering oral table chemo-drugs via the enteral tube is classified as a high risk exposure to healthcare workers. A literature review was carried out. PubMed, UptoDate, and CINAHL were searched. International hospital guidelines, systematic reviews and primary studies that fit the inclusion criteria, and were published between 2010 and 2020 were retrieved. Exclusion criteria included dissertations, articles, editorials and research in a language other than English. Keywords and phrases used in the searches included: (i) patients on NGT prescribed with oral tablet chemo-drugs; (ii) methods of administration of oral tablet chemo-drugs; (iii)maintain drug effectiveness and staff's safety when handling oral tablet chemo-drugs.

Conclusion: A closed system is preferred for crushing cytotoxic medication, as it avoids environment contamination and exposure of nurses to the hazardous particles. A proper administration of drug via enteral feeding should include dilution/flushes using sterile or purified water to tap water before and after the administration to ensure the total dose is administered.

00125 Recommended Guidelines and Risk Factors of Patients Undergoing Radiological Procedures with Intravenous Contrast: A Literature Review

Fazila Aloweni, Lim Siew Hoon

Singapore General Hospital

Aims: To examine the need for a dedicated IV cannula when administering IV contrast before radiological investigations

Methodology: Patients experienced potential risk when undergoing radiological investigations which require intravenous (IV) contrast. A literature review was undertaken. PubMed, Medline, and CINAHL were searched. All international hospital guidelines, systematic reviews and primary studies that fit the inclusion criteria, and were published between 2009 and 2019 were retrieved. Exclusion criteria included dissertations, articles, editorials and research in a language other than English. Keywords and phrases used included: (i (1) dedicated peripheral IV cannula for IV contrast; (ii) common peripheral IV cannula to administer both IV contrast and other IV medications; (iii) peripheral IV cannula related complications; and (iv)extravasation and phlebitis.

Result: A total of 50 articles were retrieved, but only 25 met the inclusion criteria. The findings identified patient-related risk factors of extravasation including female children, low conscious level, older age >60years old and difficult IV access. Clinical-related risk factors include, frequent vein punctures, history of radiation therapy in concerned area, chemotherapy, little muscle mass, and atrophy of subcutaneous tissue, lymphedema, limb swelling and arterial or venous insufficiency to affected limb. Cannula-related risk factors include use of an existing cannula inserted prior to radiological procedures, faster infusion rate, venous access at dorsum of the hand/ deep brachial IV catheter sites, length of catheter dwell time, use of power injection and higher contrast media viscosity.

The recommended outcomes and guidelines suggested: (i)to use a peripheral cannula that is ≥20 gauge; (ii) placement of cannula in a large arm vein or at the antecubital site; (iii) evaluate access through aspiration to determine blood return and followed by normal saline flush; (iv) choose an alternative contrast injection site or ensure site monitoring during injection when experience failure in blood return or resistance on flushing; (v)peripheral vascular access device site must be changed within 24 hours of injection of a second vesicant.

Conclusion: There was no mention for a dedicated IV cannula to administer IV contrast. Nevertheless, careful consideration and precautions are needed when patients are presented with any of the risks factors mentioned.

00126 Factors Affecting Immune Response to the Herpes Zoster Vaccine in the Elderly Population

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Aims: Vaccination has been an effective public health tool to prevent infectious diseases. While childhood vaccination has greatly reduced the incidence of diseases such as measles, vaccination in the elderly has produced less stellar results, due in large part to immunosenescence. The increasing trend in life expectancy globally underscores the need to understand how vaccine immunogenicity and hence efficacy can be maximised in the elderly. In this study, we compared whole blood gene expression response to recombinant zoster vaccine (Shingrix) against the live attenuated zoster vaccine, vaccine efficacy of which were >90% and ~50%, respectively, in the older adults.

Methodology: Healthy adult volunteers 50 – 65 years of age with serologically confirmed history of chickenpox were enrolled following written informed consent and were randomised to receive either one dose of Zostavax or 2 doses of Shingrix. The volunteers were followed up until 30 days after the last dose of vaccination to monitor for local and systemic adverse events. At pre-defined timepoints, blood samples were collected for anti-VZV antibody titre, T-cell responses, inflammatory cytokine profiling and gene-expression studies.

Result: A total of 34 volunteers were randomised to receive either Zostavax (n = 17) or Shingrix (n = 17). We found higher antibody response against VZV even after just the first dose of Shingrix compared to Zostavax. Transcriptomic analysis revealed activation of antiviral signatures at day 1 after Shingrix vaccination; notable signature includes activation of myeloid cells, antigen presentation, activated T-cell migration and cell cycle. Likewise, cytokines involved in myeloid cell activation, recruitment, trafficking were significantly up regulated in the Shingrix group at day 1 post-vaccination. These same responses were subdued among recipients of the Zostavax vaccine. We also identified pathways involved in protein transportation and mitochondrial ATP synthesis to be uniquely associated with high antibody response following Shingrix vaccination. Detailed T cell analysis is currently under way.

Conclusion: Our results suggest vaccines/adjuvants that augment innate immune responses, particularly myeloid cell activation and the mitochondrial activation in B cells, could be useful in enhancing immunogenicity and the protective effects of vaccines in the elderly.

00127 Understanding Clinical Educators' Perspectives on Barriers in the Use of Synchronous Online Teaching in Nursing Education

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Aims: Synchronous online learning has gained its value in nursing education. The pandemic has affected how teachers conduct face to face classes. It demands teachers to adopt online learning practices. Study aims to identify the teaching barriers of developing synchronous online teaching from clinical educators' perspective and seeks solutions to overcome these barriers.

Methodology: A qualitative research using thematic analysis approach with Community of Inquiry (COI) framework. Purposive sampling with 10 participants out of 24 Clinical Educators from Nursing training department, Singapore General Hospital were interviewed.

Result: The study identified sub elements in the elements and categorized barriers based on COI framework. Element 1: Teacher's Presences - Readiness of the teacher and process of teaching. Element 2 Cognitive Presences - Being Prepared and Cognitive Delivery. Element 3, Social presences - student interaction and setting online environment, logistic consideration and organizational support.

Conclusion: Interactive and engaging teaching process were appreciated in order to deliver content appropriately. Teachers' readiness to use technological tools and provide proper instructions to the students shows a remarkable impact. A central repository would be resourceful. Blended learning to achieve better effectiveness in online education. Organization support and logistic consideration needs to be managed as well.

00128 APN-led Polyp Follow-Up Virtual Clinic: A Look at Patient Satisfaction

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Aims: To review the Advanced Practice Nurse (APN)-led polyp surveillance follow-up virtual clinic for post-polypectomy, assessing the impact on patient satisfaction.

Methodology: The virtual clinic started in February 2021. The APN conducted the virtual clinic according to workflow. All reviews and outcomes were recorded on the hospital's clinical documentation systems and the patients would receive the full report via email. A feedback link was provided to the patients following the completed virtual clinic session.

Result: 274 patients were seen virtually from February 2021 to December 2022. After review, 167 (60.9%) were discharged to the polyclinic and 108 (39.1%) remained on follow-up with colorectal surgeons. The number of patients who responded to the feedback was 109 (40%). Most of the patients were satisfied with the virtual clinic, with average scores greater than three for most of the components of the questionnaire, such as, video quality rating at 74%, looking out for information at 95%, and trust with the APN was 98%.

Conclusion: This review was able to provide results associated with patient satisfaction and overall experience when participating in virtual clinic. APNs can apply their skills and experience to create a supportive telehealth environment for patients and families as well as promote the use of virtual health technologies. Patients can save time and money from having to visit a provider in person.

00129 Antagonizing TAAP001 Promotes Acute Pancreatitis Recovery via Akt-Mediated CCKAR Upregulation in Acinar Cells

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Aims: Acute pancreatitis (AP) is an inflammatory disease of the exocrine pancreas that is the leading cause of gastroenterology-associated hospital admissions worldwide. Advances in targeted AP therapeutics are lacking, and many individuals who suffer from AP have an increased likelihood of developing other exocrine and endocrine pancreatic disorders.

TAAP001 is a multifunctional protein with established roles in various inflammatory diseases. This study aims to investigate the functional role of TAAP001 in AP progression and develop TAAP001-targeted AP therapeutics.

Methodology: Serum was collected from human patients with and without AP. Repeated administration of cholecystokinin analog, caerulein was used to induce AP in wild-type and TAAP001-deficient mice. Primary acinar cells were also isolated from mice for in-vitro cell-based studies.

Result: TAAP001 is markedly increased in the serum of human patients with AP and in a caerulein-induced AP mouse model. We further showed that acinar-cell derived TAAP001 is critical in AP development, where TAAP001 deficiency exacerbated AP-induced acinar cell damage and inflammatory response. Mechanistically, TAAP001 functions via inhibiting TGFβ/ALK5/AKT signaling in acinar cells to downregulate the expression of cholecystokinin Type A receptor (CCKAR), a crucial initiator of AP injury.

Interestingly, CCKAR is also essential during pancreatic regeneration following injury, and our study further demonstrated that TAAP001-deficient mice also exhibited accelerated AP recovery despite more severe initial damage. Indeed, the administration of TAAP001 neutralizing antibody at the peak of caerulein-induced AP injury induced CCKAR expression and pancreatic regeneration in mice.

Conclusion: Targeting TAAP001 may thus be an attractive strategy for AP treatment.

00130 Routine Fetal Cell-Free DNA (cfDNA) Non-Invasive Prenatal Testing (NIPT) Application in a Tertiary Hospital

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Aims:
1. To investigate the clinical performance of NIPT in Singapore
2. To determine if NIPT is more appropriate to a subset of patients

Methodology: Peripheral blood samples were collected from expectant mothers and sent to KK Women's and Children's Hospital for NIPT test. All high-risk samples had confirmatory karyotyping performed at the Cytogenetics Laboratory, SGH via amniocentesis or chorionic villi sampling, which is also available for low-risk patients. NIPT results from 2017 to 2021 were compared with karyotype and other diagnostic analysis results.

Result: A total of 1708 NIPT requests were made, among which 1696 were resulted, giving a success rate of 99.3%. Twenty high-risk pregnancies were reported, among which 17 underwent diagnostic testing. Ten of them were concordant with NIPT, including 9 autosomal trisomies and one microdeletion at 22q11.2. Among low-risk cases, 24 patients opted for further testing. One case was found to be false negative with a complex rearrangements involving chromosome 18 and a marker chromosome as revealed by karyotyping. Based on the 41 cases with both NIPT and diagnostic testing results, NIPT demonstrated a sensitivity of 90.91% and a specificity of 76.67%. Negative predictive values of NIPT was high at 95.83% whereas the positive predictive value was low at 58.82%. Fetal cfDNA was found to be significantly lower in groups with advanced maternal age and higher body mass index, respectively. However, there was no obvious trend with gestational age.

Conclusion: NIPT detection rate was superior for autosomal trisomies as compared to 22q11.2 microdeletion and sex chromosome aneuploidy. False positive and false negative arise inevitably. Hence cases with high-risk NIPT still require confirmation via invasive diagnosis.

00131 Evaluation of the APN-led On-Call Service at the Adult Ambulatory Chemotherapy Center (AACC) at KKH

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KK Women's and Children's Hospital

Aims: To provide prompt response and management of patients' conditions changes and avoid chemotherapy delays in AACC at KKH

Methodology: In chemotherapy treatment, patients may require medical review before, during, or after the treatment, particularly for hypersensitivity reactions that require immediate attention. However, it can be challenging to provide accessible medical coverage as Medical Oncologists (DMOs) are not always on-site. In 2009, Gynae-oncology APNs collaborated with DMOs to implement an on-call service that has continued since.

In 2023, surveys were conducted to assess the experiences of AACC nurses and DMOs using a 10-point grading scale. DMOs were asked four questions on their awareness, confidence in APNS' management and patient safety, comments. Apart from these question, the Nurses were also asked on the APNs promptness in response, trustworthiness and the comfort level in APN activation.

Other outcomes included APNs' response time, the number of patients reviewed, code blue activation and ICU admission from 2017-2022.

Result: Over the past 5 years, APNs reviewed 1,300 patients, 25% of them experienced hypersensitivity reactions. There were no instances of code blue or ICU admissions during this period, and the average response time to be activated was between 0-2 minutes. DMOs acknowledged APNs are crucial links for the team and patients as APNs are equally capable in provided safe and quality care. In view of this, DMOs has recommended to extend their practice in medical oncology service.

See survey findings figure1.
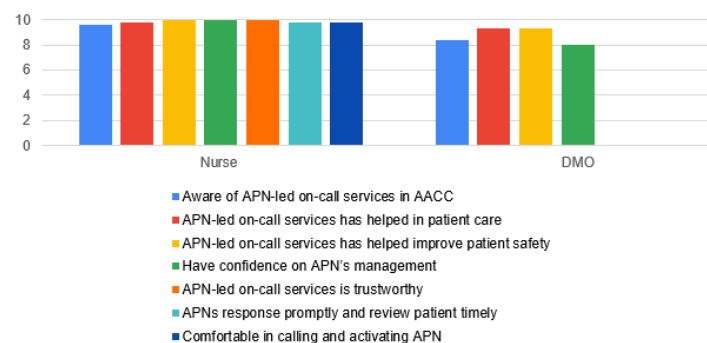
Figure 1. Survey results.

Conclusion: APNs have been successful in providing prompt response and proper management to patients who require urgent medical review in AACC, thus preventing critical events and improving patient outcomes. As a result, they have gained the trust and confidence of DMOs and nurses in their medical coverage service at AACC.

00132 The Impact of EUSFNB Using Procore Needles for Microsatellite Instability Assessment in Unresectable Pancreatic Adenocarcinoma

Francis Teh Kok Ban, Ang Tiing Leong, Wang Lai Mun, Andrew Kwek Boon Eu, James Li Weiquan, Kenneth Lin Weicong, Nicholas Tee Chin Hock

Changi General Hospital

Aims: Pancreatic adenocarcinoma has a poor prognosis with an overall 5-year survival rate of 10% as most patients present with unresectable or metastatic disease. Evaluation of microsatellite instability (MSI) or deficient DNA mismatch repair (dMMR) status can tailor treatment to increase the efficacy of systematic therapy. However, the adequacy of tissue samples obtained by routine endoscopic ultrasound-guided fine needle biopsy (EUSFNB) of pancreatic adenocarcinoma for MSI/dMMR assessment remains unclear. This study evaluated the role of EUSFNB using the Procore (Cook Medical) biopsy needles for MSI/dMMR assessment.

Methodology: This was a single-centre study which reviewed patients with suspected pancreatic adenocarcinoma who underwent diagnostic EUSFNB in a tertiary referral centre using either 20G or 22G Procore needles from January 2022 to March 2023. The newer 20G Procore needle was designed with a forward side-bevel, whereas the 22G needle had a reverse side-bevel, for tissue core acquisition. Clinical data and characteristics of lesions in all patients undergoing EUSFNB in the participating site are prospectively maintained in a registry for quality control and audit purposes. All cases of adenocarcinoma were tested for MSI/dMMR status by immunochemistry (MLH1, MSH2, MSH6 & PMS2). The primary study outcome measure was the adequacy of tissue sample for MSI/dMMR testing. Secondary outcomes were the rate of histological core tissue acquisition, the difference in the adequacy of tissue for MSI/dMMR testing between 20G and 22G Procore needles and the rate of MSI-high pancreatic adenocarcinoma. The impact of the use of these needles in obtaining adequate tissue on patient management was also evaluated.

Result: A total of 31 patients (mean age 68.2 SD± 8.17; 51% male) with pancreatic adenocarcinoma were included in the study. The mean for the pancreatic mass was 33.17 SD±20.4 with most of the pancreatic mass located at the pancreatic head, uncinate, and neck region 70% (21/31). The histological yield of EUSFNB was 100%. Overall tissue adequacy rate for MSI/dMMR assessment was 80% (25/31) and this was higher with 20G compared to 22G Procore needles (88.8%;16/18 vs 69.2%;9/13, p-value = 0.207). Two of the 23 patients with successful MSI/dMMR testing (8.7%) had MSI-high status. One received second-line treatment with pembrolizumab, and the other received best supportive care due to worsening liver function and poor functional status.

Conclusion: This study affirmed the feasibility of routine MSI testing from specimens acquired by EUSFNB using the Procore EUSFNB needles. Our results also suggested that the larger 20G Procore needle with forward side-bevel had a higher yield for MSI testing than the 22G needle with reverse side-

bevel, even though both needle types could obtain tissue cores for histology, and this should be reassessed by a further study with larger sample size that is adequately powered.

00133 Circulating Metabolites and Cardiovascular Disease in Asians with Chronic Kidney Disease

Cai Jiashen[1], Crystal Chong Chun Yuen[2], Ching Yu Cheng[2], Cynthia Ciwei Lim[1], Charumathi Sabanayagam[2]

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Aims: Chronic kidney disease (CKD) is a growing public health problem with significant burden of cardiovascular disease and mortality. The risk of cardiovascular disease in CKD is elevated beyond that predicted by traditional risk factors, suggesting that other factors may account for this increased risk. Through metabolic profiling, this study aimed to investigate the associations between serum metabolites associated with prevalent cardiovascular disease in Asians with CKD to provide insights into the complex interactions between metabolism and cardiovascular disease in kidney disease

Methodology: This was a single-center cross-sectional study of 1122 individuals from three ethnic cohorts in the population-based Singapore Epidemiology of Eye Disease (SEED) study aged 40-80 years with CKD (estimated glomerular filtration rate <60 mL/min/1.73 m2). Nuclear magnetic resonance (NMR) spectroscopy was used to quantify 228 metabolites from participants' serum or plasma. Multivariate logistic regression identified metabolites independently associated with cardiovascular disease in each ethnic cohort. Metabolites with the same direction of association in all three cohorts were selected and those significantly associated with cardiovascular disease after Bonferroni correction were meta-analyzed.

Result: Cardiovascular disease was present in 275 (24.5%). Participants with cardiovascular disease tend to be male, of older age, with hypertension, hyperlipidemia and diabetes; with lower systolic and diastolic blood pressure (BP), high-density lipoprotein (HDL)- and low-density lipoprotein (LDL)-cholesterol than those without cardiovascular disease. After adjusting for age, sex, systolic blood pressure, diabetes, total cholesterol and HDL-cholesterol, 10 lipoprotein subclass ratios and 6 other metabolites were significantly associated with prevalent cardiovascular disease in at least one cohort. Meta-analysis with Bonferroni correction for multiple comparisons found that lower tyrosine, leucine and valine concentrations and lower cholesteryl esters to total lipid ratio in intermediate-density lipoprotein (IDL) were associated with cardiovascular disease.

Conclusion: In Chinese, Malay and Indian participants with CKD, prevalent cardiovascular disease was associated with tyrosine, leucine, valine and cholesteryl esters to total lipid ratios in IDL. Increased cardiovascular risk in CKD patients may be contributed by altered amino acid and lipoprotein metabolism.

00134 Computer Aided Detection (CADe) of Colonic Polyps during Colonoscopy Reduces Cancer-Related Healthcare Cost – A Cost Effectiveness Analysis

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Aims: Colonoscopies have been used as the gold standard screening method for the detection of pre-malignant neoplastic lesions of the colon. Our previous studies into artificial intelligence (AI)-aided colonoscopies found significant improvements in adenoma detection rates in a 1-year period as compared to baseline. As an expansion, this study evaluates the cost effectiveness of AI-aided colonoscopy in the same institution.

Methodology: A decision tree model was constructed based on the cost of the GI Genius™ Intelligent Endoscopy Module, US-DG-2000309 © 2021 Medtronic. The average cost of the GI Genius™ Intelligent Endoscopy Module was calculated over a one year period to find out the additional cost incurred per patient as compared to a non-AI aided colonoscopy. The probability of various outcomes were compared between AI-aided colonoscopies and non-AI aided colonoscopies. Outcomes compared includes the discovery of a polyp, the discovery of early stage colorectal cancer (Stage I/II) and the discovery of late stage colorectal cancer (Stage III/IV). The relative difference in costs and probabilities were then used to calculate the Incremental Cost Effectiveness Ratio (ICER) to determine the cost effectiveness of subscription to the AI program.

Result: Over an average one-year period, the ICER was calculated as the ratio between the total cost of all possible outcomes from AI-aided colonoscopies against that of non-AI-aided colonoscopies. The ICER calculated was 0.72 (<1). This suggests that AI-aided colonoscopy using GI Genius™ Intelligent Endoscopy Module is cost-effective relative to non-AI-aided colonoscopy in terms of cancer-related costs expected and thus justifies subscription to the AI program.

Conclusion: Routine use of AI-aided colonoscopy is a cost-effective means of improving pick-up rate for adenomas and detection of earlier colorectal cancer.

00135 Understanding Outpatient Radiology Non-Attendance In Singapore: A Qualitative Study

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Aims: The rising demands for radiological services compel radiology practices to explore outpatient non-attendance due to the need in balancing hospitals' costs and resources and patient care requirements. This study aims to explore the underlying factors that affect radiology outpatients' motivation and the impact of these variables on patient non-attendance.

Methodology: Following purposive sampling, 30 participants participated. Participants were eligible if they were 18 years or above, had an existing radiology appointment (September 2022 to March 2023) and English literate. Participants who relied on third party assistance to attend the appointment such as from nursing homes and prison services were excluded. Interviews were conducted over the phone, recorded and transcribed verbatim. Informed consent and ethics approval were sought. Analysis was guided by Braun and Clarke's thematic analysis approach and drawing on techniques from grounded theory, such as line-by-line coding using NVivo software.

Result: The results revealed four main themes: (i) patient barriers, (ii) provider barriers, (iii) patient motivators, (iv) provider motivators, and 16 sub-themes that stemmed from these themes.

Barriers		Motivators	
Patient	Provider-related	Patient	Provider-related
Concerns on procedural risks and discomfort.

Misalignment of patient's needs/expectations of radiology procedure.

Work, family or other commitments

Financial challenges.

Transportation difficulties. | Lack of communication or unprofessional healthcare staff behaviour.

Inefficiencies of appointment booking system (inconvenient or rigid scheduling).

Lengthy appointment wait time. | Family and friends support and influence to attend appointment.

Perceived benefits of radiology appointments for confirming a diagnosis, follow up, formulating treatment plan or for assurance.

Perceived severity of consequences to medical conditions due to missed appointment | High level of trust in and good patient-provider relationship.

Good provider reputation due to prior positive patient experience.

Strategic provider location makes healthcare accessible to patients.

Effective appointment reminder system. |

Forgetfulness about appointment due to long wait.			

Conclusion: The findings highlight that multiple reasons influence an individual's decision to turn up for their appointments and providers' play pivotal role in eliminating the barriers to attendance. Patient-provider relationship, healthcare institutional reputation and effective communication motivate attendance. To alleviate concerns on affordability of radiology services, awareness of the availability various financial aids may increase appointment adherence. Targeted appointment reminder intervention to cover different patient population as well as diversification in the modes and timings where these reminders are employed may be considered. An understanding of attendance behaviours and patients' perspective towards radiology services will enable appropriate strategies to be implemented into routine practice to mitigate the negative impact of patient non-attendance.

00136 False Positive Computer-aided Diagnosis Predictions during Colonoscopy: Clinical Characteristics and Effects on Polyp Surveillance Recommendations from a Multi-Centre Study

Li Weiquan James[1], Lee Wei Jie Jonathan[2], Clement Wu Chun Ho[3], Liang Fueng Hin Raymond[4], Kenneth Lin Weicong[1], Christopher Khor Jen Lock[3], So Bok Yan, Jimmy[2], Ang Tiing Leong[1]

[1]Changi General Hospital, [2]National University Hospital, [3]Singapore General Hospital, [4]Tan Tock Seng Hospital

Aims: Computer-aided diagnosis (CADx) systems for automated prediction of polyp histology provide real-time binary outputs of "neoplastic" and "hyperplastic" to guide clinical decision-making. The magnitude and clinical relevance of false positive predictions of polyp histology in colonoscopy in a clinical setting has not been studied. The clinical characteristics of false positive CADx predictions and how it affects polyp surveillance intervals are also unknown.

Methodology: Patients more than 40 years old with indications for colonoscopy were recruited to undergo colonoscopy using a CADx system (Fujifilm Corp., Tokyo) in four large tertiary referral centres. False positive CADx predictions were defined as non-adenomatous and non-hyperplastic polypoid lesions for which the CADx system generated a definite output for predicted histology during colonoscopy. All polyps which had a CADx prediction generated were resected for final histology, which formed the reference standard for polyp surveillance intervals according to US Multi-society Task Force (USMTF) and European Society of Gastrointestinal Endoscopy (ESGE) guidelines. Polyp characteristics and patient demographics were recorded in the study. The frequency and characteristics of false positive CADx predictions were analysed on a per-polyp level, while its effect on polyp surveillance intervals were interpreted on a per-patient level.

Result: 775 polyps had an automated CADx prediction in 326 patients between February 2021 and October 2022. 8.9% (69/775) were false positive CADx predictions in 51 patients (15.6% of patients; mean age 61.8 ± 9.0 years; 43.1% female). 20.3% (14/69) and 79.7% (55/69) of the false positive CADx predictions were "neoplastic" and "hyperplastic", respectively. The mean polyp size for false positive predictions was 3.3 ± 1.7mm. Final histology for false positive predictions were polypoid mucosal folds (84.1%; 58/69), inflammatory polyps (8.7%; 6/69), juvenile polyps (2.9%; 2/69), lipomas (2.9%; 2/69) and leiomyoma (1.4%; 1/69). False positive CADx predictions overestimated the recommended polyp surveillance interval for patients based on final histology in 9.8% (5/51) according to USMTF guidelines and 2.0% (1/51) according to ESGE guidelines.

Conclusion: False positive CADx predictions were seen in 8.9% of polyps and 15.6% of patients in our study. The false positive detections occurred mainly in diminutive polyps. While an output of "hyperplastic" accounted for most of these false positive predictions, there were also "neoplastic"

outputs generated which resulted in an overestimation of the recommended surveillance intervals in 9.8% and 2.0% of affected patients according to USMTF and ESGE guidelines, respectively.

00137 Morphometric Analysis of Distal Interphalangeal Joints in Singapore: A Radiographic Study

Wong Yoke Rung[1], Khian Wan Sarah Joy Huan[2], Teng Shi Lei[1], Chuang Xue Ling[2], Rebecca Lim Qian Ru[1]

[1]Singapore General Hospital, [2]Ministry of Health

Aims: Our study aims to determine the nominal dimensions of patients' middle and distal phalanges of all five digits in Singapore via radiographic measurement. This will be compared to other populations in South East Asia and analysed in comparison with the smallest currently available implant.

Methodology: Standard anterioposterior and lateral normal radiographs of 250 fingers from adult Singaporean patients were obtained, and the diameters of the middle and distal phalanges were measured on both images. The middle phalanx was measured as the narrowest diameter of the medullary canal, while the distal phalanx was measured as the narrowest diameter of the cortical bone. These measurements were then compared with the smallest commercially available headless compression screw (Medartis 1.7mm) used in Singapore for arthrodesis of the distal interphalangeal joint. The screw was considered to fit if the clearance between the leading thread (1.7mm) and the measured diameter of the phalanx was greater than 0.2mm, and oversized if they exceeded this on either radiograph. Compatibility rate was defined as the percentage of digits within which the screw would fit.

Result: There was a total of 84 female and 166 male patients. The mean diameter (lateral / anteroposterior) of the middle phalanx was 2.85 / 5.06 for the thumb, 1.88 / 3.60 for the index finger, 1.77 / 3.87 for the middle finger, 1.68 / 3.55 for the ring finger, and 1.49 / 3.14 for the little finger. The anteroposterior diameter of middle phalanges of females were significantly smaller than that of males for all fingers except the thumb and middle finger ($p<0.05$).

The mean diameter (lateral / anteroposterior) of the distal phalanx was 3.48 / 7.02 for the thumb, 2.97 / 4.44 for the index finger, 3.18 / 4.76 for the middle finger, 2.97 / 4.55 for the ring finger, and 2.44 / 3.45 for the little finger. The anteroposterior diameter of distal phalanges of females were significantly smaller than that of males for all fingers ($p<0.05$).

In comparison to the Medartis 1.7mm cannulated screw, the compatibility rate was 94% in the thumb, but 44% for the index finger, 38% for the middle finger, 30% for the ring finger and 12% for the little finger.

Conclusion: Headless compression screws used for distal interphalangeal joint fusion in Singapore are frequently oversized. When compared with the smallest screw available, all digits other than the thumb had a compatibility rate of less than 50%.

00138 Development of a Deep Learning (DL) System to Estimate the 52-Point Raw Visual Field (VF) Data from Fundus Photographs

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[1]Singapore Eye Research Institute, [2]A*Star, [3]Singapore National Eye Centre, [4]Duke NUS Medical School, [5]National University of Singapore

Aims: Development of a deep learning (DL) system to estimate the 52-point raw visual field (VF) from fundus photographs

Methodology: DL models were trained to use fundus photographs to estimate each of the 52-points on the Humphrey SITA 24-2 VF. The study included 11623 fundus photographs and VF pairs from 1838 participants in Singapore. The performance of the models was evaluated using the root mean square error (RMSE) and the mean absolute error (MAE) between the actual and estimated VF. The performance was compared across different DL models and type of fundus photographs used.

Result: The training dataset comprised of 9236 image pairs from 1467 individuals and testing dataset comprised of 2387 image pairs from 371 individuals. The best overall global estimation errors MAE=3.13±2.72 dB (RMSE=4.20±3.50 dB) were obtained from the PoolformerG DL model. The DL model performed better in the normal (MAE=2.64±2.23 dB, RMSE=3.54±2.88 dB) as compared to glaucoma subjects (MAE=5.87±3.47 dB, RMSE=7.86±4.27 dB). The combined photograph (disc+ macula) algorithm (MAE=3.13dB, RMSE=4.94dB) performed better as compared to the disc photo (MAE=4.41dB, RMSE=8.29 dB) and macula photo (MAE=3.67, RMSE=6.46 dB) trained algorithm.

Conclusion: DL can be used to estimate the 52 points on the 24-2 VF using fundus photographs. These findings can help develop tools for functional vision assessment in individuals who are unable to undergo VF testing.

00139 Community- and Home-based Neuroscience Nursing Reduces Clinic Visits and Caregiver Burden: The NNI Neuroscience Network Integration in Community Health Project

Li Wei, Ong Pei Xuan, Janis Tye, Esther Chua, Adeline Ng Su Lyn

National Neuroscience Institute

Aims: Background

Patients with neurological disorders often suffer from physical disabilities and cognitive impairment that renders traveling to specialist centres for clinical review a logistical challenge for themselves and their caregivers. Managing their clinical, nursing and psychosocial needs at home with dedicated neuroscience nursing care in consultation with their medical team as much as possible remains ideal.

This collaborative project was piloted in Dec 2020 after engaging community care providers (CCP) and providing them with relevant inter-professional training. A shared care model was adopted to manage patients with four main neurological conditions (Dementia, Parkinsonism, Multiple Sclerosis (MS) and Motor Neuron Disease (MND)) in the community.

Aim

To review and evaluate the impact of the community nursing project on clinic visit numbers and caregiver burden before and after joining the program

Methodology: Analysis of patients who were referred to the program from 1 Dec 2020 to 28 Feb 2023 was carried out. Descriptive statistics and paired t-test were performed to compare pre- and post- visit numbers and caregiver burden scores.

Result: A total of 186 patients were referred to the project, including 120 patients with Parkinsonism, 48 patients with dementia ,12 patients with MND and 6 patients with MS. NNI specialist nurses have carried out 142 joint home visits with the CCPs, while our CCPs have successfully carried out 210 home visits on their own, followed by remote multidisciplinary discussions regarding patient care via Zoom.

Interim data of 39 patients with pre- and post- 1-year home visits are compared by using Paired T test. Of these, twenty-two patients were female. The mean age was 71.95 (SD 8.36) years. There was a significant difference in the mean number of clinic physical visits per patient before and after joining the program: 2.08 visits (SD 0.984) vs 0.92(SD 0.900) visits post-enrolment (paired t test: t=5.985, df=38, p=0.000). The mean difference in number of clinic visits before and after program was 1.154 (95% CI 0.76 to1.54).

There was also a significant difference in the mean score of the caregiver Zarit Burden Index (ZBI) survey before and 1 year after joining the program: 17.6 (SD8.06) pre-enrolment vs 13.26 (SD 7.76) 1-year post –enrolment (paired T test: t=3.11, dt=30, p=0.004) with lower scores indicating lesser caregiver burden; the mean difference in ZBI scores before and after program enrolment was 3.806 (95% CI 1.31 to 6.30).

Conclusion: The number of hospital clinic visits were reduced for patients who were jointly monitored at home by community care partners and our neuroscience specialists. Their caregivers' burden scores were also reduced. This program has been shown to be beneficial to patients and their caregivers and we plan to extend the model of care to patients in other hospitals as well as other neurological and neurosurgical conditions.

00140 From Traditional Classrooms to Startups: A Case Study of How MedTech Industry Internships Foster Technological Competence in Medical Students

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Aims: Technology has become more commonplace within medicine, ranging from wearable devices to AI systems processing complex medical data. These technologies act as assistants to doctors by helping them in traditionally time-consuming tasks and speeding us diagnosis and treatment formulations. This frees up time for aspects irreplaceable by machines which require a human touch, and helps to relief the stress and workload of severely overworked physicians. However, medical students and physicians alike remain wary and unfamiliar with such technology, resulting in reduced uptake of technology among medical professionals. This would lead to major unrealized potential of technology and automation in medicine. As such, through analyzing the experiences of 2 Singaporean medical students after an internship in a medical technology company (MedTech), we hope to propose the introduction of internships in MedTech companies into the medical school curriculum as a possible solution to counter this gap in education.

Methodology: Before and after the internship, both interns were given a validated questionnaire to assess their "Technological Readiness". The questionnaire consisted of four components: 1) optimism of technology 2) potential technology innovativeness 3) discomfort with technology and 4) insecurity about new technology. A two-tailed Wilcoxon Signed-rank test was used to assess for change in TR scores before and after the internship. The 2 interns also gave feedback upon open-ended prompts in 5 areas: "Learning beyond the classroom", "Task significance", "Positive supervisory, co-worker and university support", "Overall Experience". and "How you plan to apply what you learned in the future".

Result: Based on the quantitative survey, both interns showed more positive views on technology in all 4 aspects after the completion of the internship as compared to before ($p < 0.01$), implying an increase in technological readiness following the completion of the internship. Both interns felt that the internship allowed them to learn content and acquire soft and hard skills outside of the curriculum, and enjoyed the tasks given and working in the company. Both students said that they would apply the knowledge learnt to future internships or research.

Conclusion: Through our paper, we discovered that internships in medical technology companies could play a positive role in encouraging medical students to become more comfortable and adept with technology in the future, and we hope to inspire schools to incorporate more networking and internship opportunities at medical technology companies in their curriculum in the future.

00141 Exploring the Evolution of Professionalism through COVID-19 Pandemic: A Qualitative Study

Chan Li Yun[1], Sashikumar Ganapathy[2]

[1]Duke-NUS Medical School, [2]KK Women's and Children's Hospital

Aims: Professionalism plays an integral part in healthcare and in Singapore, professionalism is codified by the Singapore Medical Council (SMC) Ethical Code and Ethical Guidelines.

In late December 2019, a novel series of pneumonia cases, later known as coronavirus disease 2019 (COVID-19) led to many healthcare professionals being called to serve. This pandemic saw healthcare professionals working longer hours and on a backdrop of high levels of responsibility, stress and uncertainty. Profound impact on their health and wellbeing were documented with many themes such as job burnout, fears, anxiety and compassion fatigue also being reflected locally. Calls for the re-evaluation of professionalism were made to explore any changes in the understanding, work, behaviour and interactions of healthcare professionals during this healthcare crisis. However, to date, no study has delved into uncovering such changes, which may provide us with valuable insights and better prepare us for similar future public health crisis by incorporating lessons learnt into programs related to professionalism or to guide future policies.

This study aims to explore the evolution (progression, stability, or regression) of professionalism through COVID-19 pandemic.

Methodology: Through semi-structured interviews in a single healthcare cluster (SingHealth), we aim to explore any changes in views of professionalism as experienced by healthcare professionals during COVID-19, and bring to surface any underlying issues not highlighted during peace times.

Result:
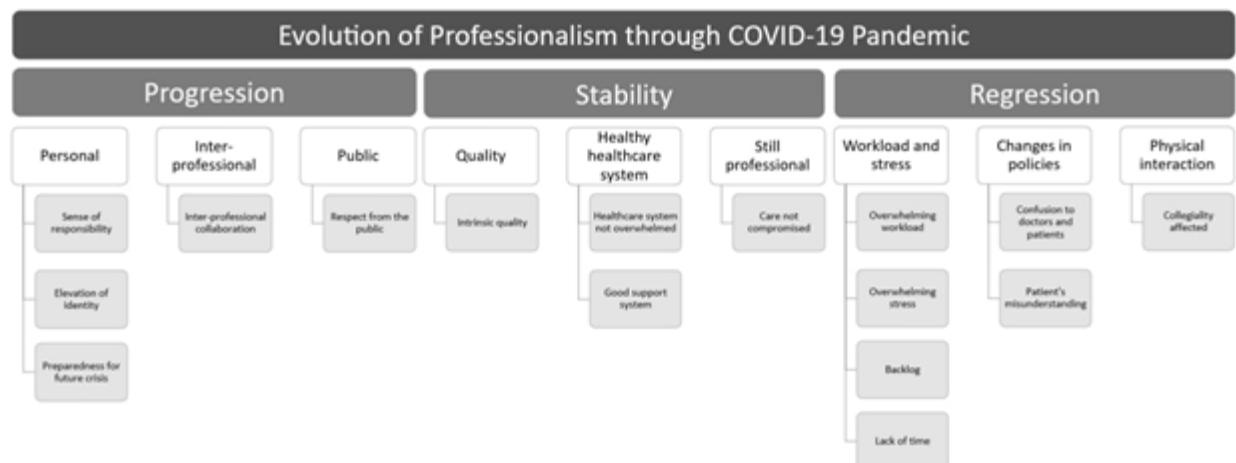
Evolution of Professionalism through COVID-19 Pandemic

Conclusion: Our study found that healthcare professionals are divided in their experience of the evolution of professionalism during the pandemic, with some highlighting progression in areas of responsibility and professional identity, others affirming professionalism as an intrinsic quality which remained relatively stable despite the challenges of the pandemic and highlighted the importance of a support system in ensuring space for professional practice, while others emphasized regression and frustration mainly arising from overwhelming workload, stress and uncertainty.

00142 Exploring the Understanding of Healthcare Professionalism and Perceived Barriers and Enablers towards the Display of Professionalism: A Qualitative Study

Chan Li Yun[1], Sashikumar Ganapathy[2]

[1]Duke-NUS Medical School, [2]KK Women's and Children's Hospital

Aims: Professionalism plays an integral part in healthcare, with unprofessional behaviours having detrimental effects. The range of definitions and domains of professionalism reflects its complexity and in Singapore, professionalism is codified by the Singapore Medical Council (SMC) Ethical Code and Ethical Guidelines.

Many have studied professionalism using a priori frameworks, but none used phenomenological studies to explore professionalism through the perception and lived experiences of healthcare professionals themselves. In addition, few have explored factors that hinder or promote professionalism in an Asian setting. These valuable insights help support the growth and development of programs related to professionalism and guide us in the changing and making of future policies.

This study aims to understand the perception of healthcare professionals on professionalism and to examine barriers and enablers in the display of professionalism.

Methodology: Through semi-structured interviews, views and experiences of healthcare professionals (doctors, nurses and allied health) towards professionalism in a single healthcare cluster (SingHealth) were explored. Specifically, the perception of healthcare professionals on professionalism and barriers and enablers of professionalism were examined.

Result:
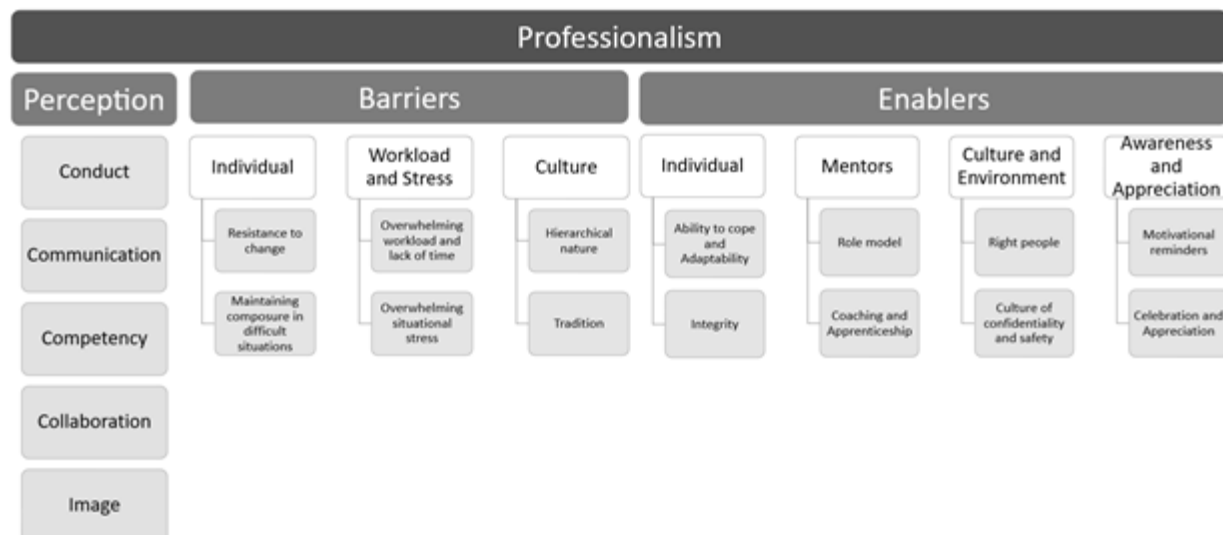
Conclusion: Our study found that healthcare professionals largely share the same understanding of professionalism, encompassing conduct, communication, competency, collaboration and image. Notably, some areas were emphasized more strongly by certain healthcare groups, such as the importance of attire as part of professionalism by the nurses as well as inter-professional collaboration by allied health. In addition, healthcare professionals see high workload and stress as barriers hindering the display of professionalism while factors such as having the right qualities coupled with the support from mentors and team serving as enablers that promote the display of professionalism.

00143 A Cost-Consequence Analysis of Nutritional Interventions Used in Hospital Settings for Adult with or at Risk of Malnutrition

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Aims: Malnutrition is a significant and prevalent issue in hospital settings, associated with increased morbidity and mortality, longer hospital stays, higher readmission rates, and greater healthcare costs. Despite the potential impact of nutritional interventions on patient outcomes, there is a paucity of research focusing on their economic evaluation in the hospital setting. This study aims to fill this gap by conducting a cost-consequence analysis (CCA) of nutritional interventions targeting malnutrition in the hospital setting.

Methodology: We performed a CCA using data from recent systematic reviews and meta-analyses, focusing on adult patients with or at risk of malnutrition in the hospital setting. The analysis included outcomes such as 30-day, 6-month, and 12-month mortality, 30-day and 6-month readmissions, hospital complications, length of stay, and disability-adjusted life years (DALYs). Sensitivity analyses were conducted to evaluate the impact of varying success rates in treating malnutrition and proportions of malnourished patients seen by dietitians in SingHealth institutions.

Result: The CCA indicated that 28.15 DALYs were averted across three SingHealth institutions due to the successful treatment or prevention of malnutrition by dietitians from April 1st, 2021 to March 31st, 2022, for an estimated 45,000 adult patients. Sensitivity analyses showed that total DALYs averted ranged from 21.98 (53% success rate) to 40.03 (100% of malnourished patients seen by dietitians). The cost of implementing a complex nutritional intervention was $218.72 ($104.59, $478.40) per patient during hospitalization, with an additional $814.27 ($397.69, $1,212.74) per patient when the intervention was extended to community and outpatient settings.

Conclusion: Nutritional interventions targeting malnutrition in hospital settings can have significant clinical and economic benefits. The CCA provides valuable insights into the costs and outcomes associated with these interventions, helping healthcare providers and policymakers make informed decisions on resource allocation and intervention prioritization.

00144 Categorising Nutritional Interventions for Malnutrition in the Hospital Settings – A Conceptual Study to Determine the Complexity of Interventions

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Aims: Malnutrition is a widespread and intricate issue among hospitalized adults, necessitating diverse interventions to address its root causes and repercussions. This research aimed to systematically examine the resource allocation and elements of nutritional interventions for adult malnutrition in hospital environments and identify variables that predict an intervention's complexity.

Methodology: A conceptual evaluation of 100 nutritional intervention studies for adult malnutrition, originating from a recent umbrella review, was conducted. The complexity of interventions was categorized using the Medical Research Council 2021 Framework for complex interventions. A logistic regression analysis was employed to recognize variables predicting the complexity of interventions.

Result: Interventions were divided into three principal categories: education and training (ET), exogenous nutrient provision (EN), and environment and services (ES). Most interventions (66%) addressed two or more of these areas. A majority of interventions took place in a hospital (n=75) or a hospital-to-community setting (n=25), with 64 studies being classified as complex interventions. The logistic regression analysis revealed three variables associated with intervention complexity: the number of strategies utilized, the targeted areas, and the involvement of healthcare professionals. Complex interventions were more likely to be tailored to individual needs and engage multiple healthcare providers.

Conclusion: The study underlines the importance of considering intervention complexity in addressing adult malnutrition. Findings advocate for a comprehensive approach to characterizing and evaluating nutritional interventions in future research. Subsequent investigations should explore optimal balances between intervention complexity and resource allocation, and assess the effectiveness of complex interventions across various settings, while considering novel approaches like telehealth.

00145 An Umbrella Review and Meta-Analysis of Interventions, Excluding Enteral and Parenteral Nutrition, Initiated in the Hospital for Adults with or At Risk of Malnutrition

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Aims: Multiple systematic reviews and meta-analyses on various nutritional interventions in hospitalized patients with or at risk of malnutrition are available, but disagreements between findings raises questions about their validity in guiding practice. Objectives: This umbrella review aims to assess the quality of reviews, identify the types of interventions available (excluding enteral and parenteral nutrition), and re-analyze the effectiveness of interventions.

Methodology: The databases MEDLINE/PubMed, CINAHL, Embase, The Cochrane Library, and Google Scholar were searched. AMSTAR-2 (A MeaSurement Tool to Assess Systematic Reviews Version 2) was used for quality assessment and Grading of Recommendations Assessment, Development, and Evaluation (GRADE) for certainty of evidence. Updated meta-analyses with risk of bias by Cochrane ROB 2.0 were performed. Pooled effects were reported as relative risks (RR), with zero-events and publication bias adjustments, and Trial Sequential Analysis performed for mortality, readmissions, complications, length of stay, and quality of life.

Result: Nineteen articles were included, with 40% assessed as some concerns or low risk of bias. Most clinical outcomes were discordant with variable effect sizes in both directions. The updated meta-analyses included 66 RCTs. In high quality trials, intervention reduces mortality at 30 days (15 studies, n: 4156, RR: 0.72, 95% CI: 0.55 - 0.94, p: 0.02, I2: 6%, Certainty: High), 6 months (27 studies, n: 6387, RR: 0.81, 95%CI: 0.71 - 0.92, p = 0.001, I2: 4%, Certainty: Moderate), and 12 months (27 studies, n: 6387, RR: 0.80, 95%CI: 0.67 - 0.95, p: 0.01, I2: 33%, Certainty: Moderate), with TSA verifying an adequate sample size and robustness of the meta-analysis.

Conclusion: Existing evidence is sufficient to show that nutritional intervention is effective for mortality outcomes at 30 days, 6 and 12 months. Future clinical trials should focus on the effect of nutritional interventions on other clinical outcomes.

00146 Elevated Lp(a) is a Risk Factor for Premature Ischaemic Heart Disease in a Multi-Ethnic Cohort

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Aims: Elevated plasma lipoprotein(a) [Lp(a)] is a common inherited condition independently associated with ischaemic heart disease (IHD). A Mendelian randomisation study has recently suggested that elevated plasma lipoprotein(a) [Lp(a)] concentrations confer a similar causal risk as heterozygous familial hypercholesterolemia for premature IHD. This study is a cross-sectional analysis aimed to assess whether elevated Lp(a) concentrations was associated with premature IHD in a South-East Asian cohort

Methodology: Plasma Lp(a) were measured in consecutively recruited patients with IHD who were admitted to hospital. Information on the age of diagnosis of IHD, and presence of comorbidities at the time of initial diagnosis of IHD were obtained from history taking and their electronic medical records. Premature IHD was defined as IHD diagnosed <45 years for male, and <50 years for women. The relationship was examined by regression model adjusting for age, gender, ethnicity, diabetes, hypertension, hyperlipidaemia, and smoking.

Result: The study participants were 521 patients with IHD, of which 82.2% were men, 46.5% were newly diagnosed IHD, and 9.5% had premature onset of IHD. The median age was 63.4 years while the median age of onset of IHD was 59.2 years. Our multi-ethnic cohort included Chinese (49.3%), Malay (31.3%), Indian (12.7%) and other (6.7%) ethnicities. The Lp(a) distribution was positively skewed to the right for all ethnicities. At the 90th and 95th percentiles, Lp(a) concentrations were ~155 nmol/L and 195 nmol/L respectively. Univariable and multivariable regression analysis identified Lp(a) $\geq$ 155 mmol/L to be associated with premature IHD.

Conclusion: Elevated Lp(a) was associated with premature onset of IHD in our multi-ethnic cohort. Lp(a) levels should be routinely measured in all individuals with established or at high risk for IHD. More studies required to evaluate the Lp(a) threshold that would be clinically useful to identify individuals at risk for premature IHD.

00147 The Effect of Competency-based Training on Suicide Risk Management for Community Nurses

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Aims: Suicide is one of the major challenges facing community mental health and healthcare professionals. Nurses working in the community increasingly encounter cases with suicide and related concerns. The aim of this study was to evaluate the effect of competency-based training in suicide risk assessment and management.

Methodology: This study was a mixed method design with quantitative and qualitative outcome management involving a single group pretest-posttest analysis, with purposive sampling (N=19).

Participants' knowledge was assesses based on Multiple Choice of Questions. Confidence and attitudes were measured using Confidence in Clinical Management Scale and Suicide Behaviour Attitude Questionnaires respectively. Competency check list was developed based on the training content including assess of the suicide risk factors, assessment of suicidal ideation and suicidal behaviour and relevant interventions based on the assessment.

Descriptive statistic test was used for demographics, questionnaire scores, mean, standard deviation (SD), and median. The Wilcoxon signed-rank test was used to examine the differences of nurses' knowledge, confidence, attitude and competency pre- and post-training. Data was analysed using Stata 17 (College Station, TX: StataCorp LLC). Value of $p < 0.05$ was set as statistical significance for all the tests.

Result: There were statistically significant positive changes in the participants' knowledge, attitudes, confidence and competency in managing suicidal patients ($p < 0.001$).

Qualitative data indicated participants perceived themselves to be more confident and prepared in suicide assessment and planning of the relevant interventions based on the assessment post training.

Conclusion: The training improved nurses' clinical capability in management of patient with suicide risk. The findings of the study suggested that the training could be delivered to nurses in other clinical setting.

Further research could be conducted in evaluating the sustainability of the training effect in nurses' competency, as well as the measurement of the clinical outcomes relating to patient care with the training of the nurses.

00149 Validation of a Parent-proxy, Obesity-specific Health-related Quality of Life (HRQoL) Measure - Sizing Them Up - In Singaporean Adolescents Seeking Obesity Treatment

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Aims: Parents are crucial stakeholders in weight management therapy for adolescents with obesity. Thus, it is vital to understand parents' perceptions of the effects of obesity on their child's Health-Related Quality of Life (HRQoL). We aim to:

Validate the parent-proxy, obesity-specific Sizing Them Up (STU) in Singaporean adolescents seeking obesity therapy; and

Establish determinants of STU scores.

Methodology: This is a cross-sectional prospective study. Adolescents aged 11 to 17 and their parents were recruited from KK Hospital's Weight Management Clinic from June 2022 to January 2023. Parents completed the STU and generic Pediatric Quality of Life Inventory (PedsQL) upon recruitment, and repeated STU at least two weeks later. Internal consistency of the STU was determined via Cronbach's α while intraclass correlation coefficients (ICC) were derived for test-retest reliability. Univariate and multivariable linear regression were used to establish the association between STU scores and the adolescents' Body Mass Index (BMI) for construct validity, as well as race, gender, age, parental weight status and socioeconomic status. Pearson correlation was used to compare STU and PedsQL for convergent validity.

Result: 64% of the 91 recruited adolescents were males. Their mean age was 13.6 ± 1.8 years old, and mean BMI was 32.3 ± 5.1kg/m2. 62% were Chinese, 23% Malays, 10% Indians and 5% of other races. 76% of parents were mothers.

STU demonstrated strong internal consistency (overall Cronbach's α = 0.84). 54 parents (59%) repeated the STU with moderate to strong test-retest reliability (ICC = 0.30 [school] to 0.70 [total QoL]).

Parents of adolescents with higher BMI gave lower scores in the physical (b= -0.24, 95%CI: -0.4, -0.07), emotional (b= -0.32, 95%CI: -0.6, -0.08), teasing (b= -0.27, 95%CI: -0.5, -0.06) and total QoL domains (b= -0.17, 95%CI: -0.3, -0.03), but better scores under positive attributes (b= 0.30, 95%CI: 0.06, 0.5), suggesting an association between STU and the adolescents' BMI, and good construct validity. For convergent validity, STU and PedsQL had moderate to strong correlations in all domains except school functioning (r = 0.22, p=0.04).

Malays were rated more poorly than Chinese in the school domain (b= -6.2, 95%CI: -11.3, -1.1). Compared to dual parent households, single parents reported lower scores under teasing (b= -13.1, 95%CI= -22.5, -3.7) and total QoL (b= -9.0, 95%CI: -15.7, -2.3). Adolescents with monthly household

income below the Singaporean median of $10,000 had poorer scores in the adolescent developmental adaptation domain (b= -9.9, 95%CI: -19.8, -0.005) than those from higher income families.

Conclusion: STU demonstrated good internal consistency, test-retest reliability, construct and convergent validity. Race, parental marital status and household income were associated with STU scores.

Preliminary results show that STU is a reliable, valid parent-proxy measure of obesity-specific HRQoL that may be used clinically for caregiver-patient-provider communication around weight-related concerns.

00150 Mini-nutritional Assessment in the Community: Nutritional Status and Its Impact on Muscle Mass and Physical Frailty

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Aims: Globally, the prevalence of malnutrition among older populations ranges from 23-46%. A population-cohort study reported a 30.4% incidence of nutrition risk among community-dwelling older Singaporeans aged 55 years and above. Malnutrition is a condition resulting from an insufficient, excessive or imbalanced intake of energy and/or nutrients. It contributes to the onset of sarcopenia which is associated with increased morbidity and mortality for the individual and heavier healthcare burdens for the society. Therefore, this cross-sectional study aimed to assess nutritional status using the Mini Nutritional Assessment-Short Form (MNA-SF) and its association with muscle mass, handgrip strength, and frailty status among community-dwelling older Singaporeans ⩾50 years old.

Methodology: Muscle mass and handgrip strength were measured using a bioimpedance analyser (BIA) and a digital dynamometer respectively, while the FRAIL scale was used to gauge frailty.

Result: This study sampled a total of 976 older adults. The sample was 62.6±7.1 years old and was predominantly female (67%) and Chinese (92%). Among the community, 78% of participants exhibited normal nutritional status, 21% were at risk of malnutrition and 1% were malnourished. In terms of frailty, 90% were classified as robust, 10% as pre-frail and a handful as frail. 9% and 11% of the participants had low muscle mass and handgrip strength respectively when gender-based cut-offs from the Asian Working Group of Sarcopenia 2019 consensus were applied. Average height-adjusted muscle mass was 7.1kg/m2 and handgrip strength was 27.7kg. MNA-SF scores were positively correlated with both muscle mass (r=0.33) and handgrip strength (r=0.12), and negatively correlated with FRAIL scores (r=-0.15), all $p<0.001$, after controlling for demographic variables, i.e., age, gender and race. In other words, the lower the nutrition, the lower the muscle mass and handgrip strength, and the frailer one gets.

Conclusion: Malnutrition among older adults is of rising concern with far-reaching implications for both the individual and the society. These findings highlight that developing and maintaining a healthy and balanced diet coupled with regular physical activity are important elements in an individual's health, specifically for the prevention and management of sarcopenia and frailty during aging. Lastly, it is recommended that seniors undergo routine nutritional risk assessments to identify potential or manifest malnutrition to allow timely implementation of effective nutritional support interventions.

00151 Prevalence, Associated Risk Factors; and Patient and Economic Impact of Multiple Sensory Impairment in a Multi-Ethnic Elderly Population in Singapore: The PIONEER Study

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Aims: To determine the prevalence, risk factors; and impact on patient health and economic outcomes across the laterality spectrum of multiple sensory impairment (MSI) in a multi-ethnic elderly Asian population.

Methodology: In this cross-sectional, population-based study of Chinese, Malay, and Indian Singaporeans aged ⩾ 60 years, MSI was defined as concomitant vision (visual acuity > 0.3 logMAR) + hearing (pure-tone air conduction average >25 dB), and + olfactory (score <12 on the Sniffin' Sticks test) impairments across the spectrum of laterality (any, unilateral, combination [of unilateral and bilateral], and bilateral). Backwards stepwise selection was used to determine participants' sociodemographic, lifestyle and clinical characteristics associated with higher odds of MSI laterality. Multivariable regression determined the independent associations between MSI laterality, and health-related quality-of-life (HRQoL), health indicators such as physical functioning (via instrumental activities of daily living [IADL]), independent mobility, sarcopenia, frailty, falls, hospitalization, and healthcare costs.

Result: Among 2,057 participants (mean(SD 72.2(0.2 years; 53.1% female), the national census-adjusted prevalence rates of any, unilateral, combination, and bilateral MSI were 20.6%, 1.2%, 12.2%, and 7.2%, respectively. Older age, male gender, low socioeconomic status (SES), and smoking (all p<0.05) were independently associated with higher likelihood of any MSI. In contrast, low-moderate alcohol consumption was associated with lower odds of any MSI. Compared to those with no sensory loss, those with MSI was significantly associated with decreased independent mobility (range 5.4% to 9.2%), poor functioning (OR range 3.25 to 3.45) and increased healthcare costs (range 4-6 folds) across the laterality spectrum. Additionally, bilateral MSI had a significant decrease in HRQoL (5.5%, p=0.012).

Conclusion: MSI is a highly prevalent medical condition, with 1 in 5; and almost 1 in 10 community-dwelling elderly Asians having any and bilateral MSI, respectively, with a higher likelihood in men, smokers, and those with low SES. Critically, MSI has a substantial negative impact on patient health and economic outcomes across the laterality spectrum. Sensory testing is critical to detect and refer individuals with MSI for management to improve their functional independence and QoL.

00152 Clinical Trial for 3D Printed Customized Finger Splint for Treatment of Soft Mallet Finger Injuries

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Aims: Mallet finger injury results in inability to extend the distal interphalangeal joint (DIPJ) of the affected finger and can significantly affect hand function. A customized mallet finger splint Clip-On-Splint-EasY (COSY) was developed by utilizing 3D printing technology to improve its clinical outcomes. In this clinical trial, assessment was done to evaluate its effectiveness in reducing extensor lag of the DIPJ as well as the fit and comfort, as compared to the commonly used Stack splint.

Methodology: Thus far, 6 patients have been recruited for the clinical trial. The patients were randomised to wear either one of the two splints: (a) COSY; (b) Stack splint, for a period of 6-8 weeks. The extension lag of DIPJ was measured at the 0th, 3rd, 6th and 8th week. At the end of the treatment period, the patients filled a survey to feedback on the fit and comfort of the splint.

Result: Both groups of patients have achieved a final DIPJ extension lag of less than 5(at the end of the splinting treatment. Common feedback received for the Stack splint was discomfort due to the sharp edges of the thermoplastic splint. In addition, Velcro straps of the Stack splint could detach easily and need to be replaced when wet. Patients are more comfortable with the COSY splint, but one patient reported slight maceration of the finger.

Figure (from left to right): The same patient wears COSY splint at Week 0, slight maceration observed at Week 3 and measured DIPJ extension lag of 0° in Week 6

Conclusion: So far our results show that COSY splint is able to significantly reduce DIPJ extension lag at the end of treatment. COSY splint is also more comfortable than the traditional Stack splint. We noted that for maximal effectiveness, the splint needs to be pushed in the proximal direction sufficiently until the DIPJ sits on the COSY splint with slight hyperextension, while still allowing proximal interphalangeal joint to flex. Subsidence of swelling mid-term during the splinting period were commonly observed which may cause poor fit. Hence, a smaller size splint should be provided as spare for patient to change conveniently.

00153 Novel Use of Natural Language Processing for Registry Development in Peritoneal Surface Malignancies

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Aims: Peritoneal surface malignances (PSM) are an example of a rare conditions that are resource consuming to accrue or identify using traditional methods. We aimed to develop a novel pipeline using natural language processing (NLP) to accelerate the process of identifying patients with PSM in a test case for registry creation and quality improvement.

Methodology: The study employed a rule-based NLP system trained on a set of 100 radiographic reports from computed tomography abdomen and pelvis (CTAP) scans to classify reports based on the presence or absence of PSM. The algorithm was applied to a set of 10,261 reports, with manual review of positive calls and a set of 500 negative control reports by two board-certified specialists to establish ground truth. An in-house platform was then used to populate a registry and assess referral patterns in PSM patients.

Result: The NLP algorithm processed 10,261 reports in 1.5 seconds, identifying 251 reports as positive for PSM, with a false positive rate of only 0.1% and excellent sensitivity (98%) and specificity (98%). Of 228 unique patients identified for registry inclusion, 27.6% were reviewed by PSM specialists within 6 months of CTAP, with 35% of these receiving surgery. Patients not reviewed by PSM specialists were most commonly reviewed by medical oncology (40%), colorectal surgery (11.5%) gastroenterology (7%), or internal medicine (5%).

Conclusion: The study demonstrates the potential of NLP to streamline the identification of patients with rare conditions and improve the efficiency and quality of registry creation. Such algorithms can rapidly classify free text in a fraction of time it takes for manual review and at comparable accuracy.

This has implications for both clinical and quality improvement purposes.

00154 Dental Caries Screening for Children by Community Nurses – Training Model and Calibration

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Aims: Dental caries affects 40% of preschool children in Singapore. Untreated caries in children can affect diet, quality of life, growth and development in children, some even require dental treatment under general anaesthesia. Children younger than 6 years old usually do not visit the dentist unless there is a dental problem. Upstream intervention involving non-dental healthcare professionals may be essential in early disease detection and referral. We propose a community approach in dental caries screening involving non-dental healthcare professionals. Aim: To describe child dental screening training model for nurses and to determine the accuracy of child caries screening by nurses.

Methodology: Sixteen community nurses from the Mission I'mPossible 2 (MIP2), Project HOlistic Management and Enablement (HOME) and Family Nexus at Our Tampines Hub (FNOTH) received children-related oral health education and hands-on dental caries screening training. Nurses from MIP2 are trained only in Lift-The-Lip (LTL) dental caries screening, while nurses from the other 2 programmes were trained in both LTL and open-wide (OW) dental caries screening. Calibration was done using 20 professionally taken photographs of young children's teeth.

Result: The average calibration accuracy for the lift-the-lip caries screening (involving upper 4 front teeth) and open-wide caries screening (involving posterior teeth) is 73.3% (with a range of 40-90%; n=15) and 88.9% (with a range of 70-100%; n=12) respectively. Although pictures with mild caries have the highest proportion of inaccuracy, most of these pictures were interpreted at a higher severity.

Conclusion: Nurses can reliably screen dental caries and refer at-risk children for further evaluation. Using the train-the-trainer model, trained nurses can train other nurses and preschool teachers in dental caries screening for young children. Community nurses can play an important role in increasing caregiver's awareness to dental caries and referring timely for dentist/specialists intervention.

00155 Sequential Therapy in Post-Denosumab Cessation: A Scoping Review

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Aims: Denosumab is a highly effective treatment for postmenopausal osteoporosis, significantly improving BMD and reducing risk of fracture. However, its cessation is associated with rapid bone loss and an increased risk of vertebral fractures. To date, there are no guidelines on established treatment regimens to mitigate BMD loss or vertebral fractures after denosumab discontinuation. The purpose of this scoping review is to critically appraise the current literature and examine the effects of various anti-resorptive treatments on preserving BMD gains, prevention of rebound-associated fractures and bone mass turnover rate.

Methodology: Systematic searches were conducted in two electronic databases; PubMed and EMBASE. Titles and abstracts of articles were screened independently by two masked reviewers based on prespecified inclusion and exclusion criteria. Discrepancies were resolved through discussion after unmasking.

Result: Our scoping review showed that potent bisphosphonates were effective in preserving BMD after denosumab discontinuation. Zolendronic acid showed the highest efficacy in preventing the rebound phenomenon, with suppression of bone turnover marker increase, and prevention of BMD decrease. Transition to alendronate was also shown to maintain gains in BMD after denosumab cessation. However, short-term studies revealed that risendronate was not able to prevent bone loss in this group of patients. In sequential treatment with raloxifene post-denosumab cessation, there was partial preservation of BMD but its treatment was not effective in suppressing elevation of bone turnover markers.

Conclusion: Discontinuation of denosumab has been associated with a rebound phenomenon. Despite ongoing research on different anti-resorptive treatments, no validated strategy exists. Further studies are necessary to elucidate anti-fracture efficacies of proposed sequential treatment algorithms and help formulate decision criteria for clinical practice.

00156 Discordance Between Self-reported and Performance-based Physical Function in Patients Who Have Knee Osteoarthritis: Associations with Pain Intensity and Negative Affect

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Aims: Patients with painful knee osteoarthritis (KOA) can experience functional limitations that are evaluated through self-reported measures (SRM) and performance-based measures (PPM). However, there is often poor correlation between SRM and PPM, leading to overestimation of perceived disability and potentially unnecessary treatments like total knee arthroplasty (TKA). This study aims to explore whether pain intensity and symptoms of anxiety and depression are associated with discordance of Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) with PPMs of physical function.

Methodology: We used cross-sectional data (n = 212) from two different randomized controlled trials involving patients with radiographically confirmed KOA. All patients were assessed for knee pain intensity and symptoms of anxiety and depression. Self-reported function was assessed by the WOMAC physical-function subscale. PPMs were assessed by timed gait and stair tests. Continuous discordance scores were quantified by difference in percentiles between the WOMAC and PPMs such that positive values indicate greater perceived than observed functional limitations.

Result: About 25% of patients had >20 percentile units in WOMAC-PPM discordance. In Bayesian regression analyses, knee pain intensity had >99% posterior probability of positive associations with WOMAC-PPM discordance (Table 2). Among patients awaiting TKA, anxiety intensity had approximately 99% probability of positive associations with discordance, and these associations had >60% probability of exceeding 10 percentile units. In contrast, depression had low probability of any association with discordance.

Table 2. Associations of pain intensity and negative affect with WOMAC-Gait and WOMAC-Stair percentile discordance†

| Predictor | Comparison | WOMAC-Gait Discordance | | | WOMAC-Stair Discordance | | |
| | | Adjusted Difference* | Probability of Effect Size** (%) | | Adjusted Difference | Probability of Effect Size (%) | |
		Median (95% CrI)	Effect > 0	Effect > 10	Median (95% CrI)	Effect > 0	Effect > 10
Pain Intensity	8 vs 3	19.5 (8.1 to 31.0)	>99.9	94.9	9.1 (0.2 to 18.3)	98.5	42.3
Anxiety Frequency	5 vs 2	1.3 (-16.5 to 18.6)	58.4	14.5	1.3 (-15.7 to 16.9)	59.8	10.7
Anxiety Intensity	8 vs 3	14.3 (2.0 to 30.6)	99.0	71.4	12.5 (2.0 to 26.6)	98.9	65.8
Depression Frequency	2 vs 5	3.2 (-14.0 to 23.3)	68.8	20.8	0.2 (-18.6 to 19.5)	51.3	10.9
Depression Intensity	3 vs 8	6.1 (-6.6 to 22.4)	83.2	29.9	5.2 (-7.3 to 20.0)	81.1	23.9

WOMAC= Western Ontario and McMaster Universities Arthritis Index; PPM = performance-based measure; CrI = credibility interval

† Results shown are from Bayesian linear regression models. All models were adjusted by the demographic variables of age, sex, body weight and height. Pain-intensity models (fitted on pooled sample) additionally included study. Anxiety and depression models, stratified by study (Study 1 or 2), included knee pain intensity.

*The adjusted differences (with 95%CrI) indicated the difference in WOMAC-PPM percentile discordance associated with (i) a 5-point change for pain, anxiety, and depression intensity (measured on a 11-point scale) and (ii) a 3-point change for anxiety and depression frequency (measured on a 7-point scale). The associated 95%CrIs were based on the highest density intervals of the posterior distribution. As pain and negative affect variables were modelled as flexibly as monotonic ordered predictors, the adjusted differences may vary depending on comparator values and are best represented graphically (Figure 2).

**Posterior probability distribution of regression coefficient exceeding 0 and 10 discordance percentile units. For example, other variables being equal, patients with a knee pain intensity score of 8 points would have, on average, 19.5 (CrI, 8 to 31) percentile units greater WOMAC-Gait discordance than patients with a knee pain intensity of 3 points. Given the observed data and prior knowledge, there was >99% and 95% posterior probability that the true difference exceeded 0 and 10 percentile units, respectively.

Conclusion: Around 1 in 4 patients with KOA had significant discordance between their SRM and PPM. Knee pain and anxiety intensity were meaningful predictors of this discordance. This is important because major treatment decisions for KOA, such as whether to undergo TKA, are often based on patients' self-reported functional levels. If validated, our findings may help healthcare providers make better treatment decisions for patients with KOA.

00157 Improving Maternal Population Health through Primary Health Level Screening for Postpartum Depression during Well-Child Visits: Prevalence, Associated Risk Factors, and Breastfeeding

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Aims: Postpartum depression (PPD) is a public health problem that is associated with detrimental effects on the wellbeing of the mother, child and family. Early detection for PPD at the primary health level provides an opportunity for intervention. We aim to examine: (1) the prevalence rate of PPD in the primary care population, (2) acceptance and attendance rates of intervention for women who screened positive for PPD, (3) sociodemographic and maternal risk factors of PPD, and (4) the impact of PPD on breastfeeding.

Methodology: We implemented a mother-child dyadic screening program using the modified Patient Health Questionnaire-2 during routine well-child visits at 2 or 3 months postpartum between July 2019 and December 2021. We performed multivariable logistic regression to identify independent risk factors for PPD and described using adjusted odds ratio (OR) with corresponding 95% confidence intervals.

Result: Among 5561 mothers, the prevalence rate of probable PPD was 2.4%. About half (54.4%) of mothers who screened positive accepted intervention and about two-thirds declined onward referrals to tertiary care (63.5%) and community mental health service (78.9%). In the final adjusted model, mothers who had probable PPD were more likely to be older than 35 years old (OR 1.88, 95% CI 1.05-3.45; p<0.05) and not breastfeeding (OR 1.9, 95% CI 1.06-3.38; p<0.05).

Conclusion: Overall, our findings highlight the importance of early PPD screening and management in primary care. These findings can help inform maternal mental health service development and utilization, thereby optimizing maternal and infant outcomes.

00158 Study on Weight Loss Outcomes after Bariatric Surgery to Determine a Metric Least Influenced by Preoperative BMI

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Aims: Percentage excess weight loss (%EWL) and percentage total weight loss (%TWL) are used for reporting outcomes after bariatric surgery. However, they are not ideal for comparing outcomes on populations of varied initial body mass index (BMI). This study aimed to validate a recently introduced metric - percentage alterable weight loss (%AWL), after laparoscopic sleeve gastrectomy (LSG) and Roux-en-Y gastric bypass (LRYGB).

Methodology: Analysis of weight data of all patients who had undergone LSG and LRYGB until end of year 2021. Outcomes for both procedures were analyzed separately. The patients were divided into quartile subgroups Q1 (lowest BMI) to Q4 (highest BMI) and weight loss up to 5 years postoperatively was compared using %EWL, %TWL and %AWL metrics. An intermediary metric was also tested for its effect on the weight loss patterns for both procedures.

Result: The cohort included 1020 LSG and 322 LRYGB patients, with initial mean BMI of 43.5 ± 7.5 and 41.9 ± 8.3 kg/m2, respectively. %EWL significantly favors lower BMI subgroups for both procedures. %TWL is ideal for comparing weight loss during the first 6 months but it then favors higher BMI subgroups beyond 6 months. %AWL with reference BMI of 13 kg/m2 seems the best metric for medium-term comparison of weight loss for LRYGB and an intermediary metric based on BMI 8 kg/m2 provides the best fit for medium-term comparison for LSG.
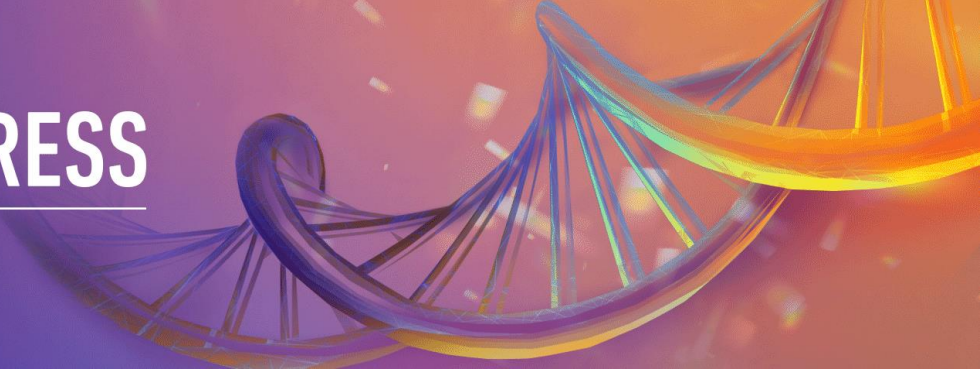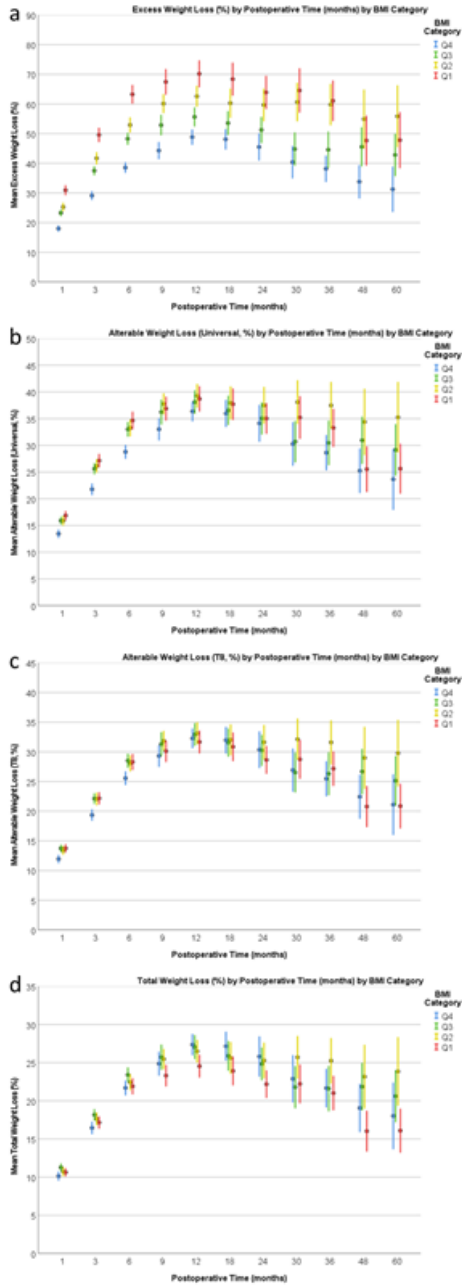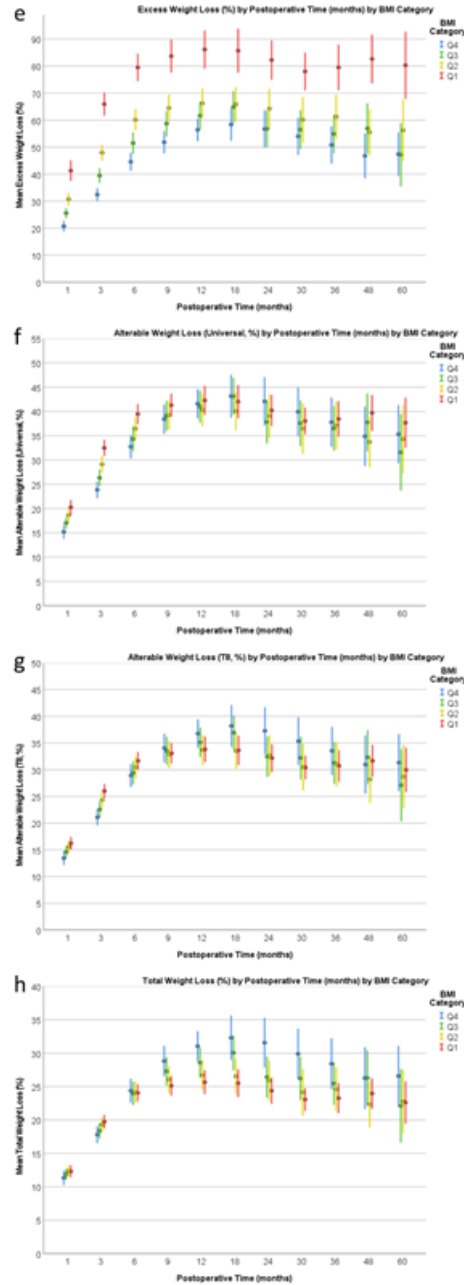
Conclusion: %TWL is least influenced by initial BMI during short-term follow-up after LSG and LRYGB. For medium-term comparison, %AWL is best suited for LRYGB while an intermediary metric is found to provide the best fit for LSG.

00159 The Effectiveness of PGT-A for Single Frozen Thawed Blastocyst Transfers in Women with Recurrent Implantation Failure (RIF)

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Aims: To evaluate the effectiveness of Preimplantation genetic testing for Aneuploidies (PGT-A) on IVF outcomes for women with recurrent implantation failure (RIF) in single frozen-thawed embryo transfers.

Methodology: Recurrent implantation failure is a common cause of infertility. The use of PGT-A to select embryos with the normal number of chromosomes for transfer may improve IVF outcomes for women with RIF.

This is a retrospective study in the Centre of Assisted Reproduction, Singapore General Hospital, from January 2020 to December 2022. The women included in the study underwent IVF program in our Centre, had at least one failed IVF cycle and never had a live birth. Cycles with donor gametes were excluded from the study. A positive pregnancy was indicated by the presence of a fetal heart detected using ultrasound scan.

For the PGT-A group, oocytes were collected and fertilized using Intra-cytoplasmic sperm injection (ICSI) in the fresh cycle. Assisted hatching was performed on the embryos on Day 3. Three to 5 Trophectoderm cells were biopsied from Day 5 or 6 blastocysts and tested using Next Generation Sequencing technology for aneuploidies. Biopsied embryos were vitrified after biopsy. The women then returned for their frozen IVF cycles whereby single euploid embryos were thawed and transferred.

For the non-PGT-A group, the women had oocytes collected and fertilized using Intra-cytoplasmic sperm injection (ICSI) in the fresh cycle and suitable blastocysts vitrified on Day 5 or 6. Subsequently, a single frozen blastocyst was thawed and transferred in the frozen IVF cycle.

Selection of blastocysts for thaw and transfer were based on pre-thaw quality using Gardner's blastocyst scoring.

Result: There was a total number of 17 cycles in the PGT-A group and 123 cycles in the non-PGT-A group. For the PGT-A group, the pregnancy rate (PR) was 29.4% (5 out of 17), and live birth rate (LBR) was 80% (4 out of 5). In the non-PGT-A group, PR was 35.8% (44 out of 128). There were 20 live births (LBR= 62.5%) and 12 ongoing pregnancies.

A chi square test showed no significant difference for PR (p=0.607) and LBR (p=0.446) between both groups. The LBR was higher in the PGT-A group, indicating a lowered miscarriage rate.

Conclusion: In this preliminary study, it was shown that the selection of single euploid blastocyts using PGT-A in single frozen-thawed embryo transfers improves live birth rate for women with RIF. For future

studies, a collaboration between IVF centres in Singapore to increase the sample size is beneficial to evaluate the potential of PGT-A in improving IVF outcomes.

00160 Factors Influencing Oral Care Provision for Elderly Residents and the Perceptions and Oral Health Awareness of Nursing Home Staff in Singapore

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National Dental Centre Singapore

Aims: The aims of this study were to evaluate the oral health awareness and dental habits of nursing home staff and the factors and perceptions of oral care provision for the elderly nursing home residents in Singapore.

Methodology: All 77 nursing homes in Singapore were invited to participate in this study. The nursing home (NH) staff included were those involved in the direct oral care provision of the elderly residents.

An electronic survey which included questions on their dental habits and oral health awareness, and factors and perceptions on oral care provision was emailed to the participants. They responded to questions on oral health awareness and perceptions on oral care provision using a 5- point Likert scale and selected from a list of barriers and enablers for factors influencing oral care provision.

Result: 367 staff from 25 nursing homes responded to the questionnaire (response rate 32.5%). The NH staff comprised of 69% female and 31% male, and their mean age was 33 years old (range 19-72).

Majority of the NH staff felt that their oral health was important to them, and that good oral health was important for good general health. Two-thirds of the NH staff felt that as people age, it was normal for them to lose their teeth. The NH staff were generally aware about the consequences of tooth loss, with 85% responding that tooth loss results in reduced chewing ability and inadequate food choices, leading to lack of nutrition, and 79% agreeing that tooth loss can decrease a person's quality of life.

On the attitudes and perceptions on providing oral health care, most of the NH staff agreed that caring for the oral health of elderly residents was as important as other aspects of health care (93%). Majority of the NH staff were confident in their ability to clean the teeth or dentures of the elderly residents (89%). However, they ranked lower in terms of oral health assessment (78%), coming up with oral care plans (79%) and knowing where to refer the elderly residents if the resident requires dental treatment (79%). 77% of the NH staff reported having received previous training in caring for the oral health of elderly residents. However, only 61% of all the NH staff felt that they have received adequate training to care for the oral health of the elderly residents.

The greatest challenges faced while providing oral care for the residents were uncooperative behaviour of the residents while providing oral care (52%) and difficulties communicating with the elderly residents (34%). The top factor that motivated the NH staff to provide oral care to the elderly residents was satisfaction in caring for the elderly residents (79%).

Conclusion: NH staff had good oral health awareness and recognized the association between good oral health and general health.

Future oral health training for NH staff should be tailored to providing oral care for residents with challenging behaviors, oral health assessment and formulating oral care plans, to develop the capacity and capability of the NH staff, so that they are able to provide the highest standards of care for the elderly NH residents in Singapore.

00161 Patterns of Colonization of Admitted Newborns with Antibiotic Resistant Organisms at Birth

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Aims: In this study, we aim to describe the epidemiology and antibiotic resistance patterns of skin colonizing bacteria obtained from newborns admitted to the neonatal intensive care unit (NICU).

Methodology: This is a retrospective cohort study involving newborns with culture-positive swabs from the external ear which were obtained upon admission to the NICU at KK Women's & Children's Hospital from January 1, 2017-31 December 2021. Clinical characteristics, culture and antibiotic susceptibility data were extracted from the department data collection and hospital electronic databases. Multi-drug Resistant Gram-negative organisms (MDRO) were defined as microorganisms with resistance of ≥3 antibiotic categories: carbapenems (imipenem, meropenem), penicillins (ampicillin, piperacillin/tazobactam), broad-spectrum cephalosporins (ceftazidime, cefepime), aminoglycosides (gentamicin, amikacin), and fluoroquinolones (ciprofloxacin).

Result: We included 314 infants with positive admission swabs over the study period – 53.5% male, median 34 weeks (IQR 30, 38) gestation and median birthweight 2147g (IQR 1470, 2875). A total of 379 isolates were obtained, with 120 (31.7%) isolates identified as Gram-positive and 259 (68.3%) Gram-negative. MDROs accounted for 17.4% (45/259) of Gram-negative isolates. Specific antibiotic-resistant organisms were identified: Cephalosporin-resistant Klebsiella 71.9% (41/57 Klebsiella isolate); MDR-Acinetobacter 80% (4/5). There were no Methicillin-resistant S. aureus (0/22), Vancomycin-resistant Enterococcus (0/68) or Carbapenem-resistant Enterobacteriaceae (0/213).

Majority of gram-negative isolates were susceptible to the 'first-line' empiric antibiotic coverage of benzylpenicillin and gentamicin (211/233, 90.6%), and there was no resistance observed amongst both gram-positive and gram-negative isolates to a combination of cloxacillin and amikacin. Resistance to cefotaxime, a 'second-line' option, was more prevalent amongst gram-negative isolates (168/221, 76.0%).

A total of 27 (8.6%) infants developed bacteremia, of which 21/27 (77.8%) had concordant microorganisms isolated from their admission ear swab cultures. Of these, 18/19 (94.7%) were from early-onset infections and 3/8 (37.5%) from late-onset infections.

Conclusion: Majority of newborns admitted to the NICU who have positive bacterial swabs were colonized by Gram-negative bacteria. Multiple-drug resistant Gram negatives were uncommon at birth, with Acinetobacter species most likely to be multiply resistant. As expected, there was a high rate of concordance between early colonizing and subsequent early-onset infecting organisms.

00162 Cluster Trajectory of SOFA Score in Predicting Mortality in Sepsis

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Aims: Sepsis is a life-threatening condition with high mortality rates, and predicting outcomes is crucial for improving patient care and resource utilization. The Sequential Organ Failure Assessment (SOFA) score is a commonly used tool to assess organ dysfunction severity and predict mortality in the intensive care unit (ICU). However, SOFA is static and does not account for dynamic changes in response to initial resuscitation.

Big data analytics and advanced machine learning algorithms present a promising solution to address this limitation and improve sepsis care. This study aimed to investigate the association between dynamic changes in SOFA scores over the first 72 hours of ICU admission and mortality and length of stay in sepsis patients.

Methodology: We leveraged the power of big data by analysing records from 15,671 sepsis patients in the Medical Information Mart for Intensive Care (MIMIC) IV database who met the sepsis-3 criteria and had at least 72 hours of ICU admission. Our study employed cutting-edge data science techniques, including group-based trajectory modeling with dynamic time warping and k-means clustering to identify distinct trajectory patterns in dynamic SOFA scores. We compared the outcomes of mortality and ICU length of stay between the trajectory clusters, adjusting for potential confounders.

Result: Our analysis revealed five trajectory clusters with distinct patterns in dynamic SOFA scores. Membership in each cluster was associated with significant differences in inpatient mortality ($p<0.01$) and length of ICU stay ($p<0.01$). Specifically, patients in trajectory clusters with more severe and persistent organ dysfunction had higher mortality rates and longer ICU stays ($p<0.01$). Furthermore, our findings indicate that a data-driven approach employing dynamic SOFA assessment outperformed traditional static SOFA scoring in predicting sepsis outcomes (AUC 0.827 vs 0.764).

Conclusion: Our innovative approach highlights the potential of big data to improve sepsis care and outcomes. By leveraging electronic health records and applying data-driven approaches, we were able to identify subgroups of sepsis patients with distinct patterns in organ dysfunction and impact on outcomes. Our findings suggest that dynamic SOFA scores could be an effective tool for early identification of high-risk sepsis patients and personalized treatment. Further research and development in this area could lead to improved outcomes for sepsis patients and include validating our results in other patient populations and to develop tools to incorporate dynamic SOFA scores into clinical decision-making.

00163 Evaluation of Statin and Other Lipid Lowering Therapies among Patients with Ischaemic Heart Disease Admitted to Hospital: Two-Year Follow-up Study

Mak Ying Hui, Fionn Chua, Audrey Lam Kar Yi, Lily Mae Dacay, Lee Zhong Hui, Tan Vern Hsen, Colin Yeo, Loh Wann Jia

Changi General Hospital

Aims: American and European cardiovascular guidelines recommend high-intensity statin therapy in patients with IHD in the absence of statin intolerance. Combination therapy with ezetimibe and/or Proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitors should be considered in patients with suboptimal low-density liproprotein-C (LDL-C). It remains unclear whether the current prescription of lipid lowering therapies (LLT) in real-world setting adheres to these recommendations.

Hence, this study aims to assess the prescription pattern of LLT in patients with IHD and their LDL-C goal attainment rates.

Methodology: 555 patients with IHD who were admitted to hospital were recruited. Their LLT prescriptions and corresponding LDL-C levels at baseline, and 6, 12 and 24 months were assessed.

Result: Our study participants were mostly males (82.3%), 48.5% of Chinese ethnicity and 47% were newly diagnosed with IHD. High-intensity statin prescription increased from 45.4% at hospital admission to 87.1% at discharge and remained similarly high at 82% at 6, 12 and 24 months. Other LLT was concomitantly prescribed to 13.8% of patients at discharge and increased to 43.9% at 24 months. Ezetimibe was the most common second line LLT prescribed (39.9%, n=187) followed by inclisiran (n=5) and anti-PCSK9 monoclonal antibodies (n=4). However, the LDL-C goal $\leqslant$1.8mmol/L was achieved in only 44% of patients at 6 and 12 months, and 46.3% at 24 months. When LDC-goal of $\leqslant$1.4mmol/L was adopted, only 21-22% of patients achieved goal at 6, 12 and 24 months. The highest percentage of patients achieving LDL-C $\leqslant$1.4mmol/L was at 6 months (22%).

Conclusion: LDL-C goals were not achieved in more than half of our study cohort despite high prescription rate of high-intensity statin. The second and third line LLT are under-prescribed. More efforts should be made to improve LDL-C control in these high-risk cohort of patients.

00164 Evolving Code of Conduct in Pharmacy Practice

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[1]National Cancer Centre Singapore, [2]Duke-NUS Medical School

Aims: To understand the evolving code of conduct in pharmacy practice.

Pharmacists, have traditionally always been product(drug)-centric, starting as herbalists supplying medicinal materials to physicians in ancient Greece, to shop owners compounding and dispensing medicinal products in apothecaries, and now the focus has moved to that of a caregiver – one that is committed to person-centred care as part of a multi-disciplinary team in the wards by ensuring effective and safe use of medications. The codes of conduct for pharmacists are expected to have evolved over the ages to keep in tandem with this shift in roles of pharmacists.

To map out how this change has occurred in the recent decade, the research team embarked on an investigation of the codes of conduct for pharmacists over the past 10 years by employing a systematic scoping review as a first step to understanding how the rules governing the professional behaviour of pharmacists has changed and their associated challenges.

Methodology: The research team discussed current issues regarding pharmacists' codes of conduct with a team of domain experts consisting of academics from the National University of Singapore and the University of Liverpool and medical librarians, and used Krishna's SEBA schema to perform a six-stage systematic scoping review in six databases namely, PubMed, Embase, JSTOR, ERIC, Scopus and PsycInfo from 1st January 2013 to 31st December 2022, using variations of the terms "pharmacist code of conduct". These were independently conducted by a ten-member research team and then discussed to achieve consensus. Content and thematic analysis were then used to examine the included articles to strengthen the legitimacy of the results.

Result: We found 226 abstracts, reviewed 110 full-text articles, examined 62 articles and identified 3 themes: recognising the need for new guidelines, factors to consider in design of new guidelines and need for concurrent ethics education for pharmacy.

Conclusion: The research team established that the roles of pharmacists have transitioned dramatically from being product-centred to one with greater focus on person-centred care. However, the codes of conduct by professional pharmacy bodies have not been as responsive to such a change and have been sporadic at best in its revision. Thus, there is a need for more updated review of these guidelines.

The recommendations for updating and even new design of extant guidelines have to take into consideration the new and evolving roles of pharmacists.

Finally, these new guidelines need to be inculcated in the fresh minds of pharmacy students for these ethics of proper behaviour to take root with formal and concurrent ethics education in pharmacy schools.

00165 Ethics in Pharmacy Practice

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[1]National Cancer Centre Singapore, [2]Duke-NUS Medical School

Aims: To understand the landscape of ethics in pharmacy practice.

Pharmacists, who have traditionally always been product(drug)-centric, have evolved to be ever more patient-centric, in particular many of those in SGH being part of clinical multi-disciplinary teams in the wards. With medical care in Singapore General Hospital (SGH) getting increasingly complex, its associated ethical concerns are, likewise, getting more difficult.

This new breed of pharmacists is increasingly faced with such moral dilemmas but not necessarily the tools with which to navigate through them.

To address this problem, the research team embarked on an investigation of the current ethical dilemmas faced by pharmacists by employing a systematic scoping review as a first step to the construction of a unified ethics education training program for SGH pharmacists via a sound, evidence-based methodology.

Methodology: The research team discussed current issues regarding ethical dilemma that practicing pharmacists face with a team of domain experts consisting of academics from the National University of Singapore and the University of Liverpool and medical librarians, and used Krishna's SEBA schema to perform a six-stage systematic scoping review in six databases namely, PubMed, Embase, JSTOR, ERIC, Scopus and PsycInfo from 1st January 2013 to 31st December 2022, using variations of the terms "ethical dilemma pharmacy practice". These were independently conducted by a ten-member research team and then discussed to achieve consensus. Content and thematic analysis were then used to examine the included articles to strengthen the legitimacy of the results.

Result: We found 116 abstracts, reviewed 88 full-text articles, examined 62 articles and identified 4 themes: importance of ethics education for pharmacists, pharmacists experiencing increasing professional moral distress, lack of formal ethics education in pharmacy schools and unpreparedness to manage ethical dilemmas.

Conclusion: The research team established that pharmacists are recognising the need for more formal and substantial ethics education as part of their school curricula. This is primarily due to the evolving role of pharmacists, where more pharmacists are increasingly experiencing moral tensions but who feel they are not sufficiently equipped to address these ethical dilemmas. The lack of formal ethics education in pharmacy schools fail to keep up with the diverse roles pharmacists are now taking. Scientifically sound pharmacist graduates are nevertheless tossed into an increasingly morally complex professional world without the needed implements to navigate the tides of morally grey situations. Consideration must be made for the systemisation of ethics education and its assessment in the pharmacy curricula.

00166 Pharmacists' Ethics Education

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Aims: In this climate of continually evolving roles of pharmacists in Singapore General Hospital, as well as the consequent increasingly complex ethical dilemmas that these pharmacists now face, ethics education at pharmacy schools have yet to keep up to date with the challenges that development of the profession brings. Doubts have been cast on the competence of the faculty in keeping up to date with these rapid developments as to be adequately suitable educators of pharmacy ethics. Thus, it stands to reason that we perform a systematic scoping review of current pharmacists' ethics education to highlight its importance, and also as a first step preceding the actual design of an appropriate and effective ethics education program for pharmacists in SGH.

To address this problem, the research team embarked on an investigation of the current ethical dilemmas faced by pharmacists by employing a systematic scoping review as a first step to the construction of a unified ethics education training program for SGH pharmacists via a sound, evidence-based methodology.

Methodology: The research team discussed current issues regarding ethics education in pharmacy schools with a team of domain experts consisting of academics from the National University of Singapore and the University of Liverpool and medical librarians, and used Krishna's SEBA to perform a six-stage systematic scoping review in six databases from 1st January 2013 to 31st December 2022, using variations of the terms "ethics education pharmacy". These were independently conducted by a ten-member research team and then discussed to achieve consensus. Content and thematic analysis were then used to examine the included articles to strengthen the legitimacy of the results.

Result: We found 1084 abstracts, reviewed 473 full-text articles, examined 89 articles and identified 4 themes: importance of ethics education for pharmacists, lack of formal ethics education in pharmacy schools, lack of appropriate assessment of ethical competence before practice and lack of formal ethics training of faculty teaching ethics in pharmacy schools.

Conclusion: We established that due to the evolving role of pharmacists, they are now facing mounting ethical challenges, yet are not sufficiently accoutered to address these moral dilemmas. Pharmacy ethics as taught in pharmacy schools are often solely in the form of vignette discussions. The lack of formal ethics education in pharmacy schools fail to keep up with the diverse roles pharmacists are now taking. Scientifically sound pharmacist graduates are tossed into an increasingly morally complex world without having been properly assessed for their ethical competence. This shortcoming is felt even among faculty who are diffident when they had to educate pharmacy students on ethics, who themselves lack formal training in ethics. Consideration must be made for the systemisation of ethics education and its assessment in the pharmacy curricula, as well as a formal train-the-trainers program for faculty.

00167 Barriers and Motivators to Healthy Lifestyle Habits among Seniors in Singapore

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Aims:

i. Estimate the prevalence of seniors in Singapore who engage in healthy lifestyle habits (HLH) such as exercise, healthy diet, paid work, social activities, lifelong learning and volunteerism.
ii. Identify the barriers and motivators to HLH
iii. Examine the relationship between the barriers and motivators, and HLH.

Methodology: This study employed a cross-sectional survey administered in Bukit Merah, Telok Blangah Way and Yong-en Active Hub (YEAH), an active ageing centre. The survey constituted questions regarding demographic profile, HLH frequency, and barriers and motivators towards each HLH.

Community-dwelling seniors (N=147; 63.27% female; mean age±SD:70.9±7.9 years) were recruited through convenience sampling of 79 YEAH respondents and random stratified sampling of 68 community respondents via a door-to-door survey.

Result: The HLH prevalence among respondents are as follows: 84% for healthy diet, 81% for social activities, 78% for exercise, 43% for lifelong learning activities, 24% for volunteerism and 20% for paid work.

"Intrinsic motivation", "knowledge of benefits" and "accessibility" were common motivators significantly associated with high engagement in exercise and healthy diet. "No time", "no companion" and "not knowing how to exercise" were barriers to engaging in exercise. Interestingly, no barriers were identified for healthy diet. Having "good relationships with family, friends or neighbours" was associated with the highest social activities engagement, while "not having time due to commitments" and "comfortable being alone" were the only identified barriers associated with low engagement.

"Learning for self-development" was associated with high engagement in lifelong learning, while "not understanding the benefits" and "not confident learning in old age" were barriers. Interestingly, "having difficulty to travel" was the only identified significant barrier but it was associated with higher engagement in volunteerism. "Flexible working arrangements" encouraged engagement in paid work but "sufficient retirement funds" was a barrier.

Conclusion: Our study identified healthy diet, social activities, and exercise to be the most engaged HLH. Our study also identified the barriers and motivators significantly associated with each HLH and their relationship with seniors' participation in each HLH. Mitigating the barriers and enhancing the motivators could be incorporated by policy makers to enhance current and future policies targeted to promote HLH among senior Singaporeans.

00168 COVID-19 in Children with Childhood Nephrotic Syndrome

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KK Women's and Children's Hospital

Aims: Various case series on the clinical course of COVID-19 in children with Childhood Nephrotic Syndrome (CNS) have been described globally. However, there is limited information about the impact of COVID-19 in children with CNS in Singapore. We aim to describe the characteristics of COVID-19 in children with CNS and identify the associated complications.

Methodology: A retrospective review was conducted on children with CNS who had COVID-19 between March 2020 and December 2022, while under the care of the Paediatric Nephrology Service at KK Women's and Children's Hospital, Singapore. Data were extracted from electronic medical records and manual charts, encompassing clinical characteristics, immunosuppressant usage, clinical outcomes, and hospitalization rates.

Result: A total of 22 children with CNS developed COVID-19, including 2 cases of recurrent infection. The median age was 10.3 years (interquartile range [IQR]: 5.8-13.8), and 68.2% (15/22) were receiving steroid treatment at the time of infection. Common presenting symptoms included fever and mild respiratory manifestations, with no instances of respiratory complications necessitating oxygen support. Hospital admission was required for 4 children (18.1%), all of whom were male aged 5.1 to 17.8 years. Among the admitted patients, one child, newly diagnosed with NS during COVID-19 infection, received two doses of albumin infusion. The remaining 3 children did not require albumin infusion; one had Steroid-Dependent NS with frequent relapses, and two had Steroid-Resistant NS. Hospital stays ranged from 4 to 7 days. Two admitted children experienced acute kidney injury, leading to a reduction in cyclosporine dose for one patient

Conclusion: Children with CNS generally experience a mild course of COVID-19 infection without severe complications, despite receiving immunosuppressive therapy. COVID-19 in children may trigger CNS relapse or new-onset NS. The continuation of immunosuppressants appears to be generally safe without an increased risk of sepsis. These findings align with existing published literature.

00169 Towards a Consensus: Standardizing Characterization of Emergency Care Service Frequent Attenders (ECS-FA) - A Scoping Review

Collin Elijah Ho Rui Hung[1], Collin Yip Ming Tan[1], Zhi Quan Tay[1], Chan Daniel Jeremiah[1], Darien Wen Jing Leong[1], Regina Xinyi Ng[1], Juntian Wu[2], Marcus Eng Hock Ong[3], Fahad Javaid Siddiqui[3]

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Aims: Emergency Care Service Frequent Attender (ECS-FA) accounts for a disproportionate utilization of resources in the emergency department. While many have tried to characterize the frequent attenders (FAs), there has not been a large-scale review of the different ways and characteristics of the ECS-FA. To date, there has not been a common set of characteristics used to describe the FA. A standardized way of characterizing the FA regardless of Emergency Department setting, healthcare set up or subgroups will provide clinicians and researchers with a common language for discussing contributing factors, and for innovating and comparing interventions that target this specific population. We provide preliminary results of a scoping review of the literature on ECS-FA. This scoping review aims to collate and organize the published literature on the various ways an Emergency Care Service Frequent Attender (ECS-FA) is characterized.

Methodology: A scoping review was conducted adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses scoping review (PRISMA-ScR) extension guidelines. Searches were conducted on four databases (Medline, Embase, PsycINFO, and CINAHL) to identify research studies on ECS-FA. Non-primary research papers, conference abstracts, and study protocols were excluded. Ten reviewers independently screened literature search results and extracted data from the included studies. Each article was independently reviewed by two reviewers and verified and extracted by a third reviewer.

Result: The database search yielded 12330 unique references for abstract review, of which 1065 were retained for full-text review, where 611 papers met our criteria for inclusion. Our initial data extraction of 43 papers yielded 24 papers that sought to characterize the FA. We grouped the characteristics into demographics, social characteristics, presenting and ed visit details, pre-visit exposure and revisit details. The most frequently reported characteristics are Age and Gender (n=24), Condition Specific Cohorts, Comorbidities and Past medical history (n=14). The least commonly reported characteristics were Location of Residence, Cost incurred and Revisit Rates (n=1).

Conclusion: There exists significant diversity in our understanding of the frequent attender. By instituting a standardized set of characteristics, we aim to provide clinicians and researchers with a common language for discussing contributing factors, and for innovating and comparing interventions that target this specific population. This scoping review, a work-in-progress, is set to provide insights into the hotly debated issues surrounding ECS-FAs across various global contexts. Through the

completion of this scoping review, our intention is to formalize the characterization of the frequent attender, thus establishing a consistent foundation for future discourse and investigations.

00170 Challenges Identified in Defining Frequent Attenders of Emergency Care Systems (ECS-FA): A Scoping Review and Recommendations

Chan Daniel Jeremiah[1], Darien Wen Jing Leong[1], Collin Elijah Ho Rui Hung[1], Collin Yip Ming Tan[1], Zhi Quan Tay[1], Regina Xinyi Ng[1], Juntian Wu[2], Marcus Eng Hock Ong[3], Fahad Javaid Siddiqui[3]

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Aims: Emergency Care Service Frequent Attenders (ECS-FA) represents a disproportionate utilization of healthcare resources. This has led to extensive research focused on FA. Yet, there is currently no consensus on the definition of a FA, making subsequent analyses of this population inconsistent and hard to compare. We aim to provide an overview of the adopted definitions of a frequent attender in the current literature.

Methodology: A scoping review was carried out in accordance with the PRISMA-ScR extension guidelines for systematic reviews and meta-analyses. Four databases, namely Medline, Embase, PsycINFO, and CINAHL, identified research studies focused on individuals who frequently use ECS. Non-primary research papers, conference abstracts, and study protocols were excluded from the review. Ten reviewers independently screened results and extracted relevant data from selected studies. Two reviewers independently reviewed each article, with the third reviewer settling the discordant decisions

Result: The database search yielded 12330 unique references for abstract review, of which 1065 were retained for full-text review, where 611 papers met our criteria for inclusion. The majority of papers (30/42) defined FA using the number of visits to ECS per year. There were exceptions (4/42) that used other methods to define FA, for example, the Top 10% of participants, the Top 20 of most frequent ECS attenders based on total ECS visits, ECS utilization in the last year prior to death, and lastly groups defined by author. The most popularly used definition for FA was >4 ECS visits/ year (14/42), followed by >5 VISITS/year. (5/42).

Conclusion: This review shows that there is a wide variation in the definition of FA. However, most literature proposes >4 ECS visits/ year as an acceptable cut-off. We propose the development and adoption of a standardized definition for an FA, that will be applicable for all ECS settings. This will allow comparisons of future metanalysis to better determine factors contributing to FA's and interventions to decrease ECS burden.

00171 Global Review of the Interventions to Reduce Emergency Care System Frequent Attenders: A Scoping Review

Zhi Quan Tay[1], Collin Elijah Ho Rui Hung[1], Collin Yip Ming Tan[1], Darien Wen Jing Leong[1], Chan Daniel Jeremiah[1], Regina Xinyi Ng[1], Juntian Wu[2], Marcus Eng Hock Ong[3], Fahad Javaid Siddiqui[3]

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Aims: The emergency care system (ECS) provides care in two distinct phases, pre-hospital and in-hospital. Pre-hospital care is provided at the scene and during transfer to the emergency department (ED). In-hospital care is provided at the ED. To improve care at each phase requires a variety of interventions. We aim to collate and present an overview of the published interventions on emergency care system frequent attenders (ECSFA) in a way to guide and designs better interventions for ECSFAs for each phase. This scoping review aims to collate and organize current literature on interventions conducted worldwide to reduce ECSFA, highlighting key areas for discussion and future research.

Methodology: A scoping review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses scoping review (PRISMA-ScR) extension guidelines. Searches were conducted on 4 databases (Medline, Embase, PsycINFO, and CINAHL) to identify studies on ECSFA. Non-primary research papers, conference abstracts, and study protocols were excluded. Ten reviewers independently screened the search results and extracted data from included studies. Each article was independently reviewed by two reviewers and verified and extracted by a third reviewer. Studies on ECS-FA interventions were then further sorted out.

Result: 12,330 unique references were included for abstract review, of which 1,065 were retained for full-text review, where 611 papers met our inclusion criteria. Variables for data extraction include information on the study settings, healthcare system characteristics, population studied, the definition of ECS-FA, measures and scales used, characteristics of ECS-FA presented, type of intervention, intervention agent, main results of the intervention, challenges in implementing the interventions, presence of follow-up assessment and adherence to follow-up.

We present preliminary data for 10 intervention studies. The types of interventions were case managers/care coordinators (n=9) and an ED multidisciplinary, community-based program (n=1). Only 3 studies were randomised controlled trials (RCTs). These interventions were conducted in the United States of America (n=8), Switzerland (n=1) and England (n=1), targeting urban ECSFA. Most ECSFA are defined as patients with ⩾3 visits in a year. All but 1 (Lee, 2006) of the interventions resulted in a statistically significant reduction in ECS-FA attendance. Pertinent limitations faced were loss to follow-up, inadequate intervention duration and small eventual sample size. Reasons for loss to follow-up were due to death, loss of contact or refusal for further participation.

Conclusion: This scoping review is currently in progress and will provide valuable insights into the challenges faced when implementing such interventions. The results will guide future research, improving intervention designs to best suit the settings and study questions with fewer limitations, thus generating more robust evidence.

00172 Development of a List of Autoimmune Rheumatic Diseases and Their Manifestations for Population Screening: A Consensus Development Study

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Aims: Screening questionnaires/tools are one of the key strategies to shorten diagnostic delay among patients with autoimmune rheumatic diseases (ARDs). However, most existing screening questionnaires/tools for ARDs are developed to screen for only one or a limited number of ARDs and thus have limited utility given the overlapping manifestations among different ARDs. We therefore aimed to develop a list of ARDs for population screening and, based on which, to develop a list of manifestations to be assessed in a screening tool.

Methodology: This study comprised two phases: Phase 1, development of a list of ARDs through a modified Delphi study with accredited rheumatologists; and Phase 2, development of a list of manifestations through a modified nominal group technique with accredited rheumatologists, other healthcare professionals caring for patients with ARDs and patients with ARDs.
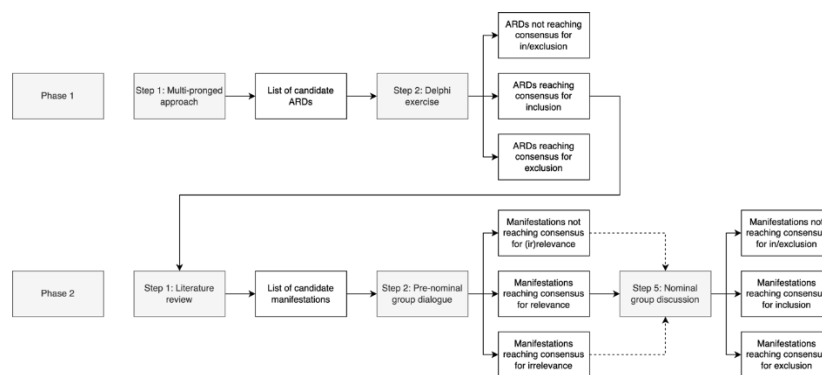
Result: In Phase 1, a list of 14 candidate ARDs were identified using a multi-pronged approach, of which 10 were deemed necessary to be screened for in the general population through three rounds of Delphi exercise. In Phase 2, 80 candidate manifestations of these 10 ARDs were identified from a literature review, of which 59 were deemed necessary to be assessed in a screening tool through a pre-nominal group dialogue and two rounds of nominal group discussion.

Conclusion: A consensus-based list of ARDs and their manifestations for population screening were developed in this study. This provides a basis for the development of a new ARD screening tool to facilitate early diagnosis of ARDs.

00173 Improving the Rate of Secondary Diagnoses in SKCH Patient Discharge Summaries

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Aims: Background:

Discharge summaries are important pieces of medical documentation that are used by both healthcare professionals and patients to understand the events of a hospital admission, as well as ensure safe handover of care. There is a need for high-quality discharge summaries as they are essential for promoting patient safety during transitions between care settings, particularly during the initial post-hospital period.

Documenting secondary diagnoses will lead to patients being more correctly identified according to the level of medical complexity of their case. In addition, well-documented discharge summaries are vital to the provision of accurate data to the Government for the purpose of receiving appropriate operating subvention.

If important medical information coded into the discharge summaries are sometimes missed or documented incorrectly, it can significantly impact patient care and subsidies to the patient and hospital funding.

Current problem:

Baseline data for patients discharged from SKCH PACC wards between October 2022 and February 2023 showed that almost 30% of them had no secondary diagnoses in their discharge summaries. This translated to a proportion of our patients not qualifying for subventions reserved for complex care patients, which may affect both the patient and hospital institution.

Aim statement:

100% of patients discharged from Sengkang Community Hospital will have secondary diagnoses coded as part of their discharge summaries.

Methodology: To better understand the workflow process, the team engaged ward doctors in a data-gathering survey. A root case analysis was then conducted to determine the reasons contributing to the failure of coding secondary diagnoses in discharge summaries. Three PDSA cycles were conducted based on interventions designed to tackle the main reasons elucidated from our Pareto chart analysis. The interventions included (1) a formal training session for ward doctors to understand the rationale, and correct definition of secondary diagnoses, (2) visual reminder system, and (3) simplified workflow for coding of secondary diagnoses.

Result: The number of discharge summaries with secondary diagnoses increased from 69% to 92% 1 month after implementation of our first intervention.

Conclusion: Secondary diagnoses in discharge summaries are important for patient care and better appropriation of our healthcare resources. There was an improvement in the number of secondary diagnoses in discharge summaries after the implementation of our first intervention. We foresee a further improvement to 100% of inpatient discharge summaries with secondary diagnoses after our subsequent interventions.

00174 Predicting Risk of ICU Admission in Trauma Patients at the Emergency Department

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Aims: We propose a decision support tool to assist clinicians in identifying trauma patients that require Intensive Care Unit (ICU) admission and predicting the ICU length of stay (LOS). We evaluated the tool based on Net Benefits (NB) and ICU utilization.

Methodology: MIMIC-IV1 data was used to develop machine learning (ML) models to predict ICU admission and LOS of trauma patients at three stages in the ED (Triage, Consultation and Disposition). Various models, including a stacked ensemble model, logistic regression, random forest, and other ML models were evaluated for their predictive accuracies. Net benefit2 and queueing theory3 were used to evaluate patient and system outcomes.

Result: Table 1 presents the predictive accuracies of the ML models in which AUROC values were between 74% to 82%, indicating reasonably good prediction power. Our results show positive NB for the ML models across all prediction stages. Our queuing models show the need to plan for the number of ICU slots required to ensure sufficient beds for trauma patients during peacetime. We also illustrate resource sufficiency being dependent on the risk threshold used to define patients with ICU LOS of more than 3 days.

Conclusion: This project demonstrated the potential for ML models to predict ICU admission and ICU length of stay of trauma patients at ED. Early identification of high-risk patients may lead to more timely treatment and better outcomes, but adequate ICU resources will be needed.

Table 1: Predictive Accuracies of ML Models Across 3 Stages in ED

Outcome and model	AUROC	Sensitivity	Specificity	False Negative Rate	F1 (Class 1)	F1 (Class 0)
Triage Stage						
Logistic Regression	0.79	0.38	0.92	0.62	0.44	0.89
Random Forest	0.79	0.16	0.97	0.84	0.26	0.90
Gradient Boosting	0.78	0.10	0.99	0.90	0.17	0.90
Neural Network	0.79	0.16	0.97	0.84	0.25	0.90
Stacked LSTM	0.76	0.27	0.95	0.73	0.36	0.89
Consultation Stage						
Logistic Regression	0.79	0.38	0.92	0.62	0.45	0.89
Random Forest	0.79	0.24	0.96	0.76	0.34	0.90
Gradient Boosting	0.78	0.10	0.99	0.90	0.17	0.90
Neural Network	0.79	0.17	0.97	0.83	0.26	0.90
Stacked LSTM	0.77	0.46	0.90	0.54	0.48	0.89
Disposition Stage						
Logistic Regression	0.79	0.37	0.93	0.63	0.44	0.89
Random Forest	0.81	0.37	0.97	0.63	0.49	0.92
Gradient Boosting	0.80	0.36	0.97	0.64	0.49	0.92
Neural Network	0.82	0.29	0.97	0.71	0.41	0.91
Stacked LSTM	0.74	0.45	0.95	0.55	0.55	0.92

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00175 How Knowing About Breast Cancer and Women's Feelings About It Affect Their Decision to Get Regular Screenings: Insights from the BREATHE Study

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Aims: Routine breast cancer (BC) screening attendance is suboptimal (<40%) in Singapore, undermining the use of BC screening to detect early BC. We aim to explore if women's BC awareness and sentiments towards BC screening influence their willingness to attend routine screening (RS).

Methodology: Participants (aged 35-59) were recruited from two restructured hospitals and two polyclinics through the BREAst screening Tailored for HEr (BREATHE) study (ongoing recruitment). BC awareness was assessed using true/false statements, with the correct answer and explanation given after every submitted response (digital interface). We characterised participants as aware of BC risk prior to study enrollment if they answered >80% of the questions correctly. Following this, participants were asked if knowledge of BC screening made them more willing to attend RS (yes/no) and an explanation for their choice (free text, optional). Association between willingness to attend RS and initial BC awareness was examined using logistic regression. Word cloud (R package "ggplot") and sentiment analysis (R package "sentimentr") were used to analyze free text. Sentiment value of each sentence was calculated and aggregated for each participant.

Result: As of December 2022, 2979 participants answered the English questionnaire. Eighty percent (n=2361) were aware of BC risks before enrollment. Compared to those who were unaware, a larger proportion (96%, 2261/2361 vs 87%, 538/618) of BC-aware participants expressed increased willingness to attend RS (OR[95%CI]: 3.35 [2.46-4.57]). In the age-adjusted models, other factors that contributed to an increased willingness to attend RS include: previous attendance of BC screening, belief in screening importance, low fatalistic attitudes towards developing BC, and finding screening to be not embarrassing, inexpensive, convenient, and not painful.

Of those who were less willing to attend RS (n=180), 66% (n=119) included free-text explanations; the top-mentioned words were "pain"," time", and "regular". Among those who were more willing to attend RS (n=2799), 34% (n=955) included free-text explanations; the top-mentioned words being "early", "detect", and "prevent". Participants with increased willingness to attend RS reflected more positive sentiments (mean [IQR]: 0.23 [0 - 0.43]) compared to those who were less willing (-0.12 [-0.30 - 0]). This trend was similarly seen in the regression model, where those with neutral or negative sentiments were significantly less willing to attend RS (OR[95%CI]neutral vs positive(ref): 0.16 [0.09 -

0.27], p=<0.001; ORnegative vs positive(ref): 0.11 [0.07 - 0.19]), even after accounting for age and BC knowledge score.

Conclusion: Our results suggest that one in five Singaporean women are sub-optimally informed about BC risks. BC risk education can contribute to an increased willingness to attend RS, even among BC-aware women. Importantly, addressing women's negative sentiments towards screening is crucial for improving RS attendance rates.

00176 Strength and Lower Limb Function Correlated with Life Space of Older Adults in Singapore

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Aims: Life space is a measure of community mobility and is reflected by the activities people engage in and the places they access. Shrinking life spaces often see higher mortality rates and increased morbidities, especially among aging populations. The literature has shown that people with better locomotion and vitality are likely to have higher life spaces. In this study, we hypothesize that physical capabilities correlate positively with the life spaces of community-dwelling older adults in Singapore. To achieve this, we assessed seniors with a battery of physical assessments and administered a questionnaire.

Methodology: A volunteer sample (N = 976) joined the Elderly Activity Life-Space (EASE) Project at various community centres and senior activity centres across eastern Singapore. All physical assessments were conducted in-person with trained staff, and life space was measured with the self-reported University of Alabama at Birmingham Life Space Assessment (UAB LSA) scale. The sample was between 50–88 years old (M = 62.6, SD = 7.1), predominantly female (67%) and Chinese (92%).

Result: Participants reported having relatively high life spaces (M = 90.5, SD = 17.9). Applying cut-offs established in literature, majority performed well on lower extremity tests such as the 30s Chair Stand Test (30CST; M = 16.9, SD = 5.2), the 5x Sit-to-Stand Test (5XSST; M = 8.8, SD = 2.8), the 10m walk test for gait speed (M = 1.4m/s, SD = 0.2), and the composite Short Physical Performance Battery (SPPB; M = 12.6, SD =1.4). They also had relatively high scores on the hand grip test (HGS, M = 27.7, SD = 8.2); only 11% had low HGS after applying gender-based cut-offs. Approximately one-third had low scores on the Timed Up and Go test (TUG; M = 8.6, SD = 2.0) and the Two-Minute Step Test (TMST; M = 93.2, SD = 19.3). Pearson correlation coefficients were computed to assess the relationship between life space and the various physical assessments. Sociodemographic variables (e.g., age, sex, and race) were controlled for in analysis. The following physical assessments had significant correlations to life spaces: HGS, $r(974)$ = .08, p = .008; TUG, $r(973)$ = -.17, $p < .001$; GS, $r(973)$ = .15, $p < .001$; SPPB, $r(974)$ = .13, $p < .001$.

Conclusion: The results suggest that better strength and lower extremity function are related to increased life space. On the other hand, less apparent were the associations between life space and power or endurance assessments like the 30CST, 5XSST, and TMST. We conclude that focusing more on strength training and improving lower limb function in older adults may benefit community mobility more than power and endurance training.

00177 Development and Validity of a Self-reported Measure of Stair Descent Function in Knee Osteoarthritis and Total Knee Arthroplasty

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Aims: Patients with knee osteoarthritis (OA) or total knee arthroplasty (TKA) often have difficulty descending stairs. Performance-based measures (PPM) of stair descent can be tedious to administer and existing self-reported measures of stair climbing ability are generally worded and do not enquire the use of compensatory strategies. Hence, this study aimed to develop and validate a self-reported measure of stair descent function (termed stair descent assessment [SDA]) that accounts for (i) handrail use, (ii) stair gait pattern, and (iii) perceived stair climbing difficulty.

Methodology: A sample of 103 patients with TKA participated. Cross-sectional and longitudinal (pre-TKA to Month-3 post-TKA interval) convergent validity was assessed by comparing correlations between SDA and the Western Ontario and McMaster Universities Arthritis Index physical-function subscale (WOMAC-PF) with PPMs of sit-to-stand, gait speed, and stair-climbing tests. Discriminant validity from pain intensity was assessed by contrasting the SDA/WOMAC-PF correlations with the PPMs and knee pain intensity. Pre-to-postoperative sensitivity to change of all measures were evaluated by the probability of superiority (PS) index.

Result: Amongst patients who reported "none" or "little" difficulty on the WOMAC stair descent item, a sizeable proportion of patients (preoperative: 16 of 21; postoperative: 32 of 54) reported using compensatory strategies on the SDA (Figure 1). SDA showed comparable or stronger cross-sectional and longitudinal convergent validity with PPMs as well as discriminant validity from knee pain intensity when compared with WOMAC-PF. Longitudinally, the SDA and stair-climb test shared similar sensitivity-to-change characteristics (PS, 0.66 vs 0.68).
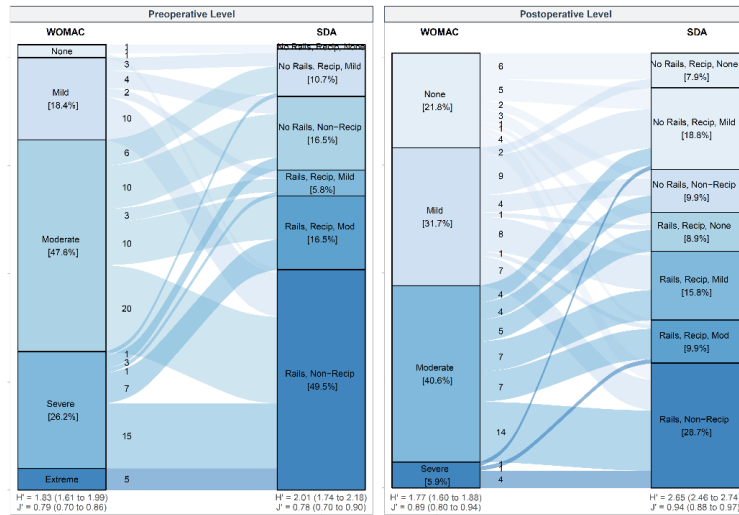
Figure 1. Crossover between response options of WOMAC stair descent item (left panel) and SDA (right panel). Bar height is proportional to the number of patients. Numbers in connecting segments represent number of patients in the segment. Below each bar, Shannon *H'* and *J'* indices (bootstrapped 95%CI in parentheses) measure item classification efficiency. (See Statistical Analysis and Appendix sections for details.)

Conclusion: The SDA showed adequate measurement properties that may complement PPMs of stair climbing function in knee OA/TKA patients. For ease of access, SDA was incorporated into an online application (https://stillness.shinyapps.io/stair_descent_item/). Further studies in large and diverse patient samples are needed to validate and refine the SDA.

00178 Costs Relating to Freezing of Gait in Singaporeans with Parkinson's Disease

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Aims: Approximately 50% of people with Parkinson's (PWP) experience freezing of gait (FOG) – an episodic inability to take effective steps, consequently affecting walking. FOG results in higher fall risks and disability, likely increasing functional dependency, healthcare-related costs and productivity losses. To date, no study has explored costs related specifically to FOG. Since FOG is associated with falls and greater disability, this may increase healthcare costs, caregiver-related costs, and economic burden. This study examined FOG-specific costs by comparing annuals costs of PWP with FOG (FOG+) and without FOG (FOG-). Determining FOG-specific costs may help inform government subsidies for PWP with FOG to alleviate the financial burden of this debilitating impairment.

Methodology: A prospective cohort study was carried out with data collected at approximately 3-, 6- and 12- months intervals. PWP who scored greater than 1 on item 3 of the FOG Questionnaire were classified as having FOG (FOG+), while PWP who scored the equivalent or less than 1 were classified as PWP without FOG (FOG-). Direct costs (healthcare-related costs and formal caregiver costs) were derived based on costs published on institution websites. Indirect costs (productivity losses of participants and their informal caregivers) were computed based on estimated wages published by the Ministry of Manpower. Between-group differences in direct and indirect costs were compared with the Mann Whitney U. Significance was set at $P<.05$.

Result: There were no significant differences in total annual mean costs [FOG+: SGD12257.48, FOG-: SGD17132.17, p=.412]. However, PWP with FOG had significantly greater annual pharmacotherapy costs [FOG+: SGD1877.46, FOG-: SGD362.97, p=.041].

Conclusion: PWP with FOG incur significantly higher pharmacotherapy costs annually. While this may be confounded by longer disease duration, a trend for greater costs with increasing FOG severity was observed. Future studies with larger samples could investigate if FOG severity indeed increases costs incurred in PWP, while controlling for disease duration, to determine if more subsidies should be directed to PWP with severe FOG in the community.

00179 Poor Oral Health and Cognitive Decline among Older Persons in Singapore: Current Evidence and Future Perspectives

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Aims: Singapore is a rapidly ageing society, with one in four individuals expected to be over 65 years of age by 2030. Consequently, the prevalence of ageing-associated health conditions is expected to rise in the coming years. For instance, the number of people with dementia is projected to jump from 45,000 in 2015 to 241,000 in 2050. Given the rising body of research on the association between poor oral health and cognitive impairment worldwide, it is highly relevant to appraise the evidence in the local population and utilise it to provide insights into future perspectives to improve the oral/general health of older Singaporean persons. Therefore, in this review, we aimed to identify studies exploring the association between poor oral health and cognitive decline using real-world data among older Singaporeans.

Methodology: An electronic search using the terms 'Singapore' AND 'periodontal' OR 'caries' OR 'oral' AND 'brain' OR 'cognition' was performed in PubMed. Studies using original data from Singapore were selected, and data extracted for the review, with the literature search performed by two referees. After selecting articles published using Singaporean data, we manually explored the scientific production of the authors of the identified papers to search for other manuscripts, if available.

Result: On reviewing the literature, we found four articles investigating this association. Three studies assessed older people enrolled in the PHASE study (Panel on Health and Ageing of Singaporean Elderly), a nationally representative study comprising 4990 community-dwelling older adults aged 60 years and above. While one study assessed older adults in the HOPE study (Healthy Older People Everyday), a population-based study involving 1051 individuals aged 65 and older from the Northwest region of Singapore. Preliminary evidence suggests tooth loss, natural sequelae of untreated gum disease, and poor chewing ability to be linked to cognitive impairment. The association between chewing disability and cognitive impairment was suggested to be partially mediated by depression. Some of the proposed mechanisms include reduced brain stimulation and/or nutrient deficiencies due to deteriorations in masticatory performance and common underlying systemic inflammation in the pathogenesis of these conditions, among others.

Conclusion: An association between poor oral health and cognitive decline has been observed. However, evidence for a causal relationship remains unclear. Future research should focus on exploring the causality between poor oral health and cognitive status and designing clinical trials to evaluate the effects of improving oral health on objective markers of cognition. Altogether, Singapore's demography

presents a unique opportunity to explore challenges connected to healthy ageing and uncover mechanisms explaining the link between oral and cognitive health.

00180 Identification of Mycobacteria and Detection of Drug-resistant TB in Clinical Samples Using Targeted Next-Generation Sequencing (NGS) Using the Deeplex® MYC-TB assay (Deeplex)

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Aims: Tuberculosis (TB) is a major health problem worldwide and its incidence is 32.8 per 100,000 in Singapore. Multidrug resistant TB (MDRTB) is a serious public health challenge thus quick and accurate diagnosis is essential for controlling its spread. Rapid molecular tests are used locally for the direct detection of TB and genes conferring resistance to rifampicin or both isoniazid and rifampicin. Nontuberculous mycobacteria (NTM) are also becoming increasingly important pathogens and account for 56% of our laboratory's acid-fast (AFB) smear-positive samples. Direct molecular test results provide presumptive information and culture remains the gold standard for identification of mycobacteria and drug susceptibility testing (DST).

Conventional culture-based techniques take several weeks and whole-genome sequencing which provides genotypic information on mycobacterial species, TB lineage and mutations conferring drug resistance, requires cultured isolates, which take an average of 2 to 3 weeks to grow. The Deeplex assay (GenoScreen, Lille) enables the detection of MTB or NTM directly from smear-positive clinical samples using targeted amplicon-sequencing. It enables subspeciation of the MTB complex, resistance prediction to 15 anti-tuberculosis drugs for samples containing TB, while more than 150 NTMs may be identified through its cloud-based database.

Our aim is to evaluate the Deeplex assay in detecting MDRTB and NTM from reference strains and clinical samples.

Methodology: We evaluated the ability of the Deeplex assay in detecting and speciating mycobacteria, and TB drug resistance profiling using 23 cultured reference isolates and 32 AFB smear-positive sputum and extrapulmonary specimens. Extraction of DNA and library preparation was performed following the manufacturer's instructions; and sequencing by Illumina's MiSeq. The results were correlated with the speciation and DST of the cultured isolates, established through conventional methods.

Result: For the reference strains in MGIT culture, the Deeplex assay was able to detect MTB with 83% concordance (5 out of 6) and NTM with 94% concordance (16 out of 17); 2 isolates could not be identified, possibly due to a low starting DNA load. For the smear-positive clinical samples, the assay was able to detect MTB DNA with a concordance of 100%(n=16) versus the culture result, and all variant mutations conferring drug resistance identified were concordant with the phenotypic DST results. For NTMs, concordance was lower at 62.5% (10 of 16) at initial testing. For 5 of the 6 samples with

discrepant or no results, the cultured isolates were extracted and the concordance upon retesting was 100%.

Conclusion: The overall performance of Deeplex was better for clinical samples with an AFB score of more than 1+ and those that did not contain a mixture of organisms. The Deeplex assay may be used for the rapid diagnosis of both MTB and NTM in clinical samples and cultured isolates. An interim result issued would be useful to aid clinician-decision making on the empiric use of first-line drugs for TB patients or the de-isolation of smear-positive NTM cases.

00181 Effective Interventions to Improve Access to Medicines in Primary Care Settings in Low- and Middle-Income Countries: A Qualitative Study

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Aims: Noncommunicable diseases (NCDs) are the leading cause of mortality worldwide, responsible for three-quarters of all deaths. 77% of all NCD deaths and 86% of premature NCD deaths occur in low- and middle-income countries (LMICs), where access to medicines for treatment is a challenge. Despite the increasing attention on NCDs in the past decade, progress towards addressing this problem has been slow. Through key informant interviews, this study describes core challenges faced and key interventions that have been effective in improving access to NCD medicines at the primary care level.

Methodology: Semi-structured interviews were conducted between January and February 2023 over Zoom with 15 participants with experience in providing service, administering, or overseeing at least one primary care facility providing NCD healthcare services in an LMIC. Participants were asked a series of questions on challenges faced and interventions that have worked in improving access to NCD medications at the primary care level.

Result: Core challenges identified included low patient awareness of risk factors for NCDs and related complications, low government healthcare spending, inadequate design of the health system for NCDs, and poor governance. Interventions described by participants were observed to be interlinked, reflecting the need for a systems approach to improving access to medications. A Current Reality Tree was developed to illustrate the interlinkages between the barriers and interventions (Figure 1).
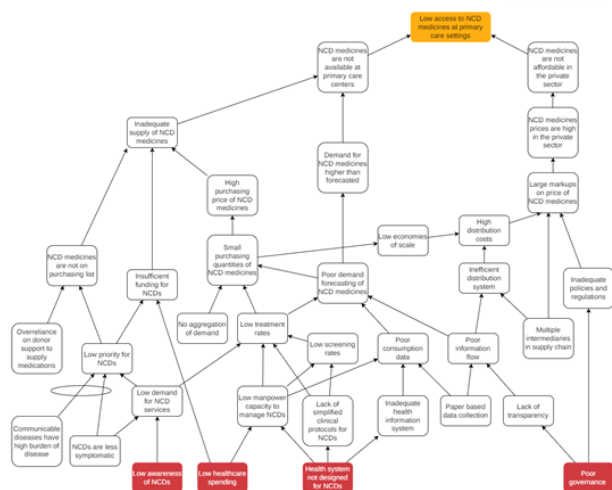
Figure 1: Current Reality Tree

Conclusion: Access to medicines continues to pose a major challenge in global efforts to manage NCDs in LMICs. Various interventions recommended by WHO and other experts have shown effectiveness in addressing barriers to access to medicines in the primary care setting. Findings from this study could serve as guide for exploring the interlinkages between challenges faced and interventions to address them, highlighting the need for a systemic approach to improving access to medicines. Future studies could explore the prioritization and selection of these interventions in LMICs.

00182 Competence in Musculoskeletal Pain among Nurses in Primary Care: A Cross-sectional Study in Singapore

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SingHealth Polyclinics

Aims: In Singapore, musculoskeletal (MSK) pain is one of the commonest reasons people seeking medical attention in primary care. Nurses play an important role in the multidisciplinary approach to MSK pain. Competence is key to effective MSK pain management. Research on primary care nurses' competence regarding MSK pain is limited. This study aimed to evaluate the current competence levels of primary care nurses in SHP in MSK pain, and to explore the correlations among the domains of competence, and years of nursing experience.

Methodology: A multi-centered cross-sectional study was conducted in public primary care setting. Nurses were enrolled from eight SingHealth Polyclinics. Data were collected between October 2022 and April 2023 using a self-administered electronic questionnaire. Instruments included Neurophysiology of Pain Questionnaire (NPQ), Clinical Assessment Vignette (CAV), Management Advice Vignette (MAV), and Health Care Pain Attitudes and Impairment Relationship Scale (HC-PAIRS). Basic demographic data were also collected. Convenience sampling was used.

Result: Response rate was 80%. The nurses obtained a median score of 6 points, or 50% (IQR = 5-8 points or 41.7-66.7%) in NPQ; a median of 3 points, or 50% (IQR = 2-4 points or 33.3-66.7%) in CAV; a median of 2 points, or 50% (IQR = 1-3 points or 25.0-75.0%) in MAV; and a median score of 52 points (IQR = 49-56 points) in HC-PAIRS. There were no significant correlations among the four dimensions of competence studied. The number of years in nursing significantly correlated with CAV (r = 0.301, p = 0.003), as well as HC-PAIRS (r = -0.231, p = 0.026).

Conclusion: This study throws light on the current status of SHP nurses' competence in MSK pain in primary care. There are opportunities to curate training to enhance competence of SHP nurses in managing MSK pain. Besides, our findings could inform the nursing school curriculum design to focus on pain neuroscience and evidence-based management. Our study also shows that work experience may influence nursing skills and attitudes towards musculoskeletal pain, thus good learning environment at work is important.

00183 Evaluation of Risk Prediction Models for Chronic Kidney Disease Progression: A Systematic Review

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Aims: To systematically review the performance of risk prediction models for progression of chronic kidney disease (CKD).

Methodology: We systematically search using PubMed to identify relevant studies published between 2010 and 2021. We included longitudinal studies, published in English, which focused on the development or validation of risk prediction models for the progression of chronic kidney disease (CKD) with estimates of performance including area under the curve (AUC). Studies included participants recruited from clinic, hospital, or communities. Data were extracted and analysed by two independent reviewers.

Result: Out of the 268 studies retrieved, five met the eligibility criteria. The included studies had a median follow-up period of 4.5 years (range: 3.6 – 5.0). Data were obtained from 4 countries compromising 4 prospective cohort studies and 1 translational research study. Sample sizes ranged from 126 to 107,097 participants, with a predominant inclusion of males and White Caucasian ethnicity. Key risk factors identified were age, gender, ethnicity, diabetes, cardiovascular events and estimated glomerular filtration rate(eGFR). Disease progression definition varied with 2 studies defined it as a decline of more than 40% from baseline, 1 study defined it as decrease in eGFR slope of >5% per year, 1 study defined it as initiation of kidney dialysis and 1 study used a composite outcome including rapid decline in eGFR, sustained decline of eGFR of at least 40% from baseline, and the need for long-term dialysis or kidney transplant. Four of the included studies developed and validated predictive models with good discriminatory performance, yielding AUC values ranging from 0.77 to 0.94. Three of these studies developed machine learning algorithms (MLA) and defined >40% eGFR reduction as the progressor group, achieving AUC values ranging from 0.77 to 0.84. One study employed a traditional regression approach, defining kidney failure as the outcome, and achieved an AUC of 0.94. Three studies conducted external validation, while one study used internal validation only.

Conclusion: There is significant heterogeneity among studies in terms of the CKD progression definitions and follow-up periods, highlighting the need to standardize these criteria for future research. Despite these limitations, risk models employing both MLA and traditional regression approaches have demonstrated acceptable discriminatory performance. To enhance the accuracy of CKD progression prediction and improve their clinical utility, it is crucial to further refine and externally validate these models.

00184 Anchor Start – A Screening Programme for Maltreated Children and Families

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KK Women's and Children's Hospital

Aims: Early exposure to maltreatment can have significant impact on a child's development, behavior, and emotional well-being. Results from a pilot programme (Anchor), which screens children and their siblings aged less than 4 years with suspected maltreatment, revealed significant developmental, behavioural and social-emotional impairments and showed an association between caregiver mental health conditions with global developmental delay in this population.

The Anchor Start programme was thus established in January 2023 to extend the screening to all pre-school children aged 0 to 6 years old and their siblings who present with suspected maltreatment. The primary aim is to evaluate these children for developmental, behavioural and social-emotional impairments and their families for mental health conditions and social risk factors to provide timely referrals and intervention. The secondary aim is to provide psychoeducation to caregivers and enhanced coordination of care for the children and their families.

Methodology: Children aged 0 to 6 years and their siblings who present with suspected maltreatment will undergo screening using age-appropriate developmental tools and a behavioural questionnaire. Symptoms of post-traumatic stress disorder are screened for using a validated checklist. Questionnaires are administered to caregivers to assess their stress level and presence of anxiety or depressive symptoms. Potential contributing social factors are also screened for. Appropriate referrals are then made, and psychoeducation and coordinated care are provided to these families.

Result: 34 children have been screened as of May 2023, of which 60% have significant developmental delay, 55% have significant behavioural difficulties and 15% have significant social-emotional impairments. Amongst children attending kindergarten, 60% demonstrated below average academic skills. 36% of caregivers who underwent screening had mental health concerns.

Conclusion: There is a high prevalence of developmental and behavioral impairments among maltreated children below age of 6 and a significant prevalence of mental health concerns amongst their caregivers. Thus, continued screening of this population is important for early identification of their needs in order for the child and family to receive timely intervention as well as improved coordination of care in order to achieve optimal outcomes.

00185 Reducing Healthcare Utilization in Patients with Indwelling Pleural Catheters: A QI Pilot

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Aims: Patients with malignant pleural effusions (MPEs) often have significant symptoms and high healthcare utilization rates. Indwelling pleural catheter (IPC) is increasingly used for treatment of MPEs as they are equally effective as talc pleurodesis in achieving pleurodesis and are meant to reduce the length of stay (LOS) in hospital. However, despite shortening initial hospital length of stay, IPCs still result in significant repeat hospital visits for issues related to the drain. In our baseline data set, patients undergoing IPC insertion would stay a median of 4 days, and within 3 months of insertion, the average ED visit related to drain issues was 57% and readmission rate was 64%.

We aim:
1)To decrease the percentage of IPC -related Emergency Department (ED) visits and hospital readmissions within a 3-month period after insertion from baseline by 30%
2)To decrease the median hospital length of stay for patients admitted for IPC insertions.

Methodology: Factors leading to repeated healthcare visits of patients with IPC were analysed using Ishikawa diagram. Interventions using Plan-Do-Study-Act (PDSA) cycles were formulated after focus group discussion: 1) A nurse-led training sessions,1 hour in duration held over the 6-month period to educate community nurses and hospital nurses on care of patients with IPC were conducted. 2) Training to patient and caregiver prior to discharge with home-based care program (H2H) referral to support with caregiver training in the community.

Result: Data for this QI project was taken in 6 monthly intervals, between 1 July 2017 to 30 Sept 2022. A total of 38 patients had IPCs inserted. Outcome measures recorded were hospital LOS for the index visit for IPC insertion, ED visits and hospital readmissions related to IPC issues tracked from 3 months after the IPC was inserted. The patients who had the IPC inserted prior to March 2021 were considered as the baseline group. Thereafter, these outcome measures were analysed with 6-monthly intervals.

The average ED visit for patients with IPC insertion over a 3-month period was 20% and readmission rate was 20%. However, the median LOS for the index IPC insertion is still high, possibly due to multiple factors. Large proportion of these cases were urgent admissions via the ED instead of planned elective admissions, and these patients tend to be sicker, has other comorbidities and worse functional status that require a longer time in hospital in order to address all these issues.

Conclusion: Patients with IPC had lesser ED and clinic visits after the interventions, contributed by the increased support of the standardised counselling and H2H support. Our study has demonstrated that

nurse-led education interventions plus involvement of home-based care networks can decrease the percentage of ED visits and readmissions related to IPC issues. Further studies are required to see if this is a sustainable change. Also, more evaluation is required to understand the factors contributing to the persistent long LOS for these patients, before designing the next PDSA cycle to address this issue.

00186 Glaucoma Diagnostic Performance Using Cumulative Retardance of Retinal Nerve Fiber Layer Measured by Polarization-sensitive Optical Coherence Tomography

Parakkel Reshma Radhakrishnan, Xinyu Liu, Jacqueline Chua, Leopold Schmetterer, Damon Wong, Chi Li, Jocelyn Cheong Mei Yoke

Singapore Eye Research Institute

Aims: To compare the diagnostic performance of retinal nerve fiber layer (RNFL) cumulative retardance, as measured by a triple-input polarization-sensitive optical coherence tomography (PS-OCT) system, and the RNFL thickness derived from the spectral-domain-OCT(SD-OCT) in glaucoma detection

Methodology: The cross-sectional study analysed 38 normal controls without glaucoma and 49 patients with glaucoma using the custom-built PS-OCT and commercially available SD-OCT to measure RNFL cumulative retardance and thickness form a circumpapillary region around the optic nerve head. The diagnostic performance of cumulative retardance and thickness in glaucoma detection was compared using the area under receiver operating curves. The subjects with glaucoma additionally underwent a visual field test and were classified in to early (VF MD$\geq$-6 dB, 35 eyes), moderate (-6 dB<MD<-12dB, 21 eyes), or severe glaucoma (MD$\leq$-12 dB, 16 eyes) based on the visual field mean deviation (VF MD). The study analysed the correlations between VF MD and PS-OCT and OCT parameters across different severity levels of glaucoma.

Result: The study found that RNFL cumulative retardance and thickness exhibited comparable high performance in glaucoma detection, with area under the curves (AUCs) of 0.97 and 0.98, respectively, and no statistically significant difference (p=0.193). In the early and moderate glaucoma groups, there was a stronger correlation between RNFL thickness and visual field mean deviation (VF MD) compared to RNFL cumulative retardance, as indicated by Spearman's correlation coefficient (ρ) values ρ=0.05 (p=0.756) and ρ=0.17 (p=0.470), respectively. Conversely, in the severe glaucoma group, RNFL cumulative retardance exhibited a higher correlation with VF MD (ρ=0.84, p<0.001) compared to RNFL thickness (ρ=0.39, p=0.138).

Conclusion: RNFL cumulative retardance and thickness have similar diagnostic performance in glaucoma detection. The correlation with VF MD varies depending on glaucoma severity. RNFL thickness showed a stronger correlation with VF MD in early and moderate glaucoma, while RNFL cumulative retardance showed a stronger correlation with VF MD in severe glaucoma. These results suggest that RNFL cumulative retardance could be a useful metric in monitoring glaucoma, particularly in advanced stages.

00187 Lentiviral Gene Therapy Restores Neurovascular Coupling at the Optic Nerve Head in Caveolin-1 Depleted Mice

Ying Shi Lee[1], Jing Hong Loo[2], Zhenxun Wang[1], Leopold Schmetterer[1], Rachel Shujuan Chong[3]

[1]Singapore Eye Research Institute, [2]National University of Singapore, [3]Singapore National Eye Centre

Aims: Caveolin-1 (Cav-1) mediated the neurovascular coupling (NVC) response in the eye, which is disrupted in glaucoma patients. In this study, we investigated the effect of lentivirus-mediated gene therapy with Cav-1 on NVC at optic nerve head (ONH).

Methodology: Lentiviral vectors encoding Cav-1 (Cav-1_LV) or control lentivirus particles (Control_LV) were delivered via intraocular injection to 13 weeks-old Cav-1 knockout (Cav-1 KO) mice. The NVC response to light stimulus and positive scotopic threshold response (pSTR) in retinal ganglion cells (RGC) were measured 4-weeks after injection. Intraocular pressure (IOP) was measured at baseline, 2 and 4 weeks after injection. Structural changes to retina blood vessels were visualized by immunostaining.

Result: Cav-1_LV effectively improved the NVC response to light flicker stimulus in Cav-1 KO mice within peripapillary vessels (arteries $p=0.048$; veins $p=0.04$), ONH small vessels ($p=0.01$) and neuroretinal tissue ($p=0.004$) as compared to Control_LV treated eyes. Gross retinal blood vessels morphology was not altered. However, extravasation of albumin in large blood vessels was reduced after Cav-1_LV injection ($p<0.001$). pSTR measurements appeared higher in Cav-1_LV compared to control_LV-treated eyes although this did not reach statistical significance. Besides that, there was no significant difference in post-treatment IOP between groups.

Conclusion: Lentiviral gene therapy with Cav-1 improves the NVC response at ONH. This may be mediated by improved endothelial function in the retinal microvasculature.

00188 GPT on Guidelines: Providing Contextual Knowledge to GPT Allows It to Provide Advice on Appropriate Colonoscopy Intervals

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Aims: Colonoscopy is commonly used in screening and surveillance for colorectal cancer. Multiple different guidelines provide recommendations on the interval between colonoscopies. This can be challenging for non-specialist healthcare providers to navigate. Large Language Models (LLMs) such as ChatGPT are a potential tool for parsing patient histories and providing advice. However, the standard GPT model is not designed for medical use and can hallucinate. One way to overcome these challenges is to provide contextual information with medical guidelines to help the model respond accurately to queries.

Our study compares the standard GPT4 model against a contextualized model provided with relevant USA colorectal cancer screening guidelines. We evaluated whether the models could provide correct advice for screening and surveillance intervals for colonoscopy.

Methodology: Relevant guidelines pertaining to colorectal cancer screening and surveillance were formulated into a knowledge base for GPT. We tested 62 example case scenarios (3 times each) on standard GPT4, and on a contextualized model with the knowledge base.

Result: The contextualized GPT4 model outperformed the standard GPT4 model in all domains. No high risk features were missed, and only 2 cases had hallucination of additional high risk features. A correct interval to colonoscopy was provided in the majority of cases. Guidelines were appropriately cited in almost all cases.

Conclusion: A contextualized GPT4 model could identify high risk features and quote appropriate guidelines without significant hallucination. It gave a correct interval to the next colonoscopy in the majority of cases. This provides proof of concept that LLMs with appropriate refinement can serve as accurate physician assistants.
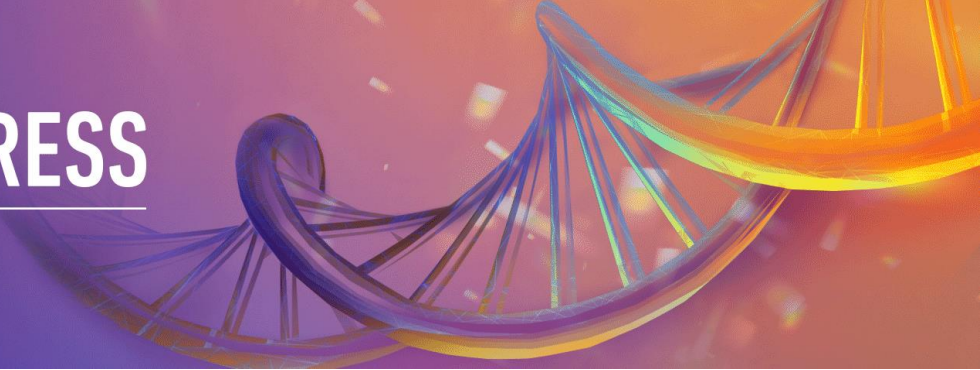
Evaluation Category		Patient Risk Profile									
		Overall (62 scenarios)		Screening (19 scenarios)		Surveillance (29 scenarios)		Post-cancer surveillance (6 scenarios)		Others (8 scenarios)	
		Context-ualized	Standard	Context-ualized	Standard	Context-ualized	Standard	Context-ualized	Standard	Context-ualized	Standard
Screening Interval	Correct Interval	147 (79%)	123 (66%)	50 (88%)	40 (70%)	55 (63%)	47 (54%)	18 (100%)	15 (83%)	24 (100%)	21 (88%)
	Incorrect Interval	39 (21%)	63 (34%)	7 (12%)	17 (30%)	32 (37%)	40 (46%)	0 (0%)	3 (17%)	0 (0%)	3 (12%)
	Interval too long	14 (8%)	25 (13%)	-	5 (9%)	14 (16%)	18 (21%)	-	2 (11%)	-	-
	Interval too short	5 (3%)	24 (13%)	-	5 (9%)	5 (6%)	19 (22%)	-	-	-	-
	No valid interval	20 (11%)	14 (8%)	7 (12%)	7 (12%)	13 (15%)	3 (3%)	-	1 (6%)	-	3 (12%)
p-value*		<0.01		0.03		0.28		0.22		0.23	

Table 1: Example output for contextualized GPT4 model

00189 Machine Learning Aids the Understanding of Microvascular Involvement in Diabetic Retinopathy

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Aims: The aim was to evaluate the progressive microvascular involvement of DM and early-stage DR using retinal and choroidal microvascular parameters extracted from OCTA images.

Methodology: Four groups of participants were included: healthy (196 eyes, 119 participants), those with DM no DR (120 eyes, 79 participants), those with mild DR (71 eyes, 53 participants), and those with moderate DR (66 eyes, 44 participants). They were scanned using a prototype SS-OCTA system.

Five predictor parameters were extracted from the OCTA images: FAZ perimeter and superficial vessel density (VD) from the superficial capillary plexus (SCP), deep VD from the deep capillary plexus (DCP), and the density of large flow voids and small flow voids from the choroid layer. To account for age differences, the parameters were pre-adjusted using the residuals from a linear regression model.

A random forest classification model was employed for four classification tasks: DM no DR vs healthy, mild DR vs DM no DR, any DR vs no DR, and moderate DR vs mild DR. The performance was measured in terms of F1 score. Feature importance was measured using Shapley Additive ExPlanations (SHAP), a local feature importance method that captures the marginal contribution of each predictor to the prediction.

Result: F1 scores of 0.682, 0.709, 0.825, and 0.644 were achieved for the respective tasks. The feature importance trend of the parameters and SHAP plots are shown in the figure.
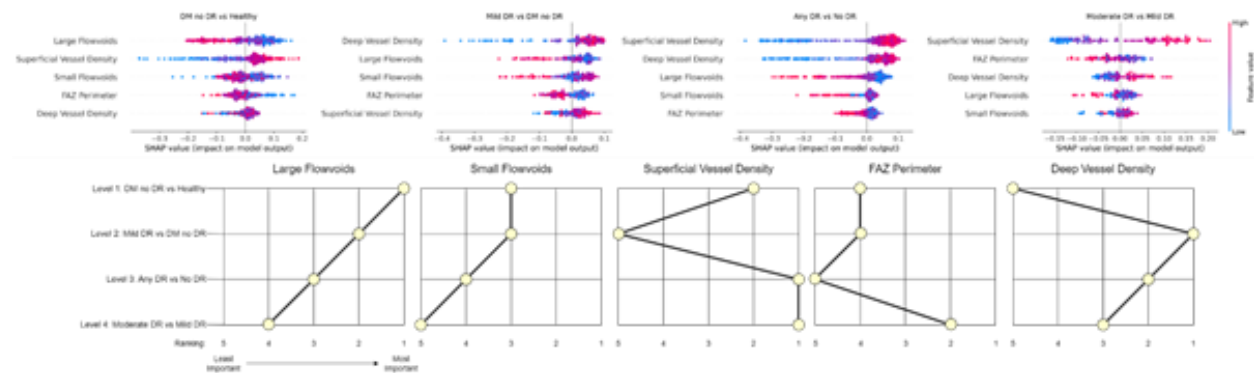
The SHAP results demonstrate that there is a distinct difference in the layers most impacted during the progression of DM and DR. Specifically, they suggest that the choroid layer is most affected when DM is developed. As DR develops, changes in the DCP become more prominent, and as DR progresses,

significant changes are observed in the SCP. When distinguishing any DR from no DR, SCP VD emerges as the most important parameter, indicating that the SCP is impacted throughout the progression, albeit to a varying degree.

Conclusion: This study demonstrated that the microvascular involvement of DM initiates in the choroid layer, and the progression of DR exhibits different patterns across different layers.

00190 Mixed Methods Evaluation of a Novel Community-Hospital Partnership for Eating Disorder Care

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Aims: Given the high level of illness complexity as well as the need for multidisciplinary treatment, Eating Disorder (ED) care has been traditionally centralized in tertiary hospitals. In the context of rising youth with ED post-COVID-19 and to better meet the needs of our families, we trialed a new model of hospital-community partnership to establish a support program for caregivers of youth with ED. We partnered with a community organization with deep expertise in supporting caregivers of those with mental illness and co-designed an eating disorder specific program. The program is administered by the community organization with ongoing expert support from the KKH eating disorder service.

This mixed-methods study aims to demonstrate the acceptability and efficacy of the support program for caregivers of adolescents with ED receiving care at KKH.   Moreover, the caregivers' experience with the program and the role of the program on their children's recovery was explored using qualitative interviews.

Methodology: The support group consisted of 13 online sessions with didactic lessons, facilitated support, and sharing from recovered patients. The materials were based on an existing general mental health curriculum and thirty percent of the materials was adapted for EDs.

Parents whose children were receiving care at KKH for ED and were participating in the program were recruited for participation.

Survey data was collected at baseline and 3- to 6- months post completion. Surveys included baseline demographics, the Parents versus Anorexia (PVA) scale, and the Warwick Edinburgh Mental Well Being Scale (MWBS) and analyzed using standard methods.   Qualitative interviews were conducted with participants exploring the impact of their participation and analyzed using thematic analysis.

Result: Seventeen caregivers were recruited into the study. Acceptability ratings (n=13) have been high with 92% rating the quality of program as good or excellent and 100% who definitely or probably would refer a friend to the support group.   There were no significant changes in PVA or MWBS post-participation.

Thematic analysis of ten interviews identified key themes elucidated key themes in the role of the program in their caregiving and wellbeing. Emotional regulation, communication skills, and self-efficacy were identified as key themes related to improved caregiver capacity. Improved social support, self-care, and decreased isolation were identified as key themes related to improved caregiver wellbeing.

Conclusion: This project has shown that community-hospital partnerships are an effective strategy to provide community-based support for adolescents with eating disorders. The program showed good acceptability and qualitative results demonstrated a deep impact of the program on participants.

00191 Non-adherence to Diabetes Complications Screening amongst Primary Care Patients in Singapore: A Mixed-Methods Study

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Aims: To determine the rates and predictors of non-adherence, and barriers/facilitators of adherence to diabetic retinopathy, nephropathy, and foot (DR, DN, DF) screening in patients with type 2 diabetes (T2DM) attending polyclinics in Singapore.

Methodology: In this longitudinal, clinic-based, mixed-methods study, patients who underwent DR/DN/DFC baseline screening and were offered an annual rescreening appointment (n=1433 appointments) were recruited from 4 SingHealth and 2 National Healthcare Group polyclinics. Participants' baseline clinical characteristics were recorded, and questionnaires measuring sociodemographic and patient-reported outcomes were administered. Non-adherence to DR/DN/DFC screening was defined as not attending the annual rescreening appointment within 4 months of the scheduled rescreening date. Multivariable logistic regression was performed to examine the baseline sociodemographic, clinical, and patient-reported predictors of non-adherence to the rescreening appointment. Additionally, 36 non-adherent and 24 adherent patients, and 9 healthcare professionals (HCPs) underwent qualitative interviews to elicit barriers/facilitators of adherence to rescreening at the 16th month follow-up, and data were analyzed thematically.

Result: Of the 639 participants (mean(SD age 60.7(9.4, 54.8% male, 68.9% Chinese), 25.7%, 26.2% and 15% were non-adherent to DR, DF and DN rescreening, respectively. Having a comorbidity resulted in a 2-3-fold increased risk of non-adherence (e.g. asthma for DR: OR 2.97 95%CI 1.23-7.16). Low self-rated diabetes control, and high cholesterol and serum creatinine levels predicted non-adherence to DR rescreening. Poor self-rated health status and lower DM self-efficacy, and being unemployed predicted non-adherence to DF rescreening. Being divorced/separated and not using diet control for DM management predicted non-adherence to DN rescreening. Qualitative interviews further revealed barriers (poor knowledge about consequences of diabetes, lack of emphasis on the importance of attending screening by HCPs due to busy clinics, long waiting times during visit, lack of time due to work commitments, inconvenient appointment times, and financial constraints) and facilitators (knowledge about the goal of screening, strong family/peer support, good relationship with HCPs, and easy access to the polyclinics) of adherence to rescreening appointments. Strategies perceived to be effective in addressing the barriers to adherence included: educational initiatives to increase awareness about DM complications, provision of affordable screening services, reducing waiting times, and gaining patients' trust via good rapport and follow-up.

Conclusion: Non-adherence to DM complications screening was high, particularly for DR and DF, and was driven by modifiable predictors and several addressable barriers/facilitators. Targeted interventions to address these factors might improve DR/DN/DFC screening adherence in polyclinic patients with T2DM.

00192 Direct Admission of Home Hospice Patients to Inpatient Hospice – A Collaboration between SingHealth Community Hospitals (SCH) and Hospice Care Association (HCA)

Sharon Harvinder Kaur Dhillon[1], Ami Nagashima[2], Loo Yu Xian[1]

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Aims: Home hospice providers in Singapore provide support for many palliative patients in the community, making it possible for these patients to be cared for in the comfort of their own home. However, due to reasons such as caregiver stress and worsening symptoms, some patients will require inpatient management and care in the acute hospitals or inpatient hospices. The admission of palliative patients to community hospital-based inpatient hospice and palliative care service (IHPCS) has traditionally been done via referrals from acute hospitals. This often involves a long and uncomfortable wait for an acute hospital bed in the emergency department (ED), followed by several days of acute hospital stay before a referral is put up and transfer is arranged to the community hospital IHPCS. Thus, the SCH palliative team collaborated with HCA to develop a workflow for direct admission of HCA palliative patients from home to SCH IHPCS.

1. To facilitate a seamless care transition for HCA palliative patients from home to SCH IHPCS, and vice-versa when they are subsequently discharged back home from IHPCS
2. To reduce the ED visits and bed occupancy of acute hospitals by palliative patients, who can get palliative treatment in SCH IHPCS
3. To improve the response time for the reduction of moderate/severe symptoms to absent/mild as charted according to the Palliative Care Problem Severity Score (PCPSS)
4. To honour palliative patients' Advanced Care Plan (ACP), Preferred Place of Care (PPOC) and Preferred Place of Demise (PPOD)

Methodology: SCH and HCA palliative teams worked together to develop a workflow to allow HCA home hospice patients to be directly referred and admitted to SCH IHPCS during office hours, hence bypassing the traditional ED/acute hospital route. This workflow was formally rolled out in August 2022 in Outram Community Hospital (OCH), then in December 2022 in Sengkang Community Hospital (SKCH), to HCA home hospice patients across Singapore. The workflow has been improvised over time, to better streamline the referral and admission processes.

Result: SCH has facilitated the direct admission of 24 HCA patients from home to SCH IHPCS. The patients were all admitted to SCH either on the day of referral or within 1 working day. This has allowed for them to bypass the ED/acute hospital route to be admitted to IHPCS, thus reducing ED visits and acute hospital bed occupancy by these patients. PCPSS demonstrated a short average duration of time for the reduction of moderate/severe symptoms (upon admission) to absent/mild. There is also ongoing data collection with regards to percentage of these 24 patients who had their PPOC/PPOD honored.

Conclusion: The SCH-HCA direct admissions collaboration has demonstrated clinical significance in facilitating a seamless transition of care and rapid reduction in the severity of symptoms in home hospice patients. SCH IHPCS will be reaching out to more home hospice providers in Singapore with the hope that this initiative will benefit more patients and caregivers desiring comfort-based palliative care.

00193 Decision Support Framework for the Evaluation of Cardiac Arrest Centers in Singapore

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Aims: Only a few public hospitals in Singapore offer the full advanced post-Out-of-hospital Cardiac Arrest (OHCA) treatments aligned with the guidelines for a cardiac arrest centre (CAC).1 We aim to develop a decision support framework (DSF) based on a discrete events simulation (DES) model to evaluate the impact of alternative CAC policies.

Methodology: Data from the Pan Asian Resuscitation Outcomes Study (PAROS)2 and literature were used to develop the DSF. The DES model has prehospital(A-DES) and inhospital(H-DES) modules. The A-DES module examined the impact on response time and fleet utilization. The H-DES module examined ICU capacity. Baseline scenarios consider the transport of OHCA patients to the nearest hospital. Alternative scenarios involve sending patients based on a scoring model (adapted from NULL-PLEASE)3 to the nearest CAC. FlexSim was used to build the model. Outcomes evaluated were survival rates.

Result: We established the DSF ability to evaluate the impact of CAC on systems and health outcomes. Directing OHCA patients to CACs and expanding ICU capacity boosted survival rates. With 50% of patients sent to CACs, survival rates increased by 0.5%. The relationship between CAC diversion and OHCA survival was not linear. As more OHCA patients are diverted to CACs, ICU capacity becomes a bottleneck resulting in a reduction in survival rates from 5.8% at 50% diversion to 5.2% for full diversion at high ICU capacity with the addition of 2 more beds. Additional CACs might help to alleviate the ICU capacity constraints. A preliminary analysis using the DSF in the selection of CAC location indicated that making CGH CAC-capable might be a better choice compared to KTPH.

Conclusion: Our simulation model suggested there is potential benefit in diverting suitable patients to CACs in Singapore. Further research is needed on criteria for diversion and capacity of receiving ICUs to manage the expected loads.
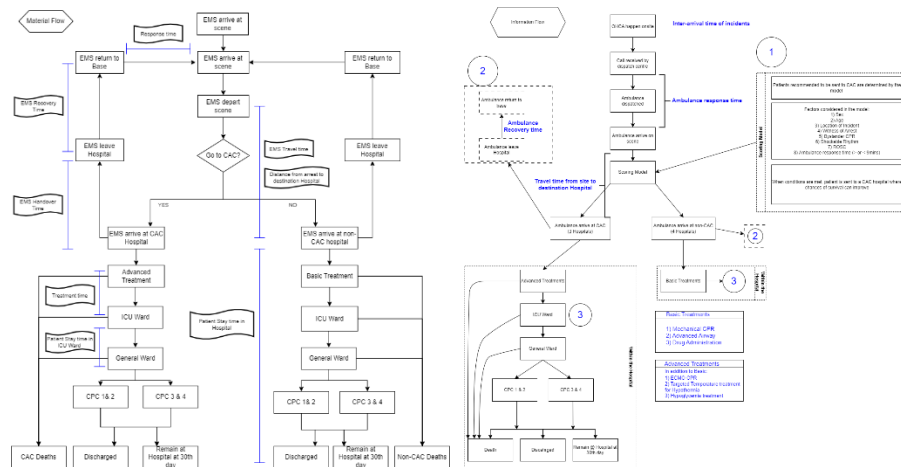
(a)
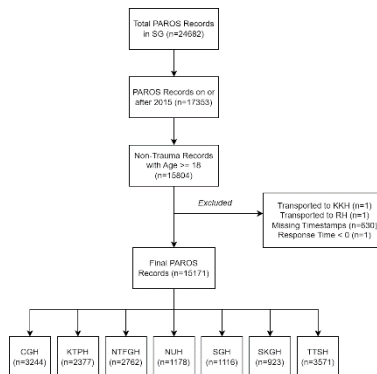
(b)

Figure 1: (a) Structure of the DES model (Materials and Information Flows); (b) Data Flow Diagram from PARO

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00194 Delayed Diagnosis of Primary Aldosteronism in Patients with Hypokalemia: Clinical Course and Associated Factors

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Aims: Primary Aldosteronism (PA) is a common and curable cause of hypertension. However, diagnosis is often delayed, leading to poorer clinical outcomes. Presence of hypokalemia, with hypertension, is characteristic of PA, and is an indication for screening. We evaluated if patients with PA had prolonged hypokalaemia before PA screening, the subsequent clinical course, and factors associated with delayed diagnosis.

Methodology: Our retrospective study included all PA patients with hypokalemia diagnosed between 2001 to 2022. Delayed diagnosis was defined as duration of hypokalemia of >1 year from first occurrence, to first evaluation by a PA specialist. Patients who underwent unilateral adrenalectomy were assessed using the Primary Aldosteronism Surgery Outcomes criteria. We performed multivariable analysis to assess for factors associated with delayed diagnosis.

Result: Of 240 newly diagnosed PA patients with hypokalemia, 122 (51%) patients had prolonged hypokalemia, with a median duration 4.5 (2.3 – 7.5) years. Patients with delayed diagnosis were older, had longer duration of hypertension, poorer renal function and more frequent cardiovascular disease. A lower proportion of patients with delayed diagnosis underwent adrenal vein sampling (58% vs 73%), $P<0.05$, adrenalectomy (32% vs 51%), $P<0.05$, and eventually achieved partial/complete clinical success post-adrenalectomy (21% vs 37%), $P<0.05$, compared to those with early diagnosis. Factors associated with delayed diagnosis included older age, presence of hyperlipidemia, and less severe hypokalemia (serum potassium >3mmol/L).

Conclusion: Despite manifestation of hypokalaemia, many patients with PA fail to be promptly screened. Greater emphasis in hypertension guidelines, and efforts to improve awareness amongst primary care physicians are urgently needed.

00195 Psychological Resilience in Antenatal Management (PRAM) – Universal Screening for Antenatal Population

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KK Women's and Children's Hospital

Aims: Maternal depression increases intergenerational transmission of risks and the perinatal period is a critical period for early intervention. However, affected women may not realise they have depression, or are unaware of care options, or are dissuaded from seeking help due to stigma. Without a universal screening programme, many may not realise they can, or indeed should, seek help. In line with the Child & Maternal Health & Well-Being Strategy and Action Plan, a universal screening and early intervention programme for antenatal depression, Psychological Resilience in Antenatal Management (PRAM) was developed. It aims to create awareness of present maternal emotional state by providing early universal screening for depression to antenatal mothers and offering timely intervention accordingly.

Methodology: In the pilot phase, outpatients attending their obstetric appointment at the one-STop Obstetric high RisK (STORK) Centre were asked to fill in the Edinburgh Postnatal Depression Scale (EPDS), a 10-item validated self-administered screening questionnaire, while waiting to be seen by their obstetric doctor. They were also given a psychoeducational brochure about antenatal depression.

During the consult, the obstetric doctor explained the results to their patient. Patients with scores of 15 (probable cases) or more were offered psychiatric care, while those with scores of 13-14 (borderline cases) were offered a phone triaging consult with a clinical counsellor.

This initiative will be rolled out to all KK Women's and Children's Hospital (KKH) obstetric clinics in phases.

Result: 458 patients were screened between December 2022 and April 2023 at STORK Clinic during the pilot phase. All patients screened were made aware of their emotional health state either via psychoeducation brochure and/or through discussions with their obstetric doctor. Fifty patients (11%) were identified as borderline or probable cases, and were offered the appropriate level of intervention.

34% of the borderline and positive screens had accepted the recommended intervention. The remaining two thirds of the borderline and positive screens declined interventions offered.

Conclusion: Whilst this universal screening initiative has created awareness of emotional health for antenatal mothers, more can be done to improve the take up of care. The findings that 66% of those needing intervention declined further care may reflect the patients' readiness to accept care. To address this, a follow-up message was initiated, providing a contact hotline to offer support and care if needed.

00196 Developing a Production Workflow for 3D Printed Temporal Bone Surgical Rehearsal Models

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Aims: Surgery for temporal bone disease is challenging due to complex anatomy. Developing expertise through operative apprenticeship and practice on cadavers is episodic and expensive. 3D printed temporal bone models enable replication of anatomy and increased training opportunities. The project's aim is to derive design principles and considerations as well as a production workflow for a 3D-printed temporal bone surgical rehearsal model.

Methodology: The model was developed via the following steps:

- Image segmentation of CT scan.
- CAD augmentation of surgical landmarks i.e., round window niche.
- CAD design of resin drainage channels at surgical landmarks i.e., cochlear duct.
- Model orientation for printing to facilitate resin drainage and minimise artifactual support structures.
- Print colour matching through resin dying.
- Model printed via high-resolution resin stereolithography.
- Print post-processing using millifluidic resin-clearing techniques.
- Post-print augmentation of surgical landmarks i.e., facial nerve canal, using silicone casting.

A specialist ENT surgeon assessed the utility of this model for surgical rehearsal compared to prior experience with cadaveric models and actual patients. This was assessed for realism, in the tympanomeatal flap, canal wall down mastoidectomy, posterior tympanotomy, stapedotomy and cochleostomy procedures.
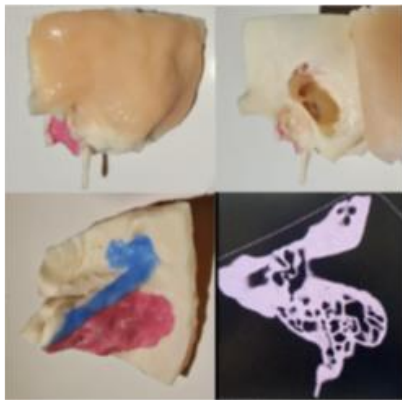
Result: The 3D printed model performed comparably. Ossicular mobility was unable to be simulated on this model. Support structures from the printing process and drainage channels should be differentiated from normal anatomy.

Conclusion: The project met its aim. The further efficacy of this model would be ascertained in a future multi-subject comparative study.

00197 The Prevalence, Clinical Presentation and Renal Outcomes of Maternally Inherited Diabetes and Deafness (MIDD) – Observations from the NHG-KTPH Monogenic Diabetes Registry

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Aims: The mitochondrial variant m.3243A>G is a common cause of maternally inherited diabetes and deafness (MIDD) and mitochondrial encephalopathy, lactic acidosis and stroke-like episodes (MELAS). This variant compromises aerobic cellular respiration in the mitochondria, resulting in risk of damage to high energy demanding organs such as the kidneys. Diabetes due to m.3243A>G may impose additional risk to kidney damage e.g., chronic kidney disease (CKD). We describe the clinical presentation and renal trajectory of patients with MIDD identified through our NHG-KTPH Monogenic Diabetes registry and young-onset type 2 diabetes cohort.

Methodology: We screened 694 patients presenting with young-onset diabetes ($\leqslant$35 years) for the m.3243A>G variant using quantitative polymerase chain reaction (qPCR) method. Relative heteroplasmy levels of the variant is determined by the formula: $1 / [1 + (0.5)^{(CtWT - CtMutant)}] \times 100\%$. Bi-directional Sanger sequencing was employed to validate the variant. Urine lactate and creatinine levels were measured by the Department of Laboratory Medicine at KTPH for a subset of patients with MIDD. All other clinical data were obtained from available clinical records. Data are presented as mean $\pm$ SD or median (IQR) for continuous variables. A $p < 0.05$ is considered as statistically significant.

Result: We identified 13 patients (1.9%) with MIDD based on genetic screening of the m.3243A>G variant; 7 patients are male. Median age of diabetes onset is 30 (27-32) years old. The patients are treated with metformin (N = 5), insulin (N = 7) and other oral hypoglycaemic agents (N = 8). 6 patients manifested sensorineural deafness, 2 presented with stroke, cerebellar and cerebral atrophy, 4 established cardiovascular diseases and 2 have short stature. Patients with MIDD have lower BMI compared to patients without MIDD (20.6 (17.0-21.7) vs. 27.1 (23.8-31.2) kg/m2, $p < 0.001$). Their HbA1c levels are not significantly different (7.4 (7.1-8.8) vs. 8.2 (7.0-9.8) %, $p = 0.309$).

In MIDD patients, the heteroplasmy levels of m.3243A>G in urine are significantly higher than in blood (83.5 (67.9-99.3) vs. 37 (18.3-69.7) %, $p < 0.001$). Patients with higher heteroplasmy level in both blood and urine were observed to have higher urinary lactate:creatinine ratio (0.04 ± 0.01 vs. 0.18 ± 0.09).

Among 9 patients with 2-16 years' renal trajectory, 3 patients had moderately increased albuminuria (3 - 30 mg/mmol) and 4 patients had severely increased albuminuria (>30 mg/mmol). 6 patients had

progressive decline of eGFR > 1 ml/min/1.73m2/year, and one of them was diagnosed with end stage kidney disease (eGFR < 30 ml/min/1.73m2). Based on KDIGO's classification, 2 patients have moderate risk, 3 have high risk and 2 have very high risk of developing CKD. There is no significant correlation between m.3243A>G heteroplasmy level and indicators of renal decline.

Conclusion: The clinical presentation of MIDD is highly heterogeneous, and patients have high chance for increased risk of CKD in keeping with the possibility of a role of mitochondrial dysfunction.

00198 Does Witness Type Affect the Chance of Receiving Bystander CPR in Out-Of-Hospital Cardiac Arrest?

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Aims: The relationship between the bystander witness type and receipt of bystander CPR (BCPR) is not well understood. Herein we compared BCPR administration between family and non-family witnessed out-of-hospital cardiac arrest (OHCA).

Methodology: Singapore data from 2010 – 2020 was extracted from the Pan-Asian Resuscitation Outcomes Study (PAROS) network registry (n = 25,024). All adult, layperson witnessed, non-traumatic OHCAs were included in this study.

Result: Of 10,016 eligible OHCA cases, 6,895 were family witnessed and 3,121 were non-family witnessed. After adjustment for potential confounders, BCPR administration was less likely for non-family witnessed OHCA (OR 0.83, 95% CI 0.75, 0.93). After location stratification, non-family witnessed OHCAs were less likely to receive BCPR in residential settings (OR 0.75, 95% CI 0.66, 0.85). In non-residential settings, there was no statistically significant association between witness type and BCPR administration (OR 1.11, 95% CI 0.88, 1.39). Details regarding witness type and bystander CPR were limited.

Conclusion: This study found differences in BCPR administration between family and non-family witnessed OHCA cases. Elucidation of witness characteristics may be useful to determine populations that would benefit most from CPR education and training.

00199 Internet-based Glucose Monitoring System Improves Glycaemia in People with Insulin-treated Type 2 Diabetes

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Singapore General Hospital

Aims: Self-monitoring of blood glucose (SMBG) using online platforms has shown promise in improving glycaemia among people with type 2 diabetes (T2D). We studied the effect of an online platform in insulin-treated T2D subjects at the Singapore General Hospital.

Methodology: T2D subjects treated with premixed insulin and HbA1c of 7.5%-10% were initiated on an internet-based glucose monitoring system (ALRT Diabetes Solution) entailing SMBG twice daily and weekly direct glucometer uploads. The system then offered algorithm-guided insulin dose suggestions to the primary physician, who could choose to accept or decline the recommendations. HbA1c and a fasting plasma glucose (FPG) were measured at baseline and at week 12 and 24.

Result: Twenty-five subjects were recruited (44.0% female, 58.9 ± 7.0 years, 52.0% Chinese). Adherence to prescribed SMBG frequency was 97.4% at the end of 24 weeks. All subjects experienced a reduction in HbA1c, with mean HbA1c falling 1.2%; from 8.6 ± 0.7% to 7.4 ± 0.6% at 24 weeks (p<0.01). Mean FPG decreased 1.6 mmol/L; from 8.7 ± 2.0 mmol/L to 7.1 ± 1.4 mmol/L at 24 weeks (p<0.01). Mean total daily dose (TDD) of insulin rose from 57.3 ± 24.4 units at baseline to 62.1 ± 25.4 units at 24 weeks (p<0.01).
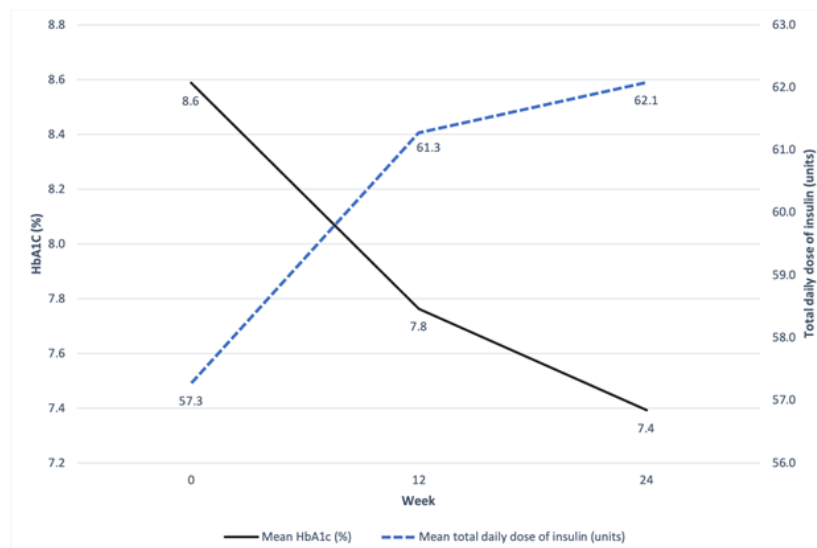
Figure 1. Trend of HbA1c and TDD of insulin over 24 weeks

Hypoglycaemia (BG <4.0 mmol/L) was reported in 48.0% of patients during the study, comparable to the self-reported baseline of 44.9%. These were more frequent at weeks 13-24 (72 episodes) than weeks 1-12 (24 episodes), and predominantly (85/96 episodes) confined to level 1 (BG 3.0 - 3.9 mmol/L).

Conclusion: An internet-based glucose monitoring system with automated insulin dose suggestions led to significant reductions in HbA1c and FPG in our cohort led by a modest increase in total daily dose of insulin. Mild hypoglycaemic episodes were more frequent with tighter glycaemic control.

00200 Observational Study to Determine Factors Affecting Blood Sample Hemolysis in the Emergency Department

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[1]Ng Teng Fong General Hospital, [2]Sengkang General Hospital, [3]Duke-NUS Medical School

Aims: Blood sample hemolysis poses a significant problem in both laboratory medicine and clinical practice. A multitude of studies have identified factors affecting the pre-analytical phase, in terms of method of blood sampling, equipment for collection (such as size of needle gauge, use of vacutainer), tourniquet time and inappropriate handling of tubes (vigorous shaking). These result in additional costs incurred by both the patient and the institution, delaying prompt management of acutely ill patients, disrupting workflows, and increasing resource usage. In this study, we describe the rates of hemolysis in a single Singapore tertiary hospital and explore potential factors influencing hemolysis, through the use of a BD Vacutainer system with a newly-inserted IV cannula.

Methodology: This is a prospective observational sub-study from part of a larger randomised controlled study conducted in Sengkang General Hospital, Singapore. A convenience sample of 199 adult patients, aged 18 to 90 years old, who presented to the Emergency Department (ED) and required blood samples for serum electrolyte was included in the study. Patient data was collected and degree of hemolysis (DH) was measured as the primary outcome in categorical form, using a univariate logistic regression model.

Result: Factors including patients' comorbidity (diabetes mellitus, heart disease, renal disease), IV cannula gauge (18G, 20G, 22G), number of attempts, difficulty of cannulation (easy, moderate, difficult) were analysed, but their effect on blood sample hemolysis were not statistically significant ($P > 0.05$). The odds of hemolysis was found to be significantly lower in subjects where the site of cannulation was the forearm (compared to hand) [OR: 0.352 (95% CI: 0.162, 0.765)] and in blood draw performed by a phlebotomist of 2-5 years of experience [OR: 0.29 (95% CI: 0.095, 0.885)].

Conclusion: We found that the site of puncture and phlebotomy years of experience are significant factors affecting blood sample hemolysis in the ED. This could potentially aid nurses and phlebotomists when choosing cannulation sites for blood draw. However, we found that the phlebotomists' experience of more than 5 years does not relate to lower rates of hemolysis. More studies can be done to determine the reproducibility of the results. Limitations of our study include limited sample size, subjective reporting of difficulty of blood draw, as well as limited range of comorbidities being studied. The data collection sites could be expanded to include other EDs in Singapore through a nation-wide, multi-centre study, which will be likely yield more accurate information regarding the various factors affecting hemolysis.

00201 To Enhance the Competency Level of Nursing Student in Transferring and Positioning Patient with Surgical Drainage System from 20% to 100% within 1 Year

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Singapore General Hospital

Aims: To enhance the competency level of nursing student in transferring and positioning patient with surgical drainage system from 20% to 100% within 1 year

Methodology: Five-WHY diagram was used to identify and brainstorm the possible root causes.

Main Root Causes (RC) identified:
- "Nursing students required guidance to handle the patient with surgical drainage."
- "Unaware of the steps to guide and assess students."

Pre-intervention surveys to explore nursing students' experience, knowledge, and confidence.

A total of 12 nursing students participated in the pre -intervention survey to explore nursing students' experience, knowledge and confidence.

Transfer checklists tools were created for pre-intervention assessment.
-        Transferring the patient from bed to chair (armchair/commode/wheelchair) or Vice Versa - Transferring patient using pat slide
-        Lifting of the patient in bed

The teaching material was created to educate and reinforce nursing students on hospital guidelines and policies.
Nursing students were reassessed using the same competency checklist.
Post survey was done after reassessment.

Result: i. Nursing Students' Knowledge

- Pre- and post-intervention surveys display median 3.
- A significant increase in the proportion of students rating 4.

ii. Nursing Students' Confidence Level

- Transferring patients with surgical drainage median increased from 4 to 5.
- Transferring patients with more than 1 surgical drainage median increased from 3 to 4.

iii. Nursing Students' Skills Competency

- Post-implementation: P-value = 4.31E-08 shows statistically significant improvement
- Reduction of Incidences
- Reduced from 4 to 1

Skill Competency level in Transferring and positioning patient
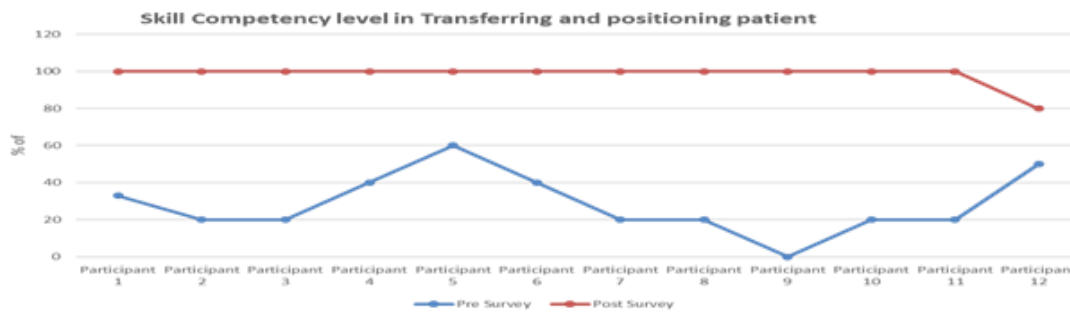
iv. Cost Saving

- Manpower Hours - Service recovery, raising RMS & patient monitoring: 6 hours [$467/ incident]
- Procedure/Consumable - Chest x-ray, drain reinsertion, drainage set: $2090.90/incident

Total costs saved per incident: $2557.90

Conclusion: The implementation of the intervention led to an enhancement in the proficiency of nursing students in transferring and positioning patients with surgical drainage system.

00202 Implementation of an Online Family-Based Intensive Healthy Lifestyle Behaviour Intervention (LITE Programme): Randomised Controlled Pilot Study

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Aims: Background

Childhood obesity is on the rise in Singapore, and early intervention is critical to improve weight trajectory and foster lifelong healthy habits in children. Family-based intensive healthy lifestyle behaviour interventions that incorporate diet, physical activity and behaviour change in a structured programme that achieved more than 26 hours of intervention over 6 to 12 months are recommended for childhood obesity treatment. Our community Lifestyle InTervention for Everyone (LITE) program is a structured, family-based multicomponent lifestyle intervention that meets treatment recommendations.

Aim

To describe the feasibility and acceptability of community LITE program and estimate the effectiveness of in terms of an improvement in Body Mass Index (BMI) z-score, waist-height ratio and other health outcomes in 19 recruited children aged 6 to 12 years old with overweight and obesity.

Methodology: A two-arm randomised controlled trial was conducted, with planned recruitment of 100 overweight 6- to 12-year-olds. Subjects' weight, height, waist circumference and blood pressure were measured, with calculation of BMI and BMI z-score. Paediatric Quality of Life Inventory (PedsQL; Singapore version 4) was administered to assess quality of life (QOL) in the children in terms of physical, emotional, social and school functioning.

Result: Nineteen participants were recruited with mean age of 8.6 ± 1.6 years with 69% males. Participants' mean BMI percent of the 95th percentile was 134.02, with 3 participants (16%) in Class I (95th – <120th percentile), 10 (52%) in Class II (120th – <140th percentile), and 6 (32%) in Class III weight category ($\geq$ 140th percentile). Ten participants were in intervention and 9 in control group. Seven (70%) of participants met the treatment recommended hours of more than 26 hours. There was good acceptability with 100% of intervention participants rating the sessions good to excellent and all were satisfied with the program. A larger mean reduction in BMI percent of the 95th percentile was observed in intervention compared to control group (-3.3 ± 3.2 vs -0.79 ± 2.3, p= 0.061) at 3 months. There was no significant change in child report of quality of life between intervention and control group (-0.4 ± 11.2 vs -5.2 ± 11.2, p= 0.380) after 3 months.

Conclusion: Preliminary results suggest that LITE programme is feasible and acceptable to be implemented amongst participants with more severe obesity. Preliminary effectiveness data suggests

that LITE may lead to a greater improvement in BMI than usual care after 3 months. Further results from the implementation of the LITE program will inform of the effectiveness of the intervention.

00203 Detection of Glaucoma Using Different Machine Learning Models

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[1]Singapore Eye Research Institute, [2]Singapore National Eye Centre, [3]Nanyang Technological University, [4]Carol Davila University of Medicine and Pharmacy, Bucharest, Romania

Aims: Numerous studies have showcased the remarkable capabilities of machine learning (ML) in utilizing optical coherence tomography (OCT) data for glaucoma detection. Nevertheless, these studies have not adequately assessed the performance of ML models across different ethnicities. Thus, this research aims to externally validate a range of ML models in glaucoma detection, employing OCT-derived retinal nerve fiber layer (RNFL) measurements and comparing their performance against a standard non-ML model.

Methodology: In this prospective cross-sectional study, we recruited 257 glaucoma participants and 257 controls to develop four types of ML models for glaucoma detection: logistic regression, support vector machines, random forest, and gradient boosting. We then evaluated the performance of these models on 356 Asians (183 with glaucoma and 173 controls) and 138 Caucasians (57 with glaucoma and 81 controls). We developed two ML models, using the original RNFL and the compensated RNFL derived from the compensation model, a multiple regression model fitted on healthy subjects that corrects the RNFL profile for anatomical factors.

Result: In the dataset comprising Asians, both the random forest models utilizing either the measured RNFL (AUC=0.97) or the compensated RNFL (AUC=0.96) displayed superior performance (P=0.057) compared to the standard non-ML approach (AUC=0.93; P<0.001) in detecting glaucoma. Conversely, in the Caucasian dataset, the logistic regression model trained on the compensated data (AUC=0.92) exhibited the best performance when compared to the Gradient boosting model trained on the measured RNFL (AUC=0.85; P=0.006) and the standard non-ML approach (AUC=0.82; P<0.001) for glaucoma detection.
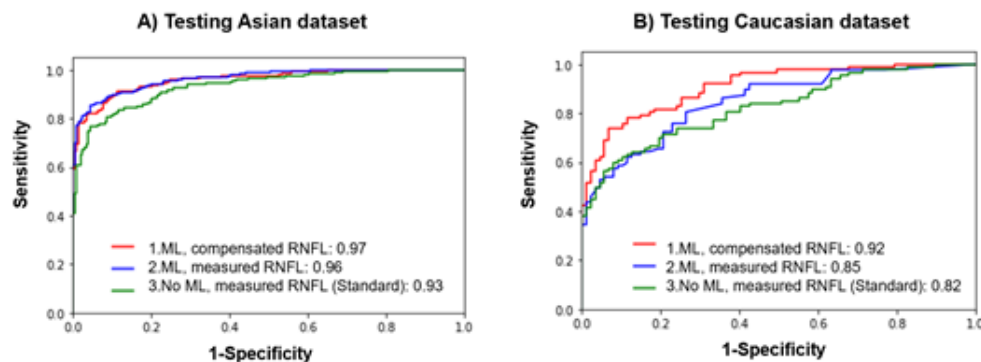
A) Testing Asian dataset
1. ML, compensated RNFL: 0.97
2. ML, measured RNFL: 0.96
3. No ML, measured RNFL (Standard): 0.93

B) Testing Caucasian dataset
1. ML, compensated RNFL: 0.92
2. ML, measured RNFL: 0.85
3. No ML, measured RNFL (Standard): 0.82

Conclusion: The ML model trained on the measured data demonstrated limited reproducibility when tested on diverse datasets. In contrast, the ML model trained on compensated data consistently maintained its performance. Our study highlights the need to consider potential ethnic-specific differences in model performance.

00204 Improving Door to Infusion Time for Intravenous Rituximab in a Single Tertiary Center

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Aims: Intravenous (IV) Rituximab is an anti-CD20 monoclonal antibody that is widely used in neurology for condition such as multiple sclerosis, neuromyelitis optica spectrum disorder, autoimmune encephalitis, and myasthenia gravis.

Patients on IV Rituximab had frequently feedback on the long waiting time to start the infusion. They can wait as long as 5hrs to get their infusion started. These had prolonged the patients' stay in the center and their satisfaction were greatly affected.

The main objective of this project is to improve the door to infusion time from 5 to 3 hours for intravenous rituximab in a single tertiary center.

Methodology: We reviewed all patients treated on IV rituximab in Medical Ambulatory Center at Tan Tock Seng Hospital from October 2022 to Feb 2023 and identify the reasons for prolonged door to infusion time.

Using the Plan-Do-Study-Act (PDSA) quality improvement methodology, a multidisciplinary team was formed to create in reviewing the identified reasons and developed a comprehensive root-cause analysis. Pareto chart was derived and interventions were implemented at intervals. Door to infusion timing was assessed to compared the pre and post interventions. The interventions were such as having a designated healthcare assistant to collect the prepared rituximab from pharmacy; creating a new workflow and develop a clear instruction set were implemented.

Result: 59 encounters of intravenous rituximab were reviewed and the door to infusion time improved from 5 to 4hrs after implementation of three interventions. The time needed for registered nurse to trigger the activation of IV rituximab had significantly reduced from 5 to 4 hrs.

Conclusion: Implementation of having a designated healthcare assistant to collect the prepared IV rituximab from pharmacy and having a clear instruction set with proper workflow had managed to reduce the door to infusion timing. However, there is a need to continue with interventions to further reduce the expected timing.

00205 Survey For MyResponder App Users: Exploring Community CPR Responders' OHCA Experience and Needs

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Aims: Singapore proposes a community responder and emergency dispatcher alliance to improve the speed and quality of bystander CPR during Out-of-Hospital Cardiac Arrests (OHCA). A mobile phone application "myResponder" alerts users to nearby OHCAs. App user qualifications, experience and needs are poorly understood.

Methodology: A survey of active myResponder app users, consisting of 26 questions in 3 sections, was conducted. The first section evaluated user experience and length and frequency of using the app. The second section assessed the user's need for CPR/AED refresher training by learning of training history, self-reported confidence, and a knowledge quiz. The third section gathered first impressions on a new system that provides real-time feedback on the user's CPR quality. The survey was prepared with FormSG and disseminated via email to 4000 registered users who have responded to at least 1 OHCA case. The results were analysed with the Mann-Whitney U test and the chi-square test using SPSS 26. Confidence, nervousness, and quiz scores are expressed as means and the proportion of users willing to undergo refresher training is expressed as a percentage.

Result: Of 4000 users invited to take the survey, 917 (22.9%) completed it. 93.6% of these reported being healthcare professionals or having CPR/AED certification. Those who had responded to $\geq$3 OHCA cases using the app reported less nervousness compared vs those who responded to <3 (1.73 vs 2.13, $p<0.01$), scored higher on the knowledge quiz (2.67 vs 2.55, $p<0.01$), and had higher confidence in using the app (8.5 vs 7.88, $p<0.01$), providing CPR (8.88 vs 8.10, $p<0.01$) and using AED (8.85 vs 8.01, $p<0.01$). However, no significant difference was observed in willingness to undergo refresher training between the $\geq$3 vs <3 groups (77.8% vs 74.1%, respectively, $p=0.19$). Users who attended a CPR/AED training more than 1 year ago vs those who were trained more recently were less confident with CPR (8.16 vs 8.78, $p<0.01$) and AED (7.91 vs 8.87, $p<0.01$), more nervous (2.11 vs 1.77, $p<0.01$), scored lower on the quiz (2.55 vs 2.66, $p=0.01$), and were more willing to undertake refresher training (83.1% vs 70.3%, $p<0.01$). Users who correctly answered all 3 knowledge quiz questions had higher confidence with CPR (8.60 vs 8.30, $p=0.023$) and AED (8.56 vs 8.19, $p=0.032$) and were less willing to undergo refresher training (73.7% vs 80.7%, $p=0.019$) than those who answered at least one question wrongly. However, no difference in nervousness was found (1.84 vs 1.82, $p=0.758$) between them. Common factors taken into consideration before responding to an OHCA included distance to (39.3%), time taken to reach (22.5%), and location of (21.4%) the OHCA site. With regards to the new CPR feedback system, 83.8% of users felt that its advantages outweighed the disadvantages and 90.9% reported interest in using it.

Conclusion: Users who were experienced or trained recently were less nervous, more confident, and more knowledgeable. Theoretical knowledge quizzes may help identify users that are suitable and willing to undergo refresher training.

00206 How Well Do We Sleep? A Cohort Study of Sleep Pattern in Hospitalized Older Adults in Singapore

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Aims: This study aims were to 1) objectively evaluate sleep patterns of the hospitalized older adults in an acute geriatric inpatient unit; 2) explore the incidence and clinical characteristics of hospitalized older adults with sleep disturbance; 3) identify clinical predictors of sleep disturbances.

Methodology: This prospective, observational cohort study was conducted at an acute geriatric inpatient unit in Changi General Hospital, Singapore. Patients admitted to the study unit who were aged 65 and above were included with sleep variables collected using an objective method with a sheet-shaped body vibrometer (SBV. Baseline demographic and clinical characteristics, and the clinical outcomes that affected the sleep patterns were collected and analyzed by a t-test for continuous data and a univariate logistics regression for association between subject's characteristics and sleep variables. All data analysis were performed using Stata 16 (StataCorp) and p values <0.05 was considered as statistically significant.

Result: Findings revealed that 58.3% of the sample was female. The mean age was 85 years. Total hours of night-time sleep were 5.6 hours among the hospitalized older adults. There was 79.4% of the participants had their sleep efficiency less than 80%. 48.7% of them slept more than 4 hours in the daytime and 27.6% spent more than 11 hours lying on bed in the daytime. 58.8% had slept less than 6 hours at night. There was no association between participants' clinical characteristics and long daytime sleep. Multivariate showed that the issue to sleep back after awaking was independence risk factor associated with long daytime sleep (OR: 3.3, 95%CI: 1.5- 7.4, P=0.004). No clinical characteristics are associated with the issue to fall asleep after awaking. In multivariate analysis, an increased on awakening episodes are associated with 1.6 times risk of having issue to fall asleep after awaking (OR: 1.6, 95%CI: 1.2-2.0, P<0.001). Those with long daytime sleep are 5.8 times more likely to be lying on the bed (OR: 5.7, 95%CI: 2.6-12.6, P<0.001). It also found that decreased Barthel Index Score at discharge, sleep latency and awakening episodes are significantly associated with nighttime sleep efficiency. Declined in Barthel status at discharged are 5.5 times more likely to have efficient nighttime sleep (OR: 5.5, 95%CI:1.4-2.1, P=0.014).

Conclusion: Our study confirms the high prevalence of poor sleep quality in the hospitalized older adults using an objective method with a sheet-shaped body vibrometer (SBV). Increased awareness of the importance of sleep for older people is needed. Future studies should evaluate the sleep promotion intervention for older adults during hospitalization.

00207 The Impact of Telemedicine on Asthmatic Patients: A Literature Review

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Aims: Study aims to determine if telemedicine can improve the quality of life for adults with asthma, decrease unplanned emergency visits or hospitalizations, and increase treatment adherence.

Methodology: Study design: A Systematic review was conducted with the guideline of PRISMA 2020 statement (BMJ, 2021).

Result: Six studies were included in the review.

Studies were conducted in urban areas, lasting between 3 to 12 months. Participants had uncontrolled asthma, evaluated through various tools such as ACT, ACQ, and EPR-3 guideline. QOL was assessed using specific-disease tools like AQLQ and MAQLQ. The table below indicates the findings:

INTERACTIVE WEB-BASED APPROACH	
Study	**Outcomes**
Ahmed et al. (2016)	• A significance improvement MAQLQ score in intervention group (IG) only at baseline to 3 months • ACT score were significantly associated with MAQLQ • No difference in emergency visit & hospitalization between IG and control
Morison et al. (2016)	• No statistical difference in ACQ and MAQLQ • No significant difference in treatment adherence
Van der Meer et al. (2009)	• IG showed improvement in ACQ score compared to control but it had no statistical significance. • AQLQ for IG improved only during first 3 months
SMART PHONE APPLICATION	
Cingi et al. (2014)	• Improvement in total ACT score for IG compared to control (p<0.05) • Significantly lower unplanned hospitalization and emergency visits for IG
Khusial et al. (2020)	• Only study 1 found significant improvement in asthma control and MAQLQ score
Mammen et al. (2020)	• After 6 months, 80% of IG participant had well-controlled asthma and were strongly associated with improvement in QOL. • Care provider reported that workflow was enhanced, and they were able to communicate management of asthma well with the help of a remote platform. The participants were confident to care of their condition

Conclusion: Overall, five out of six studies found that interactive telemedicine can improve the QOL of adults with asthma compared to usual care. However, it is still uncertain if telemedicine can reduce any unplanned visits to emergency or hospitilisation and treatment adherence, further studies need to be conducted on these areas. When telemedicine is integrated into current guidelines and practices, care

providers have found telemedicine to be time efficient and effective in delivering care to their patients (Mammen et al., 2020). It has also given confidence and awareness of their conditions and being able to manage their condition well.

Healthcare burden because of poor asthma management is becoming a bigger concern. Telemedicine can be used to educate patient on their conditions, the use of their medications and its importance to take as prescribed, therefore, a better quality of care being delivered to patients which will improve their QOL (Snoswell et al., 2020). Despite that, only two studies assess the effectiveness of telemedicine in relation to treatment adherence but found no significance. Further study is required.

The current findings of this review have found various telemedicine approach such as interactive web-based and smart phone application which have proven that telemedicine can improve QOL of adults with asthma, however, more studies are required to improve the design of the platforms that is customizable asthma management to everyone.

00208 Patient Characteristics of Alcohol-related Frequent Attenders at Emergency Department: A 10-Year Retrospective Cohort Study at Singapore General Hospital

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Aims: Alcohol-related frequent attenders (ARFAs), described as patients with repeated alcohol-related visits to emergency departments (EDs), are a major concern as they contribute a disproportionate number of visits to EDs. Previous research in Singapore studied characteristics of general (all-cause) frequent attenders (FAs), while characteristics of ARFAs have not been explored. This study describes patient characteristics of ARFAs at Singapore General Hospital (SGH) ED.

Methodology: An ongoing retrospective observational study describing and comparing ARFAs with FAs at SGH from 2008 to 2020. We included all visits within the study period. Data were extracted from SGH's ED electronic registry. Diagnoses were coded using the Systematized Nomenclature of Medicine (SNOMED) codes for meaningful analysis. The outcome was alcohol-related frequent ED attendance. Alcohol-related ED attendance is defined as a visit with an alcohol-related primary SNOMED diagnosis code at the ED. Alcohol-related frequent attendance is defined as having ≥5 all-cause attendances and ≥2 alcohol-related attendances within 12 months of initial (index) ED attendance. General frequent attendance is defined as having ≥5 all-cause ED attendances.

Result: 1,833,904 hospital ED attendances by 813,532 patients were analyzed, whereby 0.03% (n=268, 17,214 ED attendances) were ARFAs, and 2.06% (n=16,946, 271,709 ED attendances) were general FAs (Table 1). ARFAs were younger with a median age of 51 years and 92.54% of them were below 65 years of age. In contrast, general FAs had a median age of 60 years and 57.80% of them were below 65 years of age. ARFAs had a higher male proportion of 92.54%, while 57.80% of general FAs were male. The most prominent medical history among ARFAs was liver disease (31.71%), while for general FAs it was diabetes (27.95%).

Conclusion: This is an ongoing analysis looking at 10 year's SGH ED registry. The findings will add to existing ARFA literature and inform local understanding of ARFAs that may be useful for the development of interventions for this vulnerable group.

Table 1. Demographic characteristics of study population

Parameters	Entire population (n=813,532)	Alcohol-related frequent attenders (n=268)	General frequent attenders (n=16,946)	Non-frequent attenders (n=796,318)	P-value
Age, median (IQR)	43 (28-60)	51 (44-57)	60 (39-74)	43 (28-60)	<0.001
Age category (%)					
Below 65	660,614 (81.20)	248 (92.54)	9,800 (57.80)	650,566 (81.70)	<0.001
65 and above	152,918 (18.80)	20 (7.46)	7,146 (42.20)	145,752 (18.30)	
Gender (%)					
Male	432,963 (53.22)	257 (95.90)	9,917 (58.52)	422,789 (53.09)	<0.001
Race (%)					
Chinese	520,600 (63.99)	93 (34.70)	10,860 (64.09)	509,647 (64.00)	<0.001
Malay	81,386 (10.00)	19 (7.09)	2,359 (13.92)	79,008 (9.92)	
Indian	92, 619 (11.38)	132 (49.25)	2,691 (15.88)	89,796 (11.28)	
Others	118,927 (14.62)	24 (8.96)	1,036 (6.11)	117,867 (14.80)	
Nationality (%)					
Singapore citizen	567,607 (69.77)	258 (96.27)	15,826 (93.39)	551,523 (69.26)	<0.001
Foreigner	245,925 (30.23)	10 (3.73)	1,120 (6.61)	244,795 (30.74)	

Parameters	Entire population (n=813,532)	Alcohol-related frequent attenders (n=268)	General frequent attenders (n=16,946)	Non-frequent attenders (n=796,318)	P-value
Medical history (%)					
Myocardial Infarction (MI)	9,686 (1.19)	4 (1.49)	1,094 (6.46)	8,588 (1.08)	<0.001
Congestive Heart Failure (CHF)	10,029 (1.23)	7 (2.61)	1,957 (11.55)	8,065 (1.01)	<0.001
Peripheral Vascular Disease (PVD)	4,152 (0.51)	6 (2.24)	816 (4.82)	3,330 (0.42)	<0.001
Stroke	21,170 (2.60)	16 (5.97)	1,715 (10.12)	19,439 (2.44)	<0.001
Dementia	1,958 (0.24)	1 (0.37)	287 (1.69)	1,670 (0.21)	<0.001
Pulmonary	14,794 (1.82)	22 (8.21)	1,779 (10.50)	12,933 (1.63)	<0.001
Rheumatic	1,784 (0.22)	0 (0.00)	174 (1.03)	1,610 (0.20)	<0.001
Peptic Ulcer Disease (PUD)	5,290 (0.65)	9 (3.36)	591 (3.49)	4,690 (0.59)	<0.001
Liver Mild	5,657 (0.70)	65 (24.25)	556 (3.28)	5,036 (0.63)	<0.001
Diabetes without Chronic Complications (DM)	19,521 (2.40)	21 (7.84)	1,282 (7.57)	18,218 (2.29)	<0.001
Diabetes Mellitus with Complications (DMcx)	25,432 (3.13)	20 (7.46)	3,454 (20.38)	21,958 (2.76)	<0.001
Paralysis	6,505 (0.80)	6 (2.24)	651 (3.84)	5,848 (0.73)	<0.001
Renal	16,179 (1.99)	8 (2.99)	3,279 (19.35)	12,892 (1.62)	<0.001
Local Cancer	20,180 (2.48)	4 (1.49)	1,231 (7.26)	18,945 (2.38)	<0.001
Metastatic Cancer	13,826 (1.70)	0 (0.00)	756 (4.46)	13,070 (1.64)	<0.001
Liver Severe	1,504 (0.18)	20 (7.46)	222 (1.31)	1,262 (0.16)	<0.001
Human Immunodeficiency Virus (HIV)	425 (0.05)	1 (0.37)	22 (0.13)	402 (0.05)	<0.001

00209 Assertive Community Treatment for Alcohol Misuse Disorder Patients Who Are High Utilizers of Emergency Department Services: A Prospective, Multi-Centre, Before-and-After Cohort Study

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Aims: To investigate if the implementation of Assertive Community Treatment (ACT) for alcohol-related frequent attenders (ARFAs) can help reduce emergency department (ED) attendances, emergency medical services (EMS) calls and improve health outcomes for ARFAs at 3 hospitals in Singapore.

Methodology: We conducted a prospective before-and-after cohort study that compares ACT care with standard emergency care alone among ARFAs at hospitals A, B and C. The study included a 6 months follow-up after the first assessment. Patients presenting at an ED between 2020-2022 were recruited, provided that they are at least 21 years of age, have made 2 or more alcohol-related and 5 or more all-cause visits to an ED in the previous 12 months, and can communicate in English or Mandarin. Data on socio-demographics, ED attendances, EMS calls, Christo Inventory for Substance-misuse Services (CISS) scores, University of California, Los Angeles (UCLA) Loneliness scores and Center for Epidemiologic Studies Depression Scale Revised (CESD-R-10) scores were collected for ARFA patients recruited during the study period.

Result: Of the 93 patients recruited across the 3 hospitals, 93.6% (n=87) were males and the median age was 57 (IQR: 51-64). Hospital A had the greatest median ED attendance reduction of 44.4% (pre median: 9, IQR: 7-15; post median: 5, IQR: 3-12) between 12-month pre and post intervention periods respectively, followed by hospital B with a 33.3% reduction (pre median: 9, IQR: 5-14; post median: 6, IQR: 2-19). 12-month post intervention ED attendance data is still being collected for hospital C.

Hospital B had the greatest median EMS call reduction by 45.5% (pre median: 11, IQR: 6-17; post median: 6, IQR: 4-15), followed by hospital A with a 22.2% reduction (pre median: 9, IQR: 6-17; post median: 7, IQR: 4-15). 12-month post intervention data on EMS calls is still being collected for hospital C.

Hospital C recorded the highest improvement of a decrease of 25% in median CISS scores (pre median: 12, range: 6-15; post median: 9, range: 2-14), followed by a 18.18% decrease for hospital A (pre median: 11, range: 4-16; post median: 9, range: 2-15). There was a slight increase of 5% for hospital B (pre median: 10, range: 2-16; post median: 10.5, range: 2-15). Median CESD-R-10 decreased by 12.5% for hospital A (pre median: 8, range 1-22; post median: 7, range: 1-21), but increased by 20% for hospital B (pre median: 7.5, range: 1-21; post median: 9, range: 3-19) and by 4.35% for hospital C (pre median: 11.5, range: 0-26; post median: 12, range: 0-19). Median UCLA 3-point scores remained unchanged for hospital A at 4 (pre median range: 3-8; post median range: 3-9), and for hospital B at 3 (pre median

range: 3-9; post median range: 3-9) as well as for hospital C at 6 (pre median range: 3-8; post median range: 3-7).

Conclusion: This is an ongoing clinical trial. This study suggests that ACT can be effective in reducing ED attendances, EMS calls and improve health outcomes in ARFAs. More hospitals will be involved, and more data will be collected to further validate the effectiveness of ACT for ARFAs.

00210 Factors Associated with Work Productivity among an Inception Cohort of Patients with Autoimmune and Non-Autoimmune Rheumatic Diseases

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Aims: Various factors have been reported to be associated with reduced work productivity among patients with autoimmune rheumatic diseases (ARDs) and non-autoimmune rheumatic diseases (NARDs) but they have seldom been studied systematically. We thus aimed to explore the associations between work productivity and the contextual factors identified by the Outcome Measures in Rheumatology (OMERACT) Worker Productivity Working Group in an inception cohort of patients with newly diagnosed ARDs and NARDs and a group of healthy volunteers without rheumatic diseases (HCs).

Methodology: Data on contextual factors (demographics, related skills/abilities, personal appraisals, health, economic need, work-life balance, nature of work, work accommodations, workplace support and non-workplace support) of were collected from all participants in this cross-sectional study. Linear regression was used to assess the associations between these contextual factors and work productivity loss (measured using the Work Productivity and Activity Impairment questionnaire).

Result: A total of 193 patients with ARDs, 121 patients with NARDs and 129 HCs completed the study survey. At least 1 contextual factor from 8 domains (related skills/abilities, personal appraisals, health, demographics, economic need, work-life balance, nature of work and workplace support) was significantly associated with work productivity loss in univariable analyses. Among these, coping (coefficient = -7.46, p = 0.002), health status (coefficient = -0.35, p = 0.013) and physical demands at work (coefficient = 3.77, p = 0.042) from the domains of related skills/abilities, health and nature work, respectively, were significant in multivariable analysis, after adjustments for demographics (age, gender, monthly income and education).

Conclusion: The associations between the contextual factors identified by OMERACT and work productivity were validated among an inception cohort of patients with newly diagnosed ARDs and NARD. This provides insights into the development of interventions to improve work productivity among patients with ARDs and NARDs.

00211 Safety of Shoulder Injections in Patients at Risk of Lymphoedema: Case Study and Literature Review

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Aims: To describe the outcomes of a post-mastectomy patient who underwent intra-articular hydrodilatation for adhesive capsulitis

Methodology: The setting was an acute general hospital's outpatient rehabilitation medicine clinic. The patient is a 69-year-old patient with a history of right breast cancer, who underwent mastectomy and sentinel lymph node sampling 2 years prior, and following chemotherapy was treated with letrozole. She was referred for frozen shoulder in the ipsilateral arm with worsening pain and stiffness despite a comprehensive exercise and stretching routine. Laboratory testing was unrermarkable. Further response to analgesia was poor and she was counselled for shoulder hydrodilatation. The procedure was uneventful and she tolerated 20mLs of a steroid/lignocaine/saline mix.

Result: Following the procedure her pain improved slightly, and her QuickDASH score improved from 61 to 43. Passive range of movement of the shoulder improved slightly in all directions and she was able to don clothes more easily. There were no complications described at follow-up. She was discharged to outpatient physiotherapy and 4 months later the pain had completely resolved.

Conclusion: Shoulder hydrodilatation is a commonly-performed intervention for adhesive capsulitis, with significant improvements expected in pain and mobility. However, the absence of an intact lymphatic drainage on the ipsilateral side is a relative contraindication for any procedures including venepuncture and joint injections, due to the risk of precipitating lymphoedema and skin infections.

In this patient's case we considered that her axillary lymph nodes were still partially intact, and that the intervention site was proximal in the upper limb. A Korean team had also recently published reassuring results on injection safety in this condition and population.

With sufficient precautions and good patient selection this procedure is likely safe and easy to perform. Further longitudinal studies will allow better risk-stratification to enable the right patients to benefit without exposure to unnecessary complications.

00212 Tamoxifen in Breast Cancer and Risk of Parkinson's Disease: A Meta-Analysis

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Aims: Tamoxifen is a selective estrogen receptor modulator used for treatment of hormone sensitive breast cancer. The incidence of Parkinson's disease (PD) is lower in women compared to men, possibly suggesting a neuroprotective effect of estrogen. Here, we examined the association between Tamoxifen and risk of PD.

Methodology: A search of PubMed using search terms synonymous with "tamoxifen" and "Parkinson's disease" were conducted. Only studies in English were included and information on study design, sample size, dosing and duration of treatment, as well as incidence rates and odds ratio (OR), were extracted. The odds ratios were pooled under a common-effect model.

Result: A total of 37,932 subjects (from 3 cohort and 1 cross-sectional studies) comprising of 17,233 subjects who were on Tamoxifen and 20 699 subjects without tamoxifen satisfied the inclusion criteria. These patients were treated for hormone-sensitive breast cancer. The exposure to tamoxifen ranged from 30-96 months. Using the common effect model, the pooled OR was 2.4, with 95% CI (1.91-3.01), p<0.0001. The test of heterogeneity revealed I2 of 81.5%, p=0.001. A total of 28,640 tamoxifen-exposed patients were pooled for study of incident rate. The fixed-effects model revealed an incidence rate of 5.86 events per 10,000 person-years (95% CI 4.82–7.12) with minimal heterogeneity (I2=26%, Cochran's Q test P=0.258).

Conclusion: Our meta-analysis demonstrated that the use of tamoxifen in breast cancer patients increases the risk of PD by 2.4 times. However, due to the wide heterogeneity of individual studies, the results need to be interpreted with caution. Future studies with improved methodologies and screening for prodromic PD and imaging and blood biomarkers will further address the cause effect relationship between tamoxifen and PD risk.

00213 Participation in the Eastern Community Health Outreach (ECHO) Screening on Chronic Disease Risk Factors: A Longitudinal Study

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Aims: The Eastern Community Health Outreach is a community-based, chronic disease screening and lifestyle intervention programme that started in 2011 for the Eastern population in Singapore. This study aimed to assess if participation in ECHO screening is associated with changes in participants' health-promoting beliefs, behaviors, and chronic disease indicators.

Methodology: A retrospective, longitudinal study of adults aged 40 years and above at 14 constituencies in Eastern Singapore between 20 February 2011 and 25 November 2017 was conducted. At each ECHO screening approximately 1-year apart, self-reported health-promoting beliefs and behaviors were recorded through surveys, and chronic disease indicators were measured.

Outcomes at each subsequent ECHO screening were compared to those at the index screening using mixed-effects linear, logistic, and proportional odds models, with time as a fixed effect, and both random intercepts and slopes for participants. As a sensitivity analysis, multiple imputation by chained equations was performed.

Result: 9,392 adults (median age 57 years) were included, of whom 5,859 (62.4%) were female. Over a 6-year period, there was a consistent increase in odds of all 10 health-promoting beliefs and 6 healthy dietary and physical activity behaviors at each subsequent screening.

The logistic mixed models showed a 16% (odds ratio 0.84, 95% confidence interval 0.76 to 0.93), 23% (0.77, 0.67 to 0.88), 13% (0.87, 0.77 to 0.97), 28% (0.72, 0.66 to 0.79), and 16% (0.84, 0.76 to 0.93) lower odds of being a current smoker, having abnormal blood pressure, waist circumference, venous blood glucose, and high-density lipoprotein respectively 1-year post index screening, most of which were maintained over a 5-year period (figure 1). Sensitivity analysis using the multiply imputed datasets showed consistent results.

Conclusion: An increase in likelihood of attaining more favorable health-promoting beliefs, behaviors, and chronic disease indicator levels over a 5-year period suggests that participation in ECHO screening may be associated with an improvement in chronic disease risk factors.
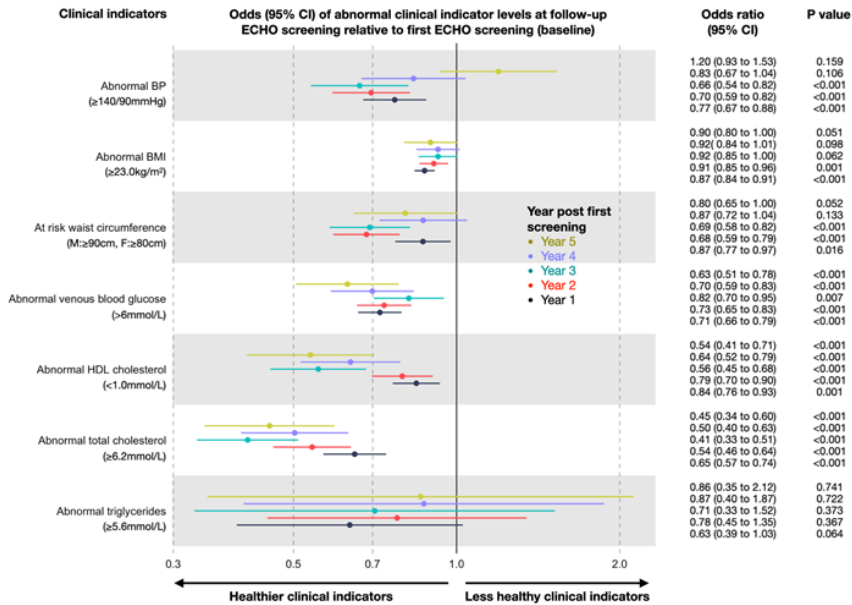
Figure 1. Effect of ECHO participation on chronic disease indicators over a 5-year period.
BMI=Body mass index. BP=Blood pressure. ECHO=Eastern Community Health Outreach. HDL=High-density lipoprotein.

00214 SNCA Rep1 Polymorphism Influences Non-Motor Symptoms in Early Parkinson's Disease

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Aims: Parkinson's Disease (PD) is a neurodegenerative disorder characterized by motor and non-motor symptoms. Variations in the alpha-synuclein gene promoter (SNCA-Rep1) have been linked to PD susceptibility and motor symptom severity. However, less is known about the relationship between Rep1 and non-motor symptoms in PD. Our group previously reported impaired cognition and motor function in long Rep1 carriers using cross-sectional data. Here, we report the influence of Rep1 polymorphism on non-motor symptoms in early PD patients over a course of five years.

Methodology: 208 early PD patients were genotyped for the Rep1 polymorphism with subsequent classification as either short or long Rep1 carriers. Detailed motor and non-motor symptoms were assessed yearly for five years. Linear-mixed model was performed to investigate the associations of Rep1 status and longitudinal change in clinical outcomes, controlling for age, gender, disease duration, APOE4, Hoehn & Yahr stage and baseline Montreal Cognitive Assessment (MoCA) score.

Result: The outcome trend over time was significantly different by Rep1 status, with long Rep1 carriers exhibiting more rapid decline in global cognition (β = -0.232, p = 0.027) as assessed by the MoCA and increasing apathy (β = 0.035, p = 0.027) as assessed by the Apathy Scale. Additionally, mean outcome over time was significantly different by Rep1 status, with long Rep1 carriers exhibiting more rapid decline in attention and memory (β = 0.121, p = 0.001) as assessed by the Non-Motor Symptoms Scale Domain 5.

Conclusion: This study provides novel evidence of influence of SNCA-Rep1 allele polymorphism on the progression of non-motor symptoms in early PD patients, with longer Rep1 allele carriers demonstrating a more rapid decline in global cognition, attention and memory and increased feelings of apathy. This study highlights the importance of identification of potential genetic risk factors which could aid in the development of personalized therapeutic strategies for better patient outcomes.

00215 Development and Internal Validation of a Prediction Model for Return-to-work among Stroke Inpatients

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Changi General Hospital

Aims: Although returning to work post-stroke is an important aspect of recovery, there is currently no externally validated prediction model for return-to-work among stroke inpatients. This study aimed to develop and internally validate a prediction model for return-to-work within two years from stroke inpatient rehabilitation discharge.

Methodology: The model was developed using data from stroke patients who were previously working and had undergone inpatient rehabilitation at an acute care hospital in Singapore, between 2016 and 2017. Demographic and clinical data were collected during inpatient stay. The primary outcome was whether the patient returned to work, i.e. employed in a paid, full-time or part-time job, within two years from inpatient rehabilitation discharge.

Candidate predictors were identified a priori based on the literature and expert clinical opinion. Missing values of candidate predictors were multiply imputed using chained equations. To prevent overfitting, the model was specified using least absolute shrinkage and selection operator logistic regression (LASSO-Full). 10-fold cross-validation was used to select the value of lambda. Internal validation was performed using bootstrapped resampling. LASSO-Full was compared with competing models in terms of discrimination, calibration, and prediction accuracy.

Result: 314 patients (mean age 59 years) were included, of whom 232 (73.9%) were male. 24 candidate predictors were identified. Following shrinkage, LASSO-Full retained 14 predictors.

LASSO-Full showed excellent discrimination (area under the receiver operating characteristic curve [AUC] 0.924, 95% confidence interval 0.891 to 0.956). Its discrimination performance and prediction accuracy (Brier score 0.117) were comparable to the best competing models (figure 1). LASSO-Full's predicted probabilities may be conservative (calibration slope 1.598, 1.193 to 2.004).

Conclusion: Existing return-to-work prediction models have AUCs between 0.70 and 0.80. The excellent discrimination performance of the models in this study supports a multisite, external validation study.
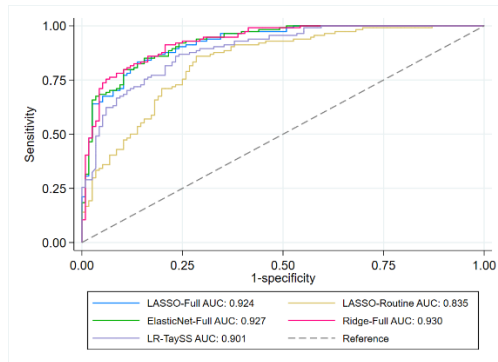
Figure 1. Discrimination performance of prediction models for return-to-work within two years from stroke inpatient discharge.

LASSO-Full: Included 14 predictors after variable selection by LASSO (gender, marital status, household income, job type, importance of RTW, engage services for RTW, motor FIM (walking) at discharge, cognitive FIM (total) at discharge, area of stroke, motor impairments, language impairment (aphasia), no. of inpatient rehab days, CCI, spasticity).
LASSO-Routine: Included 9 routinely collected predictors after variable selection by LASSO.
ElasticNet-Full: Included 16 predictors after variable selection by elastic net.
Ridge-Full: Included all 24 predictors in a ridge regression.
LR-TaySS: Included all 6 variables that were independently associated with RTW in Tay SS et al. (2023), in a logistic regression.

AUC=Area under the receiver operating characteristic curve. CCI=Charlson Comorbidity Index. FIM= Functional Independence Measure. LASSO=Least absolute shrinkage and selection operator. LR=Logistic regression. RTW=Return-to-work.

00216 Profile of Pain in Geriatric Hip Fracture Patients: A Cross-Sectional Study

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Aims: Hip fractures are a significant source of morbidity and mortality in geriatric patients, with pain a well-established morbidity. While previous studies have highlighted that pain in hip fracture patients is often undertreated pre-operatively, on the ground, current clinical observations have shown that the opposite may be true. Better analgesia and pain protocols have resulted in more robust pain control. Recognising the fine line between over and undertreatment of pain, holistic and accurate pain assessment is essential in bridging mismatches between the physician and patients' perception of pain. This cross-sectional study aims to assess the pain profile in operated hip fracture patients with the use of standardised pain assessment tools.

Methodology: A pilot cross-sectional observational study over a 5 week period was conducted. 28 patients were recruited over 5 weeks from patients co-managed by the Orthopaedic and Geriatric Medicine teams in Singapore General Hospital. Pain intensities at rest and on movement were assessed pre-operatively and post-operatively. Pain was assessed using the Numerical Rating Scale (NRS) or Faces Pain Scale-Revised (FPS-R) when NRS could not be performed.

Result: 28 patients were assessed for eligibility and 6 were excluded for conservative management of hip fracture. 22 patients were interviewed daily from admission to post-operative day 5. The average age was 80 years, and majority were female (N=18, 81%). Pre-operatively, pain intensity at rest was a median of 2 from day 1 to 5, with the spread of pain intensities markedly larger on day 1. Paired testing within-subjects showed a significant decrease in pain scores from day 1 to day 2 for both at rest ($p<0.014$) and on movement ($p<0.004$). Post-operatively, median pain intensity was the highest at rest on day 1, decreasing in intensity from day 2 onwards. There was significant difference ($p<0.001$) between pain scores at rest and on movement on all 5 days post-operatively.

Conclusion: This novel study has demonstrated the pain profile of geriatric hip fracture patients both pre-operatively and post-operatively up to day 5, and explored the feasibility of using FPS-R as a secondary pain assessment tool in cases where NRS could not be performed. In terms of pain profile and management, patient care activities (on movement) remain significant contributing factors in both the pre-operative and post-operative period. Future larger cross-sectional studies exploring the use of FPS-R as well as appropriate analgesics during patient care activities pre-operatively and post-operatively could be considered.

00217 MELD 3.0: An Updated Model for Prediction of Mortality amongst Patients with Cirrhosis Validated in a Large Tertiary Hospital in Singapore

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Aims: The original Model for End-Stage Liver Disease (MELD) was introduced to predict 3-month survival to prioritize allocation for liver transplantation and had several updates since its inception. A recent study in the USA optimized the current model (MELDNa) to create MELD 3.0, the latest model which could suggest better prediction of 3-month mortality. This study aims to validate the prognostic performance of MELD 3.0 in patients with cirrhosis admitted to Singapore's largest tertiary hospital.

Methodology: Demographical, clinical, biochemical and survival data of patients with cirrhosis admitted to Singapore General Hospital (SGH) from 01 January 2018 to 31 December 2018 were studied retrospectively. Area under the receiver operating characteristic curves (AUROC) was computed to get the discriminative effects of the prognostic models (MELD 3.0, MELDNa, and MELD) and compared with the DeLong's test. Youden's index was used to determine the optimal MELD 3.0 cut-off for high-risk patients. Competing risk analysis was performed for patients at various risk levels.

Result: 862 patients were included (median age 70.0 years [IQR 63.0 – 78.7], 65.4% males, 75.8% Chinese). The proportion of patients with Child-Turcotte-Pugh classes A/B/C at admission were 55.5%, 35.5% and 9.0% respectively. The median scores of MELD 3.0, MELDNa and MELD were 12.2 (IQR 8.7 – 18.3), 11.0 (IQR 8.0 – 17.5), 10.3 (IQR 7.8 – 15.0) respectively. The 30-day, 90-day, 365-day mortality were 5.7%, 13.2% and 26.9% respectively. MELD 3.0 performed significantly better compared to MELDNa and MELD in predicting 30-day, 90-day, and 365-day mortality (Table 1). Patients with a MELD 3.0 score >17 had high risk of 90-day mortality. When compared to patients with MELD 3.0 score ⩽17, patients with MELD 3.0 score >17 had significantly poorer survivability (p<0.05) and had higher 90-day mortality (46.8% vs 16.4%).

Conclusion: MELD 3.0 performed better than its predecessors in predicting mortality in patients with cirrhosis admitted to SGH, consistent with the findings in the recent USA study. MELD 3.0 score >17 predicts higher mortality.

Table 1: AUROC of each prognostic model at various survival timepoints. Comparison of the AUROC of the

prognostic model against MELD 3.0 using the DeLong's test.

	1-month mortality (95% CI)	p-value	3-month mortality (95% CI)	p-value	1-year mortality (95% CI)	p-value
MELD 3.0	0.823 (0761–0.886)	NA	0.754 (0.705–0.803)	NA	0.682 (0.642–0.723)	NA
MELDNa	0.793 (0.725–0.860)	0.018*	0.724 (0.673–0.776)	0.0061*	0.654 (0.611–0.696)	0.0023*
MELD	0.783 (0.717–0.849)	0.0029*	0.707 (0.655–0.759)	0.0001*	0.644 (0.602–0.686)	0.00002*

CI: confidence interval
p-value: p-value against MELD 3.0 score. *represents statistical significance at $p < 0.05$
NA: Not applicable

00218 Improving Patient Education on Benign Paroxysmal Positional Vertigo (BPPV)

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Aims: Benign paroxysmal positional vertigo (BPPV) is a common and often distressing vestibular condition affecting older adults. The symptoms experienced may lead to high levels of anxiety and fear-avoidance behaviours, which can result in increased dependence and reduced health-related quality of life. Previous studies have shown the benefit of an education program among patients' with Meniere's disease in managing their symptoms and anxiety. However, little is known of the impact of such programs in patients with BPPV.

A new education program has been created as part of a quality improvement initiative where patients receive information about BPPV, prior to the first physiotherapy consultation. We aimed to investigate the effectiveness of the program in improving patients' BPPV-related knowledge and anxiety levels. Additionally, we aimed to investigate whether the new program could reduce time spent on patient education during the first physiotherapy consultation, from a prior baseline of 14 ± 8.0 minutes.

Methodology: In this pre-test, post-test study, patients diagnosed with BPPV by physicians were consecutively screened and recruited from the outpatient physiotherapy vestibular clinic between February to March 2022. Patients completed a survey which assessed their BPPV knowledge (via a 10-item questionnaire), self-rated knowledge (via a 5-point Likert scale), and anxiety (via a 11-point numeric rating scale), after which they were asked to view online education materials prior to the first consultation. These outcomes were re-assessed at the end of the first physiotherapy consultation. Time spent in patient education during the consultation was measured using a stop watch. Changes in time spent on education and scores were analysed using the unpaired t-test and Wilcoxon signed rank test respectively. Significance was set at $p<0.05$.

Result: 29 patients (75.9% female, mean age = 60.7 ± 14.8) participated in the study. The mean time spent in patient education was 6.3 ± 3.7 minutes, and this was a statistically significant reduction from the time taken before the rogram was initiated (55.2% reduction, mean reduction 7.73 minutes (95% CI -11.07 to -4.39, $p<0.0001$)). Participants' knowledge score in the pre- and post-test increased from 6.1 (1.9) to 6.9 (1.4) ($p = 0.014$), along with their self-rated knowledge which increased from 1.9 (0.9) to 2.3 (0.8) ($p = 0.039$). However, the anxiety scores did not change significantly.

Conclusion: Educational material on BPPV given before the first physiotherapy consult improved participants' knowledge and understanding of the condition, thereby significantly reducing the amount of time spent in physiotherapy clinic providing patient education. However, there was no significant effect on anxiety. This initiative could potentially free up more time in clinic for therapists to engage in interventions like canalith repositioning maneuvers and vestibular rehabilitation.

00219 The Impact of a Revised National Childhood Immunization Schedule on Vaccination Defaulters

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Aims: Primary Aim: To evaluate the impact of the 2020 NCIS on catch-up vaccination uptake rates in children at 18 and 24 months of age

Secondary Aim: To evaluate the catch-up immunization rates of individual vaccines at two years of age

Methodology: Retrospective database study reviewing the records of 23,090 children aged 2 years old at time of collection. The study population consisted of children born between 1st January 2018 and 31st December 2019, categorized into 2018 and 2019 cohorts with 11,371 and 11,719 children, respectively. The 2018 cohort followed the old 2016 National Childhood Immunization Schedule (NCIS) while the 2019 cohort followed the new 2020 NCIS. Vaccination records were extracted at 18months of age to determine initial vaccination uptake, and at 24months of age to determine catch-up vaccination uptake rate.

Result: Catch-up vaccination rates increased by 5.2% and 2.6% in children on the new NCIS at 18 and 24 months, respectively. The uptake of individual 5-in-1 (DTaP, IPV, Hib), MMR, and pneumococcal vaccines increased by 3.7%, 4.1%, and 1.9% at 18 months.

Conclusion: Reduced vaccination doses and visits in the new NCIS bring direct and indirect benefits to parents and promote vaccination adherence for their children. These findings highlight the importance of timelines in improving catch-up vaccination rates in any NCIS.

00220 Prevalence and Experience of Dental Caries among Singaporean Schoolchildren: A Time Trend Analysis from 2007 to 2019

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[1]National Dental Centre Singapore, [2]Health Promotion Board Singapore

Aims: This study aimed to describe caries prevalence and experience trends among Singapore schoolchildren between 2007 and 2019.

Methodology: Anonymized records of all 6-year-old Primary 1 (P1), 11-year-old Primary 6 (P6), and 14-year-old Secondary 3 (S3) before the start of each school year between 2007 and 2019 were extracted from the Integrated Dental Electronic Assessment System (IDEAS) by school level, ethnicity, and sex. Prais-Winsten regression was used to assess trends of mean DMFT and caries prevalence among the schoolchildren by school level, with reported Average Annual Percentage Change (AAPC) together with respective 95% confidence interval (CI).

Result: In total, 519,471 P1, 566,573 P6 and 548,138 S3 were included during the above period and the majority comprised of Chinese children (P1: 67.2%, P6: 68.8%, and S3: 71.0%, respectively). Overall, the prevalence of caries dropped from 6.9% in 2007 to 3.5% in 2019 (P1), from 34.5% in 2007 to 20.3% in 2019 (P6), and from 41.5 % in 2007 to 33.5% in 2019 (S3) schoolchildren. The mean DMFT reduced from 0.11 to 0.05 among P1, 0.72 to 0.35 among P6, and 1.05 to 0.76 among S3 schoolchildren during the same period. Caries prevalence and mean DMFT were consistently higher among girls. On average, caries prevalence decreased 5% per year in P1 (AAPC -5.0 [95% CI: -6.1, -3.9]) and P6 (AAPC -4.9 [95% CI: -5.7, -4.1]),). and 2% among S3 (AAPC -2.0 [95% CI: -3.5, -0.4] schoolchildren. Caries prevalence decreased approximately 5% annually among Chinese P1, Chinese P6, Indian P6, and nearly 4% among Malay P1, Malay P6 and Indian P1. The average decrease in caries prevalence was lower (about 2%) among all ethnicities at S3 school level.

Conclusion: Dental caries in permanent dentition of Singaporean schoolchildren have decreased from 2007 to 2019. However, the decrease observed among primary school students was more than double that among secondary schoolchildren. More sensitive criteria are suggested for diagnosing non-cavitated lesions since the overall prevalence is very low and the use of mobile technology as an option to improve the monitoring and early identification of dental caries in adolescents.

00221 Predictors of Interstitial Lung Disease Progression in the Systemic Sclerosis Cohort Singapore

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Aims: Clinical course of systemic sclerosis (SSc) associated interstitial lung disease (ILD) is heterogeneous with varied progression rate. This study aimed to identify baseline clinical characteristics associated with ILD progression within 1, 3 and 5 years after ILD diagnosis.

Methodology: In this prospective multi-center Systemic Sclerosis Cohort Singapore (SCORE, Jan 2008 to Feb 2021), SSc patients with ILD diagnosed by high resolution computed tomography and $\geq$1 annual follow-up pulmonary function tests were included. ILD progression was defined by forced vital capacity (FVC) decline $\geq$10% predicted or FVC decline 5-9% predicted with DLCO decline $\geq$15% from time of ILD diagnosis. Multivariable logistic and cox regression analyses, adjusting for malignancy and use of cyclophosphamide (CYC) or mycophenolate mofetil (MMF) treatment, were performed to determine independent risk factors of ILD progression.

Result: Of 124 SSc patients with ILD, majority had limited cutaneous SSc with 47.6% had limited, 33.9% diffuse cutaneous SSc and 18.5% SSc-overlap. ILD progressed in 6%, 15% and 23% of patients within 1, 3 and 5 years, respectively. After adjusting for malignancy and treatment, anti-La was associated with ILD progression within 1 year (OR 6.94, 95% CI: 1.14-42.2; p=0.04) and 3 years (OR 5.98, 95% CI: 1.31-27.4; p=0.02); we found that anti-Scl70 was associated with ILD progression within 5 years (OR 2.54, 95% CI: 1.05-6.12; p=0.04). Analyzing time to ILD progression as an outcome, anti-La was significantly associated with higher risk of ILD progression, after adjusting for malignancy and treatment (HR 3.47, 95% CI: 1.18-10.2; p=0.02). Time to ILD progression was 1.4 years in patients with anti-La vs 6.9 year in those without anti-La (p=0.02), and 4.7 year in patients with anti-Scl70 vs 8.9 years in those without anti-Scl70 (p=0.12).

Conclusion: In this Asian cohort of SSc patients, autoantibodies may help to predict ILD progression rates.

00222 Evaluation of Measurement Properties of HeartQol Health-related Quality of Life Questionnaire in Patients with Heart Diseases in Singapore

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[1]Duke-NUS Medical School, [2]Tampere University, Finland, [3]Singapore Clinical Research Institute, [4]National Heart Centre Singapore, [5]National University Heart Centre, [6]National University of Singapore

Aims: (i) To evaluate measurement properties of the 14-item HeartQoL health-related quality of life (HRQoL) questionnaire in patients with heart diseases in Singapore, and (ii) to assess measurement equivalence of the English and Chinese language versions of the questionnaire.

Methodology: This cross-sectional survey involved outpatients with heart diseases from the National Heart Centre Singapore and the National University Heart Centre Singapore. The HeartQoL and 5-level EQ-5D (EQ-5D-5L) questionnaires were self-administered in either English or Chinese according to the participants' preferred language.

The HeartQoL includes two subscales – physical (10 items) and emotional (4 items), and a global scale (all items), each ranging from 0 to 3, with a higher score indicating a better outcome. For EQ-5D-5L, a sum score (mean of response levels, ranging from 1 to 5) was calculated for each of its five domains (mobility, self-care, usual activities, pain/discomfort, anxiety/depression), with a higher score indicating a worse outcome. In addition, EQ-5D-5L visual analog scale (EQ VAS) (range 0 to 100) was used as an indicator of the overall HRQoL, with a higher score indicating a better outcome.

Measurement properties of HeartQoL scales were evaluated for criterion validity using the Spearman rank correlation (r) between HeartQoL scales and EQ-5D-5L scores, internal consistency using the Cronbach's alpha (α), and discriminative validity using the mean scale comparisons across New York Heart Association (NYHA) functional capacity classes using a trend test. In addition, the measurement equivalence of a scale for English and Chinese language versions was assessed using the 90% confidence interval (CI) of the mean difference of the scale based on the two languages, adjusted for demographic and disease characteristics.

Result: Majority of the 577 participants (mean age 58 years, 72% men) had ischemic heart disease (79%) followed by heart rhythm disorder (29%) and heart failure (27%). The distribution of NYHA classes was I (47%), II (44%), and III-IV (9%). The mean of HeartQoL physical, emotional, and global scales were 2.29 (SD 0.61), 2.49 (SD 0.65), and 2.35 (SD 0.55), respectively.

HeartQoL Physical, emotional, and global scales were moderate-to-strongly correlated with EQ-5D-5L mobility, anxiety/depression, and EQ VAS scores, each $|r| \geq 0.4$ and $p < 0.01$. Each HeartQoL scale had ($\alpha > 0.8$, indicating a high internal consistency. The mean values of each HeartQoL scale decreased with an increase in NYHA classes (each $p < 0.01$). Among Chinese patients (215 interviewed in English and 114 in

Chinese), the 90% CI of adjusted mean difference for each scale between the English and Chinese versions of HeartQoL was within 0.5 SD of the scale, indicating the measurement equivalence.

Conclusion: The HeartQoL is a valid questionnaire for measuring HRQoL among heart disease patients from Singapore. HeartQoL English and Chinese language versions produce similar scores.

00223 Evaluation of a Multidisciplinary Health Management Programme for Chronic Obstructive Pulmonary Disease (COPD)

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Changi General Hospital

Aims: Chronic obstructive pulmonary disease (COPD) is a common chronic respiratory disease in the older population. Exacerbations of COPD are associated with high healthcare utilization, and mortality. In an effort to reduce healthcare utilization of COPDs patients, Changi General Hospital (CGH) implemented a health management programme where high-risk COPD patients receive multidisciplinary clinical, educational, case management, psychological, telehealth, and social interventions to mitigate the risk of readmission. This study aimed to study the impact of this telehealth programme on COPD patients on their healthcare utilization and mortality.

Methodology: This was a retrospective evaluation of patients who were enrolled to CGH COPD health management programme from January 2012 to December 2019. A per protocol analysis was conducted where patients who completed 3 scheduled calls over a 3-month period were assigned to the intervention group while patients who were unreachable or declined to participate in the program or did not complete the program, were categorized in the control group. The study focused on four outcomes were: hospitalization rates and length of stay for all-cause and COPD-related hospitalizations, and mortality at one year compared to three month pre-enrolment. Negative binomial mixed regression model was employed to compare the hospitalization rates and Cox proportional hazard model was used to compare the mortality within 12 months of the first telephone call.

Result: A total of 845 patients, with a mean age of 77.9 years was analyzed where 440 were in the intervention group, with a mean age of 78.1 years and 405 were in the control group, with a mean age of 76.6 years. The percentage of smokers was higher in the control group compared to the intervention group (54% vs. 33%, p<0.001), while the intervention group had a higher percentage of patients who were engaged in exercise (70% vs. 48%, p<0.001). Within 12 months of becoming eligible for the health management programme, the intervention group demonstrated a decreased adjusted incidence rate ratio for COPD-related hospitalizations (IRR=0.77, 95% CI=0.65-0.92) and all-cause hospitalizations (IRR=0.68, 95% CI=0.54-0.86) compared to the control group. No statistically significant difference was observed across the two groups in terms of changes observed in LOS for COPD-related hospitalizations, all-cause hospitalizations, and mortality.

Conclusion: The health management programme was associated with the significantly 23% more reduction in COPD-related hospitalizations and 32% in all-cause hospitalizations within 12 month of enrolment compared to the control group. These findings underscore the potential beneficial effects of

the telehealth program on healthcare outcomes of COPD patients. Additional research is necessary to understand and explore ways to reduce LOS of these COPD patients.

00224 Efficiency, Validity and Reliability of GlauCATTM-Asian Computerised Adaptive Tests in Measuring the Patient-reported Impact of Glaucoma

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Aims: Understanding the impact of glaucoma and the effectiveness of treatment therapies from the patient's perspective is crucial. However, a comprehensive patient-reported outcome measure to assess the quality of life (QoL) impact of glaucoma in Asians is not available. We evaluated the efficiency, validity and reliability of "GlauCATTM-Asian", which comprises seven glaucoma-specific QoL computerised adaptive tests (CATs).

Methodology: In this cross-sectional, clinical study, 269 English and/or Mandarin-speaking participants (mean age±standard deviation [SD] 65.34±9.10 years; 39% female) across the spectrum of glaucoma (50 (18.59%) suspects; 72 (26.76%) mild-moderate; 60 (2.30%) advanced; and 87 (32.34%) severe/end-stage) were recruited from glaucoma clinics at the Singapore National Eye Centre. Participants answered the GlauCATTM-Asian CATs (Ocular comfort; Activity limitation; Lighting, Mobility; Concerns; Psychosocial; Glaucoma management) and other questionnaires and underwent eye tests. Our primary evaluation focused on the efficiency (i.e. mean number of items required for each test, time taken for CAT compared to the full item banks (IBs), and agreement between the CAT and full IB scores), and precision (SEM±SD[standard deviation]) of GlauCATTM-Asian. Secondary evaluations included an assessment of GlauCATTM-Asian's criterion validity (association of scores with glaucoma severity), convergent/divergent validity (correlations with related/unrelated questionnaires), and test-test reliability.

Result: The mean number of items administered ranged from 9 for Mobility and Glaucoma Management and 12 for Ocular comfort. Compared to answering the full IBs, CATs resulted in an average time savings of 38.3%, which ranged from 10% to 70.6% for Lighting and Activity limitation, respectively. Agreement between scores obtained by CAT vs. full IB was acceptable (Intra-correlation coefficient [ICC]≥0.75) for all tests, ranging from 0.75 for Concerns and Psychosocial to 0.93 for Mobility. The precision of score estimates was high, with mean SEM ranging from 0.35 (~0.88 reliability) for Psychosocial to 0.29 (~0.92 reliability) for Mobility. Four CATs (Activity limitation, Mobility, Lighting and Concerns) were sensitive to glaucoma severity levels (criterion validity), with scores decreasing significantly as severity increased (p-trend <0.05). All tests displayed expected correlations with other scales (convergent/divergent validity). Test-retest reliability was acceptable for all CATs (ICC≥0.75), ranging from 0.75 for Activity limitation to 0.92 for Mobility.

Conclusion: GlauCATTM-Asian can provide efficient, precise, valid, and reliable measurement of the patient-centred impact of glaucoma severity and may be useful to monitor the impact of disease progression and evaluate the effectiveness of new therapies. Future work will determine the responsiveness of GlauCATTM-Asian to treatment interventions.

00225 Developing a Production Workflow for Patient-specific 3D Printed Wrist Splints for Triangular Fibrocartilage Complex (TFCC) Injuries

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Aims: Wrist splints fabricated using 3D printing techniques perform similar to but are lighter, more breathable and washable compared to traditional splints fabricated via thermoplastic moulding. The project aimed to develop an in-hospital production workflow for a 3D printed wrist splint for a TFCC sprain, a wrist stabilisation device to enable optical surface scanning of the wrist, as well a well-fit 3D printed splint.

Methodology: An immobilisation device which maintained the forearm of a volunteer in neutral position was designed and developed using suitable materials and 3D printed housing cases. An optical surface scanner was used to obtain a virtual 3D model of the forearm anatomy in this position. CAD techniques were used to develop a wrist splint around this model which was subsequently 3D printed. The workflow, stabilisation device and physical model were assessed for fit and feasibility of implementation by a senior SGH occupational therapist.

Result: The immobilisation device performed successfully. The 3D printed splint was of a lighter and more well ventilated compared to a traditional splint. FEA Analysis of the virtual splint model demonstrated that it was unlikely to deform or fracture with use. The 3D printed splint showed a satisfactory fit for the volunteer.

I. POSITIONING DEVICE

Our design requirements for the positioning device were divided into: must-have and good-to-have.

Must-have: Immobilise patient's lower arm. Material has to be transparent and not too reflective (prevent interference with scanning). Comfort in usage (for patient).

Good-to-have: Not to distort the natural shape of the arm. Intuitive to use. Height adjustable to suit a wider range of patient profile. Portability.

Design Journey: Scan to discover more!

II. BESPOKE 3D SPLINT

Our design requirements for the bespoke 3D splint were divided into: must-have and good-to-have.

Must-have: Immobilisation of the arm from the elbow to the knuckles of the hand. Allow for thumb and finger movements. Comfort in prolonged usage. Ease-of-use. Easy to clean/sanitise.

Good-to-have: Breathable to minimise sweating. Rounded edges to avoid abrasion at key areas (webspace, wrist bone, etc.)

Concept Development: Using Meshmixer we have designed our bespoke 3D splint. Scan the QR code to read the manuals!

Conclusion: In-hospital design and production of 3D printed splints is feasible. This project is also an outcome of an ongoing collaboration between the SGH 3D Printing Centre as clinical lead, the Singapore University of Technology and Design as engineering lead, with SGH Occupational Therapy as subject matter expert.

00226 A Pilot Study on Patient Acceptability in Use of Chatbot for Symptom Screening and Patient Education for Autoimmune Inflammatory Diseases

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Aims: Chatbots are increasingly used in healthcare to enhance patient engagement, satisfaction, and cost-effectiveness. However, chatbot acceptability varies among patient populations and is not well-studied in patients with autoimmune inflammatory rheumatic diseases (AIIRD). We aimed to examine chatbot acceptability and satisfaction among patients with AIIRD.

Methodology: A survey was conducted in an outpatient setting at a tertiary rheumatology referral center. The chatbot in the study was designed specifically for symptom checker leading to diagnosis and dissemination of patient education and hospital operational information. Patients aged 17 years and older with a diagnosis of AIIRD or who were referred for suspected AIIRD, and who had interacted with the chatbot, were invited to participate in the survey. The survey was used to evaluate effectiveness, acceptability, and implementation of the chatbot. The primary outcome was user satisfaction with chatbot response. Secondary outcomes included the ease of use of the chatbot, patient willingness to engage again with the chatbot, and overall chatbot acceptability before and after consultation with a rheumatologist. Descriptive statistics and ANOVA were used for data analysis.

Result: 200 outpatients (100 first-visit and 100 follow-up) with known or suspected AIIRD participated in the survey between June to October 2022. The study demonstrated overall high acceptability of chatbots in rheumatology, which remained consistent across age, gender, and visit type. Subgroup analysis suggested that those with higher education levels were more likely to embrace chatbots as information resources. Participants with inflammatory arthropathies also demonstrated a higher degree of chatbot acceptability as an information source compared to individuals with connective tissue disease.

Conclusion: Our study demonstrates that a rheumatology chatbot designed for diagnosis and dissemination of information can achieve high acceptability among patients with AIIRD which is independent of patient demographics or type of visit. The high acceptability is more pronounced in patients with inflammatory arthropathies and patients with higher education levels. Healthcare providers can utilize these insights when considering the implementation of chatbots in rheumatology and other medical disciplines to improve patient care and satisfaction. Patients are also able to access hospital operational information using an artificial intelligence assisted conversation agent approach rather than conventional means of searching the hospital website, which improves patient engagement.

00227 Salivary Dipeptides: A Potential Reservoir of Biomarkers for Type 2 Diabetes Mellitus

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Aims: Type 2 diabetes mellitus (DM) is increasing at an unprecedented rate worldwide. As diabetic status needs to be monitored continuously, practical, reliable, and non-invasive measures for monitoring hyperglycaemia have become imperative clinical and scientific objectives. Saliva, with its unique ability to reflect systemic health non-invasively, offers an ideal platform for continuous diabetes monitoring. Although salivary metabolites may be a viable substitute for blood biomarkers, the full potential of salivary metabolomic fingerprints has not yet been realised. Considering this research gap, we conducted an explorative study to investigate the suitability of salivary metabolites for assessing T2DM status.

Methodology: In this case-control study, metabolite profiles of saliva were measured using an untargeted metabolomics approach in 39 women with DM and 40 women without DM (non-DM). Demographic and clinical data were recorded. Features predictive of diabetic status were identified using the Least Absolute Shrinkage and Selection Operator (LASSO) regression model, and their performance was assessed using the Receiver operator curve (ROC).

Result: Orthogonal Projections to Latent Structures Discriminant Analysis (OPLS-DA) model showed that subjects in DM and non-DM groups have distinct salivary metabolomes. At an FDR of <0.05 and VIP>1, 126 metabolites significantly differed between the two groups. Most of these differentiating metabolites belonged to the class of amino acids and their derivatives, with dipeptides accounting for 65% of the identified metabolites. Amongst them, dipeptides containing leucine, valine, phenylalanine, tryptophan, tyrosine, methionine glycine, lysine and glutamine were in the majority. The LASSO regression model identified 62 features with non-zero regression coefficients as independent predictors of diabetic status, of which the dipeptide Glutamine-Tryptophan (Gln-trp) ranked as the topmost variable of importance. Further, the ROC curve for Gln-trp determined the prediction capabilities of AUC=0.80 (95% CI 0.69 - 0.90) for diabetes status.

Conclusion:

The dipeptides detected in saliva can represent products of altered metabolism or a breakdown of systemic function associated with diabetes. Leveraging saliva's non-invasive collection method, dipeptides could be developed as a potential diagnostic and prognostic biomarker for monitoring T2DM.

00228 Associations between Parity and Maternal Age at First Birth on Arterial Stiffness in Cardiovascular Ageing

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Aims: Cardiovascular ageing in women is complicated by her various phases of life: reproductive, transitional, and post-menopausal. Current studies look at the impact of menarche and menopause, however the effects of reproductive factors on cardiovascular ageing have not been quantitatively measured. This paper explores the associations between parity and maternal age at first birth (AFB) on cardiovascular ageing, obtained through noninvasive central hemodynamics that computes pulse wave velocity (PWV) and peripheral resistance (PR) in older Asian women.

Methodology: Participants were recruited from a community-based cohort of older Asian adults. Demographics, parity, AFB, and relevant cardiovascular risk factors were obtained from standardized questionnaires completed by participants. PWV was measured using a cuff-based auscultatoric oscillometric pulse wave analysis machine.

Result: 170 Asian women (mean=66(13.5) were included. Parity ranged from 0 to 8 (mean=2 (1.3). There were 30 (17.6%) women without any children, 16 (9.4%) with 1 child, 63 (37.1%) with 2, 48 (28.2%) with 3, 2 (1.2%) with 6 and 1 (0.6%) with 8. AFB (n=140) ranged from 18 to 44 (mean=28(4.4). PWV (n=162) ranged from 4 to 14 (mean=10(2.3).

Pearson correlation showed that parity had a significant, weak, positive correlation with PWV (r=0.280 & p=<.001). AFB also had significant, weak, negative correlation with PWV (r=-0.219 & p =.011), PP (r=-0.250 & p=.003) and SBP (r=-0.183 & p=.031).

Based on multivariate regression, parity ((=0.145, 95%CI [0.014,0.277], p=.030), but not AFB ((=0.004, 95%CI [-0.026,0.034], p=.802), was associated with PWV in old age in these women, independent of age ((=0.169, 95%CI [0.159,0.179], p=<.001).

1: Nulliparity, 2: Low multiparity (1–2), 3: Grand multipara (3 or more)
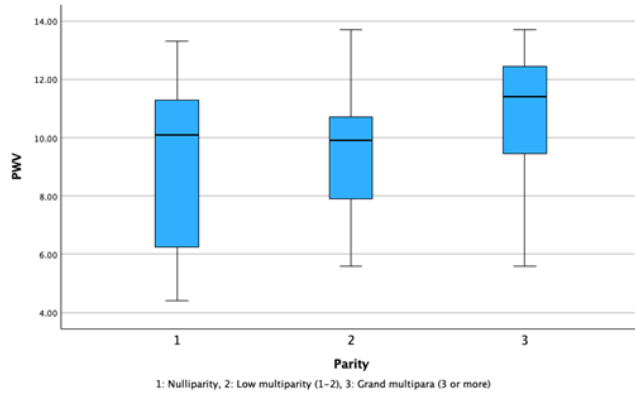
Conclusion: Parity and AFB correlated with pulse wave velocity, a marker of arterial stiffness in old age in Asian women. Accounting for effects of chronological ageing on these women, parity was significantly associated with arterial stiffness in older women. Future research to understand biological mechanisms linking parity with cardiovascular ageing would be insightful.

00229 Lower Limb and Mortality Outcomes in Asian Patients with Diabetes after Lower Limb Revascularization

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Aims: Patients with diabetes are at high risk of peripheral arterial disease (PAD) and its associated complications. Chronic limb threatening ischemia is the advanced stage of PAD, characterized by rest pain, lower limb ulceration or gangrene. Revascularization can reestablish limb perfusion but, in some cases, minor or major amputation is inevitable. The aim of this study was to describe the incidence of lower limb and mortality outcomes in patients with diabetes who had undergone a lower limb revascularization.

Methodology: This was a retrospective cohort study of patients aged 18 and above with diabetes mellitus with at least 2 years follow up in the SingHealth Diabetes Registry (SDR) from 2013 to 2020 and had undergone a lower limb revascularization. The revascularization is the index event and the year before the year it occurred was the baseline year and the observation period was from the index date to end of 2020 or death, whichever is earlier. The incidences of limb outcomes were analyzed using competing risks analyses with major amputation in both legs or death as the competing risk.

Result: 2389 Patients with diabetes in the SDR underwent lower limb revascularization. Majority were male (58.4%) and the proportion of Malays and Indians were higher than the general population (19.2% and 14.0%, respectively). The median duration of diabetes was 14 years (range 1 – 57 years) and practically all had hypertension, hyperlipidemia, cardiovascular disease, PAD and foot ulcers. After a lower limb revascularization, the overall cumulative incidences of another revascularization, a minor amputation and a major amputation at 1 year were 36.6%, 27.7% and 13.4%, respectively, and at 4 years were 51.0%, 32.1% and 20.3%, respectively. These outcomes occurred predominantly on the same side the revascularization was done on (cumulative incidence of another revascularization, minor amputation and major amputation on same side at 1 year = 25.9%, 24.5% and 11.6%, respectively, and at 4 years = 32.2%, 26.2% and 15.3%, respectively). Amputation-free and overall survival at 1 year were 69.2% and 78.1%, respectively, and at 4 years were 40.1% and 48.5%, respectively.

Conclusion: Patients with diabetes who had undergone a lower limb revascularization had a high risk of a subsequent revascularization, minor amputation, major amputation and death.

00230 Lower Limb Outcomes in Asian Patients with Diabetes

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Aims: The prevalence of diabetes in the adult population in Singapore is projected to reach 13.7% by 2030. Diabetes control is sub-optimal in many of these patients, and this leads to multiple complications including peripheral arterial disease (PAD). At advanced stages, PAD progresses into lower limb ischemia, necessitating revascularization and/or amputation. The aim of this study was to describe the incidence and risk factors for adverse lower limb outcomes in an Asian patients with diabetes cohort in Singapore.

Methodology: This was a retrospective cohort study of patients aged 18 and above with diabetes mellitus and at least 2 years follow up in the SingHealth Diabetes Registry from 2013 to 2020. The first entry year was considered the baseline year and observation period was from the beginning of the following year to end of 2020 or death, whichever is earlier. The associations between baseline characteristics and limb outcomes were analyzed using competing risks analyses.

Result: A total of 143563 patients met the inclusion criteria, of which 2601 (1.8%) had documented PAD and 2827 (2.0%) had diabetic foot ulcers at baseline. Few patients had a minor or major amputation at baseline (603 (0.4%) and 167 (0.1%), respectively). Over the observation period, the cumulative incidences at 1 year of a lower limb revascularization, minor amputation and major amputation were 0.2%, 0.3% and 0.1%, respectively. The factors that predict risk of these lower limb outcomes are shown in the table below.

Variable	Level	Subdistribution Hazard Ratio (95%CI)		
Outcome		Revacularization	Minor amputation	Major amputation
Age		0.988 (0.982 – 0.994)	0.971 (0.965 – 0.977)	-
Gender	Male	-	1.500 (1.302 – 1.728)	-
Ethnicity	Indian	1.222 (1.025 – 1.456)	1.143 (0.938 – 1.394)	1.024 (0.748 – 1.402)
	Malay	1.170 (0.998 – 1.371)	1.370 (1.158 – 1.621)	1.682 (1.320 – 2.143)
	Others	0.807 (0.587 – 1.111)	1.195 (0.877 – 1.628)	1.029 (0.623 – 1.701)
Smoking	Ex-smoker	1.614 (1.250 – 2.084)	1.433 (1.066 – 1.927)	-
	Smoker	1.417 (1.165 – 1.724)	1.082 (0.869 – 1.348)	-
	Unknown	0.914 (0.790 – 1.058)	0.823 (0.697 – 0.973)	-
DM duration (years)	6-10	1.697 (1.431 – 2.012)	1.884 (1.553 – 2.286)	1.736 (1.291 – 2.334)
	11-20	2.055 (1.745 – 2.420)	2.578 (2.147 – 3.095)	2.562 (1.955 – 3.357)
	>20	2.797 (2.246 – 3.483)	3.575 (2.805 – 4.556)	2.780 (1.931 – 4.001)
	Unknown	0.0005 (0.0004 – 0.0006)	0.516 (0.072 – 3.689)	0.984 (0.136 – 7.152)
BMI		0.962 (0.948 – 0.975)	0.974 (0.960 – 0.988)	0.973 (0.952 – 0.995)
Hyperlipidemia		-	0.661 (0.533 – 0.820)	-
Cardiovascular disease		2.250 (1.956 – 2.590)	1.536 (1.310 – 1.801)	1.974 (1.566 – 2.489)
PAD		5.962 (5.030 – 7.066)	5.207 (4.249 – 6.380)	5.863 (4.476 – 7.680)

Transient ischemic attack	-	0.448 (0.222 – 0.903)	-
Atrial fibrillation	1.415 (1.149 – 1.744)	1.654 (1.303 – 2.101)	1.612 (1.173 – 2.215)
Eye complications	2.247 (1.894 – 2.667)	2.069 (1.708 – 2.506)	2.201 (1.682 – 2.879)
Nephropathy	2.506 (2.187 – 2.871)	2.974 (2.562 – 3.453)	3.096 (2.482 – 3.861)
Neuropathy	1.344 (1.025 – 1.762)	1.493 (1.109 – 2.011)	2.152 (1.498 – 3.090)
Any lipid lowering drug	-	-	0.773 (0.608 – 0.982)
Any anti-diabetic drug	1.724 (1.417 – 2.097)	2.134 (1.680 – 2.709)	1.686 (1.222 – 2.327)

Conclusion: The baseline prevalence of PAD and foot ulcers in Asian patients with diabetes were 1.8% and 2%, respectively. Their cumulative incidences of a lower-limb revascularization, minor and major amputation at 1 year were 0.2%, 0.3% and 0.1%, respectively. Certain demographic and clinical variables were associated with increased risks of adverse lower limb outcomes, in particular Indian or Malay ethnicity, smoking, increased duration of diabetes, cardiovascular disease, PAD, atrial fibrillation, eye complications, nephropathy, neuropathy and use of anti-diabetic drugs, some of these possibly indicating poor diabetes control.

00231 A Delphi Survey of Referral Reasons for Medical Social Work Interventions in Singapore

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Aims: Medical Social Workers (MSWs) see an increasing number of complex cases due to profound societal changes in Singapore, but lack an effective and validated tool for defining and classifying complexity in local context. This study aims to develop and test validity of a newly designed case stratification tool to support MSWs to define complex problems, capture emerging needs, allocate resources and manage cases more equitably, effectively and efficiently in real-word situations.

Methodology: Four rounds of online Delphi survey were conducted to obtain MSWs' perceived level of complexity(C), severity (S) and intensity(I) for 58 referral reasons for MSWs' interventions and gain their consensus on a case stratification matrix (CSI) developed from earlier focus group discussions. 41 MSWs across all Singapore restructured hospitals and specialist centers completed the surveys. For the first three rounds, participants rated each referral reason 'high', 'low' or 'not applicable' using the CSI matrix with agreement level set at 80%. Once 80% agreement was achieved, that referral reason in question was removed from subsequent round of survey. At the third round, participants also offered some context to their judgment of CSI for each remaining referral reason that did not achieve 80% consensus. In the fourth and final round, participants indicated "agree", "disagree" or "not applicable" for their collective judgment on level of complexity, severity and intensity for all 58 referral reasons for MSWs' interventions. In addition, they provided average frequency and average time-spent per month for each referral reason.

Result: Participants had at least 80% agreement for most designated referral reasons (55 out of 58 items). Number of items with at least 80% consensus constantly improved from 29.3% in round 1, 67.2% in round 2, 75.9% in round 3 to 94.8% in round 4. Only three items, namely 1) staff counselling, 2) referral to community support services and 3) advance care planning, achieved consensus ranging from 70% to 75%. Most problems, 69% of the list of referral reasons, were classified as high complexity, high severity and high intensity. Approximately 12.1% of items had a mixture of high and low levels of complexity, severity and intensity while 18.9% of items were low in complexity, severity and intensity. Referral reasons with high levels of complexity, severity and intensity were often related to treatment, care and discharge, counseling, therapy, crisis, legal and ethical issues and low levels were linked to education and financial issues.

Conclusion: This study offered important insights for healthcare professionals and system operators to understand current profiles of social problems in real-world situations and move beyond stratifying MSW cases solely by units of activities. Complexity, severity and intensity are key constructs that need

to be taken into consideration to ensure MSW case stratification tool is more robust and useful in stratifying and assigning MSWs cases equitably and efficiently.

00232 Assessment of Quality Control for Indocyanine Green (ICG) Clearance Test in the Clinical Laboratory

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Aims: Indocyanine Green (ICG) dye clearance test is used as an adjunct marker to assess post-operative hepatic function. We aim to evaluate and assess if commercial blank stripped serum matrices is suitable as a quality control material in place of current quality control material (pooled patient serum) in ICG clearance test in the Clinical Biochemistry Laboratory.

Methodology: Two concentration levels of quality control materials (low and high QC) were prepared from spiking ICG dye into two commercial sources of blank stripped serum (Sigma Aldrich Mass Spect Gold and UTAK normal serum) and pooled patient serum.

All 3 quality control materials were analysed on the Perkin Elmer Lambda 25 spectrophotometer in singletons over 15 days to assess imprecision. Method comparison study was performed in which absorbance readings of QC materials prepared from both commercial blank stripped serum and pooled patient serum were compared.

Result: QCs prepared from pooled serum, Mass Spect serum and UTAK serum showed an average absorbance of 0.3742, 0.4148 and 0.7887 for the low QCs; 1.2067, 1.2802, and 1.4876 for the high QCs respectively.

In terms of imprecision, QCs prepared from both commercial blank serums showed better precision, with the Mass Spec Gold serum showing a calculated coefficient of variations CV of 10.1% (low QC) and 5.0% (high QC), and the UTAK serum with CV of 6.6% (low QC) and 3.8% (high QC). This is in comparison to the QCs prepared from pooled serum, with CV of 13.5% (low QC) and 3.5% (high QC).

In the method comparison study, Bland-Altman analysis showed acceptable mean bias of 10.64% (low QC), and 5.85% (high QC), between the pooled and Mass Spect serum. However, Bland-Altman analysis showed significant mean bias of 71.65% (low QC) and 20.84% (high QC) between the pooled and UTAK serum. A comparable OD reading between QC materials prepared from pooled patient serum and Mass Spect Gold blank serum therefore shows improvement in reliability of QC assessment for ICG testing.

Conclusion: In summary, commercial blank stripped serum provides a more consistent way of preparing QC materials in ICG testing. The use of blank stripped serum will improve lab testing efficiency by eliminating the need for technologist to pool and store serum, which may also pose biohazard risk. QC results are demonstrated to be more stable and less prone to matrix interferences as compared to pooled patient material. Hence, we concluded that Mass Spect Gold blank serum is a suitable alternative to pooled patient serum in the preparation of QC material for ICG clearance testing.

00233 Integrating Primary Palliative Care among Surgeons: A Systematic Review of Current Curriculum and Educational Outcomes

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Aims: Approximately 20% of surgeries performed at tertiary cancer centers are palliative in nature. However, most surgeons report a lack of training and exposure in palliative care. This is likely due to a lack of standardized palliative education curriculum during surgical training. As such, we aim to explore currently available and practiced palliative education programs (PEP) for post-graduate surgeons and summarize their efficacy in improving palliative education amongst surgeons.

Methodology: The literature search was conducted using PubMed, Embase and Cochrane databases to include studies on palliative education initiatives amongst residents or fellows in any surgical discipline with no date restriction. We then performed a scoping review to synthesize the current state of palliative education programs using the following keywords: "palliative", "surgical", "training", "education". Two independent reviewers screened 1692 titles and abstracts.

Result: 10 studies were identified that reported on the implementation, curriculum, and outcomes of PEPs. The studies included a total of 571 surgical participants. Among the various PEPs, there was heterogeneity in their curriculum. For instance, management of common EOL symptoms like pain & dyspnea were only covered in 4/6 studies whilst palliative specific skills such as discussing goals of care were only covered in 3/8 studies training communication skills.

Most learners demonstrated a self-rated increase in situational comfort after participation in PEPs. In the handful of studies which utilized objective assessment tools to assess competency, there was documented improvement in clinical knowledge (through MCQ) in 2/4 studies, and improvement in communication skills (assessed via OSCE) in 2/3 studies. However, the MCQ in these studies were not validated or standardized between studies. 7/8 studies documented increased alignment to palliative principles and attitudes, although each study chose different attitudes to assess and report on. 1 study found an increase in code status documentation pre and post PEP; this was the only study that evaluated the translation of PEP to clinical practice in the long term. None of the studies evaluated the impact on patient care of these PEPs such as quality of palliative care delivered, or patient's Health Related Quality of Life.

Conclusion: The identified studies found that the implementation and curriculum of existing PEPs vary widely, of which few used objective yardsticks to assess knowledge and communication skills, with even fewer assessing sustainability of outcomes in the long run. Our findings suggest an urgent need to create a standardized palliative education curriculum for surgical trainees that can be replicated both internally and externally.

00234 Deriving Insights from Healthcare Datasets: Unravelling Raw Clinical Asthma Data through Data Linkages and Advanced Analytics

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Aims: This study aims to outline the process of processing raw healthcare datasets from various sources in SingHealth polyclinics and Singapore General Hospital (SGH) to derive a dataset that contains structured patient demographics and clinical characteristics information to better understand asthma patient journey and improve their health outcomes.

Methodology: Raw data from 2015 to 2020 was obtained from SingHealth Data Warehouse – eHints, incorporating data from various existing sources, such as the SingHealth COPD and Asthma Data Mart (SCDM), ClinDoc and other source databases.

The data linkage process involved linking patient data from different raw data tables, forming the cohort and diagnosis tables as the basis of the final asthma cohort. Duplicate entries were identified and removed from the linked dataset. Subsequently, filters were applied to select patients based on predefined inclusion criteria and exclude participants based on predefined exclusion criteria. Supplementary information from additional source systems was utilized to address missing data. The entire process was done on Python.

Result: The extracted raw data was organized into 7 folders, with 23 subfolders and 726 files, totaling a space capacity of 300GB. The final cleaned data folder contains 13 files. The data extraction, cleaning and wrangling process resulted in the creation of the main asthma master cohort table, comprising 21,215 patients (Figure 1). This structured table comprised 122 fields, providing a comprehensive view of the baseline patient cohort. Besides baseline, the final cleaned folder, around 7GB in size, includes longitudinal clinical data, asthma symptom control, health care utilization, laboratory investigations and results, medication prescription and dispensation, counselling and health outcomes.

Conclusion: Raw healthcare data does not allow for immediate statistical analysis. A data-wrangling approach is essential to process data before performing data analysis to derive insights. This project highlights an important use case of data wrangling and serves as a guideline for future similar studies.

Figure 1: Flowchart for data processing
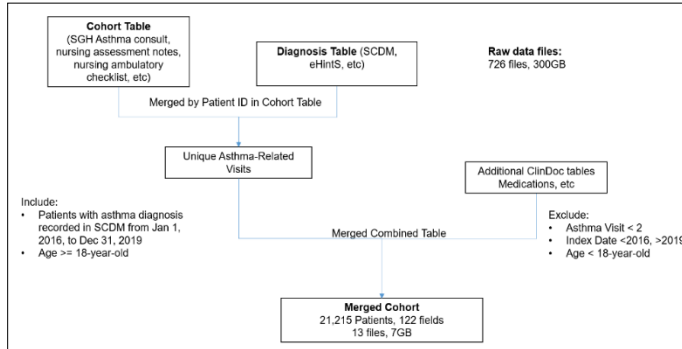
00235 Comparison between Vision Transformers and Convolutional Neural Networks in Diabetic Retinopathy Detection

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Aims: In recent years, Convolutional Neural Networks (CNNs) models have become the most common approach in executing image classification tasks. In the medical field, CNN models are largely adopted in feature-based disease detection from medical images or scans. Diabetic Retinopathy (DR) detection is one popular use case of CNN models. Transformer models were first introduced in 2017 for Natural Language Processing tasks, where further development led to the introduction of Vision Transformers (ViTs) models for image classification. While recent studies have demonstrated that ViTs models can outperform CNN models in classifying non-medical images using ImageNet, their performance in detecting referable DR from retinal photographs is relatively unexplored. In this study, we aim to evaluate the comparative performances of ViTs and CNNs on detection of referable DR using retinal photographs

Methodology: Using 41,614 retinal photographs from the Kaggle dataset, we developed five CNN and four ViTs models for the detection of referable DR. We defined presence of referable DR as eyes with moderate or worse DR. The comparative performance of all nine models was evaluated in the Kaggle internal test dataset consisting of 1,045 retinal photographs, and two separate external test sets, Singapore Epidemiology of Eye Diseases (SEED) and Messidor-1 consisting of 5,455 and 1,200 retinal photographs respectively.

Result: In the internal test set, the SWIN transformer model achieved the highest AUC of 95.7%, performing significantly better than all five CNN models. The same observation was confirmed in two independent external test sets, with the SWIN transformer achieving an AUC of 97.3% in SEED and 96.3% in Messidor-1.
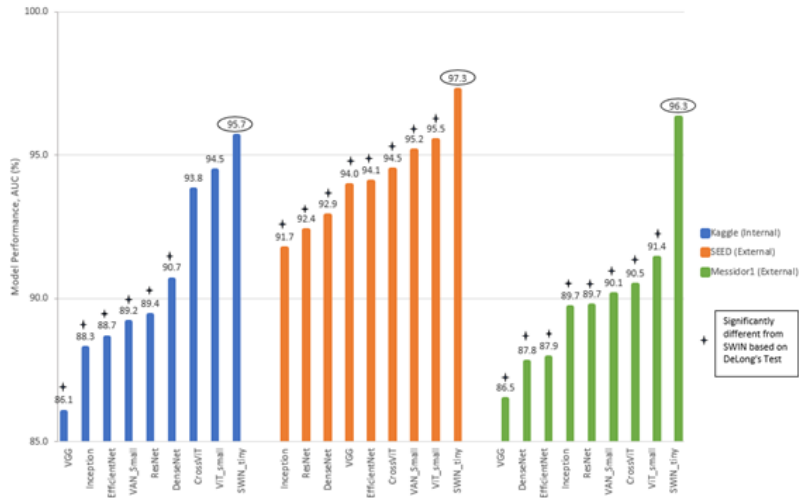
Conclusion: Based on our finding, vision transformer models may offer improved performance compared to CNN models in detecting referable DR from retinal photographs. By harnessing the potential of vision transformer techniques, it could allow refinement of existing referable DR detection models, leading to future improvements.

00236 Adopting an Age-sensitive Dyadic Analysis Tool to Understand Filial Piety and Intergenerational Support in Singapore

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Aims: Filial piety is the cornerstone of eldercare in Singapore which has a long tradition of family-based care model. Given the importance of filial piety, it is imperative to understand the emerging needs and intergenerational support among older parents and adult children in local contexts. However, the existing research predominantly focuses on single perspective either from parents or children solely instead of dyadic version, integrating both views. The truth is that filial practices involve shared decisions and thus only a one-sided perspective may not accurately reflect the realities, support and health concerns of the opposite party. This study aims to adopt the dyadic analysis model to understand the integrating perspectives of parents and children on filial piety, intergenerational support and eldercare concerns.

Methodology: Inspired by dyadic analysis model proposed by Eisikovits and Koren (2010), this study adopted a qualitative method incorporating in-depth interviews to explore the lived experiences of older parents and adult children on filial piety, intergenerational support and care concerns. A total of 16 dyads of Singaporean older parents and children from a restructured hospital participated in individual interviews to share their views. A dyadic analysis was applied to integrate the sum of two versions of the dyads by making a comparison of the overlapping and contrasting narratives, which helped to capture the depth and breadth of their experiences.

Result: The dyadic versions reflected the complexities and hidden secrets of filial practices and intergenerational support in this study. Results showed that healthcare professionals cannot ignore the overlapping descriptions and interpretations on filial support between two parties. Instead, it is plausible that the overlaps may translate into either harmonious or conflicting intergenerational relationships. This tool also helps to uncover the discrepancies of filial expectation and support between parents and children across different age groups, which further assists to unmask the underlying mental health concerns. More specifically, the contemporary older parents might expect more time-spent and emotional support from children; and the discrepancies of insufficient emotional support might translate into perceived isolation and loneliness.

Conclusion: This study expands the applicability of dyadic analysis model into the area of intergenerational studies. It sheds light for health services personnel to adopt this model into their programmes, policies and future research as it is age-sensitive that can uncover the intergenerational differences, complicated dynamics of relationships and the underlying mental health issues. By adopting this effective analytic tool, it would help to better identify the discrepancies and real-live needs at the deeper sense, which offers a clear direction for future eldercare interventions and policies.

00237 Characterising Behaviour Change Techniques Used in an Intervention Designed to Promote Eating Self-Regulation Skills in Paediatric Weight Management

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Aims: The Appetite Toolbox (ATB) is a behavioural intervention designed to promote eating self-regulation skills in 6-12 years old children identified as overweight. This study describes key components of the ATB and characterises the Behaviour Change Techniques (BCTs) used.

Methodology: Grounded in principles of Cognitive Behavioural Therapy and Appetite Awareness Training, the ATB approach consists of six 1-1.5 hour sessions delivered weekly by facilitators over a six week period. The ATB incorporates a series of eating regulation practices introduced each week by fictional characters ("the Appetite Amigos") in interactive story books alongside practices to promote behaviour-change. Session themes include: 1) Communicating hunger and fullness, 2) Recognising cravings, 3) Eating slower tastes good, 4) Eating slowly feels good, 5) Listening to body cues and 6) Focus and Relax (mindfulness). Behaviour Change Techniques were characterised using the Behaviour Change Taxonomy v1.0 [BCTv1.0]. BCTs refer to specific theory-driven and evidence-based strategies used to effectively change behaviour, including health behaviours, and the BCTv1.0 identifies 16 different categories of techniques that can be applied in variety within behavioural interventions. Two independent coders and two members of the research team completed the BCTv1.0 training and reached coding consensus prior to characterizing the ATB. The team proceeded to code the ATB intervention independently, and then came together to reach consensus. Unresolved coding discrepancies were identified and any that could not be resolved within the team were reported.

Result: A total of 14 out of 16 BCT groups were identified in the ATB, which incorporated 33 of the 93 individual BCTs included in the taxonomy. The analysis revealed the predominant groups of BCTs (and individual techniques) in the ATB were: Repetition and Substitution (including behavioural practice/rehearsal, habit formation and generalisation of target behaviour); Goals and Planning (including goal setting for behaviour, problem solving, action planning, and reviewing behaviour goals); Antecedents (including restructuring the physical environment, restructuring the social environment, and adding objects to the environment). BCTs identified in the ATB have been found effective in similar interventions promoting healthy eating behaviour.

Conclusion: Characterising the BCTs in the Appetite Toolbox will optimise reporting of the intervention efficacy and initial implementation, and aid replicability and application of the intervention in paediatric health services, including weight management.

00238 The Appetite Toolbox Trial Protocol: A Randomised Control Trial of a Behavioural Intervention Designed to Promote Eating Regulation Skills in Children with Overweight and Obesity

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Aims: Strategies to improve eating self-regulation skills are predicted to support weight management. This research protocol describes a randomized controlled trial evaluating the efficacy and implementation determinants of the Appetite Toolbox, a six-week behavioral intervention delivered online and designed to promote appetite awareness and eating self-regulation skills in children with overweight and obesity.

Methodology: Children (target n=112) between 6-12 years old with a BMI z-score ⩾ 85th percentile are recruited with their primary caregiver through the National University Hospital (NUH) and randomised to complete the Appetite Toolbox either immediately (intervention group) or after a wait (waitlist-control group). The waitlist group continue with their usual care over a six-week period while the intervention group complete the Appetite Toolbox. Children's eating self-regulation skills are assessed at baseline and post-intervention across a series of primary and secondary outcomes. The primary outcomes include children's ability to adjust meal size in response to a previously consumed snack and the tendency to eat in absence of hunger, both measured during a laboratory-based test meal at the Human Development Research Centre (HDRC) pre- and post-intervention. Secondary outcomes include child's appetite awareness, eating speed (coded through video observations) and portion selections measured during the HDRC visits, as well as child-reported quality of life and caregiver-reported feeding practices and child appetite traits using validated questionnaires captured at baseline, post-intervention, and one-month follow-up. Children's height and weight were assessed at baseline alongside a measure of child executive functions using the Behaviour Rating Inventory for Executive Functions. Barriers and facilitators to behaviour-change and implementation of the Appetite Toolbox will be explored through interviews with children, caregivers and other key stakeholders.

Result: Recruitment is ongoing and data collection is expected to end in July 2024. Analyses will compare changes in observed eating behaviours and caregiver self-reports between children in the intervention and control group. Possible effect modifiers will be explored, such as child executive functions, caregiver feeding practices, and fidelity to the intervention.

Conclusion: Findings of this pilot trial will inform future efforts to implement the Appetite Toolbox and enhance paediatric weight management services in Singapore.

00239 Central Arterial Stiffness Assessment in Ageing Asian Adults: Correlates with Chronological Age, Vascular Age, and Limitations at High Framingham Risk Scores

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Aims: Arterial stiffness, especially when measured via gold standard methods, is an established marker of cardiovascular ageing. Few studies have investigated centrally obtained measures of arterial stiffness like pulse wave velocity (PWV) and aortic augmentation (AA) against Framingham 10-year risk scores (FRS) and estimated vascular age in Asian older adults. We evaluated the degree of correlation between FRS, vascular age and PWV, AA among older adults free of cardiovascular disease (CVD) at baseline.

Methodology: Participants were recruited from a community-based cohort of older adults. FRS and estimated vascular ages were derived based on demographics and relevant CVD risk factors obtained from standardized questionnaires done by participants. PWV and AA were measured using a cuff-based oscillometric pulse wave analysis machine.

Result: 360 Asian older adults (50.0% men, age 67.82 ± 12.70) with risk factors of hypertension (44.2%), dyslipidemia (53.1%), diabetes mellitus (16.1%) and smoking (15.0%) were included.

PWV (10.39 ± 2.22) correlated well with FRS ($r = 0.703$, $p < 0.001$) and vascular age ($r = 0.879$, $p < 0.001$). While vascular age correlated well with chronological age ($r = 0.865$, $p < 0.001$), the correlation between PWV and chronological age was stronger ($r = 0.943$, $p < 0.001$). AA correlated weakly with FRS ($r = 0.194$, $p < 0.001$) and vascular age ($r = 0.394$, $p < 0.001$).

While FRS ($\beta = 0.069$, 0.061-0.077, $p < 0.001$) was associated with PWV, adjusting for waist circumference, dyslipidemia and diastolic blood pressure, PWV measurements plateaued in 12.5% of participants with estimated high FRS >60%. These suggest possible limitations in using FRS estimations based on non-Asian cohorts which may overestimate vascular ageing in Asians.
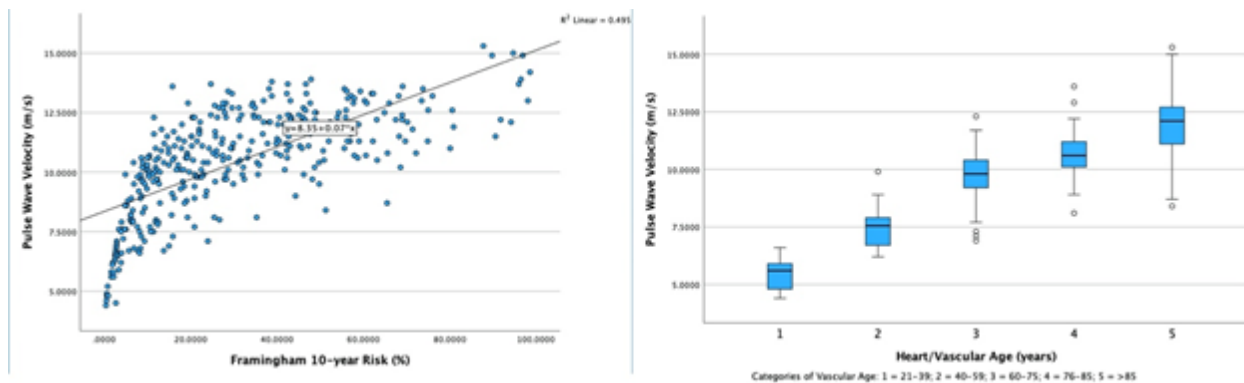
Conclusion: PWV had strong positive correlations with FRS and estimated vascular age. However, high FRS (60% and above) may warrant formal assessments of vascular age via gold standard measurements, to avoid overestimation of actual vascular ageing. Future data on participant clinical outcomes would be prognostically important and may form basis for future Asian-based calculators.

00240 Polymyxin B Therapeutic Drug Monitoring in Singapore: Are We Achieving and Calculating the Correct Therapeutic Targets in Our Local Population?

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Aims: Polymyxin B (PB), a highly nephrotoxic antibiotic, has resurged recently as salvage therapy for extensively drug-resistant Gram-negative bacterial (XDR-GNB) infections. Acute kidney injury frequently occurs with conventional PB doses, while bacterial emergence of resistance and poor outcomes are associated with suboptimal doses. Hence, the utility of PB therapeutic drug monitoring (TDM) is beneficial to inform if the dosing is adequate to treat such infections. However, PB's safety and efficacy target, i.e., area under the concentration-time curve at steady state (AUCss,24hr) PB measurement, is challenging as PB exists as a component mixture. Although most PB assays measure only major PB components, i.e., PB1 and PB2, the British Pharmacopoeia recommends PB1, PB2, PB3, and isoleucine(iL)-B1 components to comprise ≥80% in all PB formulations. We hypothesize that the current local PB dosing practice is not optimal in at least 50% of patients with XDR-GNB infections. Our study aims to evaluate the proportion of above- and sub-optimal targeted PB exposures in these patients using our developed PB assay to measure PB1, PB2, PB3, and iL-B1.

Methodology: PB1, PB2, PB3, and iL-B1 in concentrations of 0.05–10mg/L were spiked in commercial plasma to prepare the calibration curve. Plasma samples from 5 subjects treated with PB for XDR-GNB infections were collected. Sample extraction was performed using simple protein precipitation with 20% trichloroacetic acid (TCA). Reverse-phase chromatography was performed on the extracted samples using gradient elution on a C18 column (2.1x100mm) using 0.1% formic acid/TCA in water and acetonitrile mobile phases at a flow rate of 0.6mL/min. Data was acquired on an LCMS 8060 mass spectrometer. Total run time, including re-equilibration, is 4.5mins. Pmetrics software was used to calculate the PB AUCss,24hr, to determine the attainment of the efficacy target of 50-100mg.h/L.

Result: Simultaneous quantification of the 4 PB components was achieved with excellent linearity at $R^2=0.999$ in the concentration range of 0.05–10mg/L. Mean accuracies and precision for the calibration curve were within ±15%. 4 out of 5 subjects (80%) did not achieve the AUCss,24hr target. The remaining subject that achieved the PB AUCss,24hr target, had microbiological eradication. Based on 4 components of PB1, PB2, PB3 and iL-B1, the AUCss,24hr values for the 5 subjects ranged between 17.4 to 57.9 mg.h/L. Calculated AUCss,24hr values using only PB1 and PB2 were lower by up to 24.1%, compared to all 4 PB components.

Conclusion: Our study demonstrated that our current dosing regimens are sub-optimal according to the AUCss,24hr target. In addition, the study findings revealed significant differences when comparing AUCss,24hr values derived from using 4 PB components against 2 PB components. The potential risks of

inaccurate AUCss,24hr without measuring the 4 PB components, may arise with poorer clinical outcomes in patients with XDR-GNB infections. Our study findings warrant further investigation in a bigger patient cohort.

00241 Evaluating the Utility of Recycled Plasma as a Sustainable Resource in Bioanalytical Assays for Antibiotic Therapeutic Drug Monitoring

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Aims: Bioanalytical assays used in therapeutic drug monitoring (TDM) of antibiotics in blood plasma are essential tools to facilitate good antimicrobial stewardship. Blood plasma provides an ideal matrix-matched standard for preparing calibration curves in bioanalytical assays to measure antibiotic plasma levels in TDM. Matrix-matched standards eliminate matrix effects that are detrimental to assay robustness. However, accessibility to commercial blood plasma is increasingly limited by rising costs and a lack of available sources, which proved to be challenging barriers that can impede the rapid implementation of TDM. Based on our experience with any test involving the collection of plasma samples, there will inevitably be excess leftover plasma that is discarded. Hence, we propose that recycling this leftover plasma may help to defray the high cost that comes from the purchase of fresh commercial plasma. We estimate to achieve $50,000 annual savings for a lab running a TDM service over 52 5-day weeks. Our study seeks to develop a "carbon-stripping" strategy to recycle leftover plasma, and compare its utility against fresh commercial plasma for TDM assay development.

Methodology: Carbon-stripped plasma was prepared from leftover plasma from ongoing clinical studies by mixing in crushed charcoal pills and centrifuging before use. Antibiotic solutions at clinically relevant concentrations (mg/L) of piperacillin(35), aztreonam(24), meropenem(20), doripenem(13) and tazobactam(12) were spiked in commercial plasma and carbon-stripped plasma obtained from 6 different patient sources. Sample extraction was performed using simple protein precipitation with acetonitrile. Samples were directly injected, and data was acquired on a Nexera X2 coupled LCMS 8060 mass spectrometer equipped with an ESI source. Total run time, including re-equilibration, is 4.5mins. Measured levels in both spiked commercial and carbon-stripped plasma were compared to nominal values.

Result: Simultaneous quantification of all 5 antibiotic compounds in commercial and carbon-stripped plasma was achieved with excellent linearity at $R^2=0.999$ in the assay concentration range of 1–400mg/L. Mean accuracies and precision for the calibration curve were found to be within ±15%. All measured spiked-in samples were within 11% accuracy of their nominal values. Our results revealed a negligible disparity in all 5 antibiotic concentrations between spiked commercial and spiked carbon-stripped plasma recovered from 6 different patient sources, ranging between 0.4-8.9%.

Conclusion: We have successfully recycled leftover plasma and evaluated its use against commercially sourced plasma. Our preliminary results have demonstrated that recycled plasma is a viable substitute for commercial plasma for TDM assay development. Such implementation can push TDM a step towards

sustainable healthcare. Future work will include studying the feasibility of recycling leftover plasma for TDM-based work at the hospital-wide level.

00242 Development of a Simple HPLC-UV Method for Fast Quantification of Multiple Triazole Antifungal Drugs in Antifungal Therapeutic Drug Monitoring

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Aims: Triazole antifungal drugs (TAD) are widely used to treat invasive fungal infections (IFI) due to their broad antifungal spectrum and low toxicity. However, adverse events such as gastrointestinal reactions or rash can result from overdosing, while sub-optimal doses can lead to therapy failure and build-up of drug resistance. Access to therapeutic drug monitoring (TDM) of various TADs will be helpful for clinicians to manage complex IFI, allowing personalized treatment for each patient based on the most optimal and suitable TAD. However, recent TDM assay development has pivoted to mass spectrometry-based detection due to its high sensitivity. Consequently, existing high-performance liquid chromatography with UV detection (HPLC-UV) systems have become under-utilized. This study aims to develop and validate a simple, fast, and low-cost HPLC-UV method for quantifying multiple TADs in plasma. As TAD compounds exhibit good chromophore abilities, we envision that a HPLC-UV-based method to measure TAD is adequate as opposed to mass spectrometry methods. This will enable optimal resource utilization of existing clinical infrastructure.

Methodology: Plasma samples containing isavuconazole (ISV), posaconazole (PCZ), voriconazole (VOC), itraconazole (ITZ) and hydroxy-itraconazole (HICZ) were extracted using protein precipitation with acetonitrile. HPLC-UV separation was achieved on a C18 column(2.1x100mm) using gradient elution with 10mM potassium phosphate pH5.6 buffer and acetonitrile; and detected via UV at 270nm. Quantification was performed using clofazimine as internal standard. The method was validated on accuracy, precision, limit-of-quantification (LOQ), specificity, carryover, and short-term stability based on FDA guidelines. The feasibility of the assay was tested in 20 clinical samples.

Result: Quantification of all TADs in plasma was achieved within 6 mins. Our assay was linear (R2=0.998) over the 0.1-40 mg/L range. Accuracy and precision were ±15% across the specified range. The lower LOQs were found to be at 0.1mg/L (ISV, ITZ), 0.2mg/L (PCZ, HICZ), and 0.5mg/L (VOC) while the upper LOQs were at 40mg/L. The method was specific for all TADs with no observed carryover and fulfilled acceptance criteria according to US FDA guidelines. Autosampler stability at 4°C was demonstrated for up to 15h. The assay could quantify the various TAD in all clinical samples accurately and reliably.

Conclusion: We developed a simple, fast, low-cost HPLC-UV assay to measure multiple TADs in plasma with minimal sample preparation. Our developed assay is sensitive to measuring any of the mentioned TADs in plasma in a single run. It will be beneficial for routine clinical implementation of antifungal TDM. We envision that developing fit-for-purpose methods such as this assay will allow us to maximize the utility of our current clinical infrastructure in hospitals for TDM in clinical practice.

00243 A Novel Approach to Evaluate Dental Caries in Elderly Singaporeans

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Aims: The SG70 Towards Healthy Longevity Cohort Study is one of the initiatives aimed at improving the quality of life of older Singaporean by identifying the lifestyle, behavioural, socioeconomic and clinical factors that can improve the quality of life in the last years of life. This oral health study aimed to evaluate the dental caries prevalence and experience in older people aged 65 to 75 enrolled in the SG70 cohort study.

Methodology: A nurse trained and calibrated by an experienced clinical dentist with tele-dentistry expertise recorded the oral cavity's intraoral videos using an intraoral camera. Three video scans were taken for each tooth to capture the buccal, occlusal, and palatal surfaces and the surrounding gingival area. All intraoral videos were de-identified, and the files were labelled according to the subject ID and stored in an encrypted portable hard disk. The files containing the de-identified images were transferred to trained dental examiners for oral health assessment. A trained and calibrated dental professional, evaluated caries experience according to WHO criteria in 100 participants selected from the SG70 cohort study and reported as decayed, missing and filled teeth/surfaces (DMFT/S) for 5 and 4 surfaces of each crown and root, respectively.

Table 1. Tooth caries assessment.

	Mean (SD)	Percentage (SD)
Coronal caries assessment (n = 100)		
Sound coronal teeth	10.2 (7)	36.4 (24.9)
Decayed coronal teeth (DT)	0.3 (0.6)	0.9 (2.2)
Missed coronal teeth (MT)	13.8 (9.1)	49.1 (32.5)
Filled coronal teeth (FT)	3.7 (4.2)	13.2 (14.9)
Coronal DMFT	17.7 (7.0)	63.5 (24.9)
Root caries assessment (n = 100)		
Sound roots	13.6 (9.2)	48.7 (32.7)
Decayed roots (DT)	0.3 (0.8)	1.1 (2.8)
Missed roots (MT)	13.8 (9.1)	49.1 (32.5)
Filled roots (FT)	0.2 (0.7)	0.6 (2.4)
Root DMFT	14.2 (9.1)	51.2 (32.9)

*Excluding 3rd molars. SD – Standard deviation.

Result: In these 100 study participants, excluding the third molar, the prevalence of dental caries (DMFT>0) was 63.5% and 51.2% for coronal and root caries, respectively (Table 1). The overall mean coronal DMFT index was 17.7, with an average of 13.8 missing teeth. Among these 100 participants, 26% of them had at least 20 natural teeth. The number of teeth ranged from 0-28 where 15% of participants were completely edentulous and only 1% presented 28 teeth.

Conclusion: Our study suggests tooth loss is a common oral health problem among older Singaporeans. After further validation, oral health assessment using the intraoral camera may serve as a more convenient and accessible technique for early detection of oral health conditions to provide preventive oral healthcare to the rapidly ageing and vulnerable elderly population.

00244 Building a Data Dictionary and Database: Challenges and Workflow Solutions in Harnessing Healthcare Data

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Aims: To develop an efficient data access workflow for disease/specialty-specific data extraction for database building from operational databases.

Methodology: Cogent use of Big Data requires identification of relevant data to answer clinically valid questions, robust data extraction and filtering techniques which capture information with high fidelity and understanding of the strengths and limitations of multi-source datasets from operational databases.

The SingHealth central data repository is in a secured zone under the IHiS administration. Clinical and Operational data warehouses hold all identifiable data. Research database is built up by extracting identifiable data from the reporting system. Institutional TTPs de-identified before releasing the data. Data extraction requires collaboration between a requestor team (RQT) and an implementer team (IPT) to identify gaps and develop a smooth workflow to ensure data governance.

Result: Focusing on a specific disease entity, and through multipartite cooperation between IHIS and the KKH Data Analytics Office, DAO (IPT), and the Data Science Core and paediatric neurologists (RQT), the study team identified datasets for extraction. The team performed pilot runs and identified barriers. Then, optimized filter settings and ensured data matching to break down barriers and created workflows, intermediate solutions for enabling robust full data extraction. Barriers at RQT includes complicated processes to request a complete data set and limited knowledge in data management which handicap interpretation of data extracted by IPT. Barriers at IPT side included file size limitations, manpower constraints and multiple data sources requiring multiple data pulls with the potential for differential dataset pulls. Faced with the above barriers the team developed a three-step workflow: (i) Manually developed filters & criteria for generation data reports after RQT provided data fields and IPT (DAO) created report field list and sample templates. (ii) IPT (IHiS) automated the data extraction and provided output files using SQL scripts to develop Extract, Transform and Load (ETL). (iii) Data Extraction: IPT (IHiS) extracted data from structured data warehouse (eHInts) collating disparate data sources by using input files based on various case types and the data key being used in manually extracted report fields list. Finally, DAO and RQT verified data integrity of the extracted data.

Conclusion: This pilot program serves as a foundation for development of robust data dictionary and database building. Additional refinement is required by both requestor and implementer teams to bring the data extraction to the next iteration. The next step is to refine/iterate the processes through technical/non-technical, research and clinical related support from both requestor and implementer teams, with the ultimate objective to build a comprehensive big data cohort to provide impactful answers to clinical questions.

00245 Developing Cell Based Therapy for Photoreceptor Degeneration - Identification of Gene Candidates for Photoreceptor Cell Fate Specification

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Aims: Aging retinal degenerative disease affects the increasing aging population indiscriminately with increasing prevalence. Blindness caused by retinal degeneration results in irreversible loss of photosensitive photoreceptors. Therefore, replacing the loss of these photoreceptors is considered a potential therapy to restore vision. As shown in our publication, we have developed a laminin based method to generate functional photoreceptor progenitor cells from human pluripotent stem cells. Our day 32 photoreceptor progenitors have shown to partially restore vision in the preclinical animal models. We hypothesize that enriched photoreceptor sub-population containing signature transcript profile could lead to better transplantation outcome as shown in electroretinogram and visual behavioural assays

Methodology: We have generated human recombinant retina specific laminin (LN)-323 and 523 and have shown that the human embryonic stem cells grown on these matrices involving two media changes, were able to generate photoreceptor progenitors at day 32. Single cell transcriptomic analysis was used to compare the differentiation efficacy mediated by these matrices

Result: Based on immunohistochemical and single cell transcriptomic analyses, we observed there is different co-expression levels of cone-rod homeobox and recoverin proteins by day 32 for cells cultured on LN323+LN521, LN523+LN521 and LN521 alone, suggesting there is specific matrix mediated efficacy. We have identified 4 candidates out of 194 genes to be playing a role in early photoreceptor specification based on the differential gene analysis from cells differentiated on these different matrix formats. Ongoing experiments are underway to study these candidate genes in our laminin based photoreceptor differentiation system.

Conclusion: Our laminin based photoreceptor differentiation method have led to the identification of gene candidates that could be involved in modulating the photoreceptor sub-population. Hence, this system could increase our understanding in human early retina development and thereby generate an improved cell therapeutic product as compared to our earlier report which ultimately brings us closer for future therapies to treat vision loss.

00246 Identifying Factors Motivating Positive Outlier Uptake of a Childhood Obesity Management Programme

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Aims: The prevalence of childhood obesity in Singapore is rising, with many going into adulthood with psychosocial and health complications. The Kick Start Move Smart (KSMS) programme was an online pilot programme for childhood obesity which involved sessions with physicians, sports trainers, and dietitians. The KSMS programme provided the recommended treatment hours (more than 26 hours over four months) for childhood obesity intervention. Some participating families were identified as positive outliers as they exhibited significantly lower body mass index (BMI), improved quality of life, and positive health behaviours. Using the positive outlier approach, these families' strategies may be mobilised to improve the outcomes of others in the same community. Understanding and identifying the enablers for increased engagement of evidence-based childhood obesity treatment can guide development of future interventions. This study aims to identify factors enabling positive outlier uptake of the KSMS programme to guide development of other childhood obesity interventions.

Methodology: Five families who completed more than 26 hours of the KSMS programme were identified as positive outliers. A focus group discussion (FGD) involving the five parents was conducted, during which factors that motivated uptake of the childhood obesity programme were discussed. The FGD was recorded, transcribed, and analysed using thematic analysis.

Result: Some enabling factors that influence positive outlier uptake were parental concern regarding the child's weight gain, child's lack of activity and exercise intolerance, and weight-related bullying. Parental recognition of current and possible future complications of childhood obesity was also identified as a motivating factor in engagement of the KSMS programme. Program enabling factor included the convenience of online sessions, and the education and resources provided via the structured program. Another factor that helped drive involvement in the programme was the COVID-19 pandemic, during which school and social activities were restricted.

Conclusion: Parental and program enabling factors can be used in the development of a childhood obesity intervention to increase participants' uptake, and guide development of future programmes.

00247 A Comprehensive Framework for Investigating the Influential Factors of Surgical Systems Based on DEA Model and Tobit Regression

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SingHealth

Aims: The objective of this study is to develop a system benchmarking framework for understanding the factors that influence the efficiency of surgical systems across Southeast Asia during the COVID-19 pandemic.

Methodology: The study timeline spans from January 2020 to December 2021, and the institutional data were collected from multiple institutions (GNRC and RIMS in India, HCTM and UMMC in Malaysia, ULin and USU in Indonesia, FJMU in Pakistan, SGH in Singapore, Vietnam-175 in Vietnam UPM in Philippines and Jaffna in Sri Lanka). National level data were obtained from the Oxford Government Response Database, World Bank and WHO.

This study combined Malmquist Index (MI) based on Data Envelopment Analysis (DEA) and Tobit Regression. DEA was utilized to evaluate the institutional health system efficiency and national COVID-19 control efficiency. MI was used to evaluate the productivity change of surgical systems over time. Finally, Tobit Regression was employed to identify the impact of different factors on the productivity changes of health systems considering national MI as explanatory variable, hospital level MI as well as other hospital factors as outcome variables to enhance the framework's comprehensiveness and effectiveness.

Result: Most countries suffered from low factor productivity when COVID-19 started. However, the surgical system efficiency was improved significantly and stayed at efficient situation after launching control policies. Total beds capacity, total number of doctors deployed for COVID response and national MI are positively correlated with productivity improvements. These indicators were found to have a positive effect on the contagion and death control of COVID-19.

Conclusion: This study suggests that for the resilience of surgical care against COVID-19 amongst the countries included in the study, some of the more effective responses were demonstrated in UPM, SGH and UMMC. These findings can inform healthcare institutions in their effort to preserve healthcare capacity for pandemic response and maintain quality surgical services.
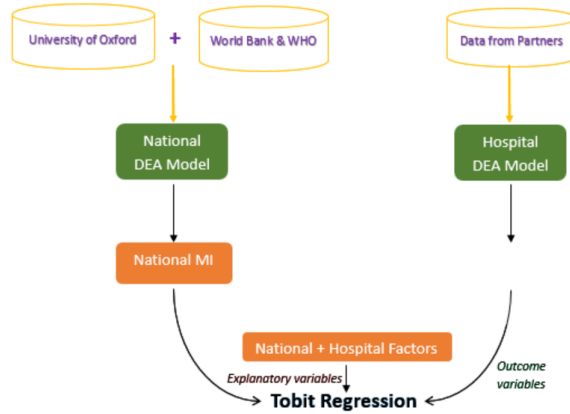
Figure 1: Framework of the methodology

00248 Transcriptomics-enabled Molecular Tumor Board at a Tertiary Cancer Centre in Singapore

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Aims: Genetic testing to support diagnosis and treatment of cancer is becoming increasingly utilized with the availability of high-throughput assays to interrogate multiple targets at the same time. This will be cost-effective provided that this avalanche of data generated can be interpreted and translated to meaningful outcomes. Development of the Molecular Tumor Board (MTB) was undertaken to provide a collaborative platform to collate and discuss patients' clinical and molecular profiles towards the timely identification of biologically relevant therapies and potential clinical trials. We evaluate and report here our pilot experience with including whole transcriptomic sequencing as a routine molecular profiling assay in our MTB.

Methodology: IMPACT (Individualized Molecular Profiling for Allocation to Clinical Trials) is an ongoing study at the National Cancer Centre Singapore (NCCS) to recruit cancer patients for molecular profiling to decipher the underlying mechanisms for tumorigenesis and progression. In addition to next-generation sequencing (NGS; Oncomine Comprehensive DNA and RNA panels), whole transcriptome RNA sequencing was included for 137 samples. RNA expression analyses were subsequently performed to (1) predict response to immunotherapy using in-house (IO-Select) and external models (T-cell GEP), (2) identify gene fusions using the STAR-Fusion algorithm, and (3) identify dysregulated gene expression through gene set enrichment analysis (GSEA).

Result: The samples comprised of 9 cancer types, with the majority from breast, lung and gastrointestinal cancers. A mean turnaround time of 21 days was achieved for RNA sequencing, and data analysis was completed before discussion at our monthly MTB. Each patient's predicted response towards immunotherapy using IO-Select and T-cell GEP scoring was considered, and we also noted that gene fusion detection from our pipeline was consistent with that from conventional NGS RNA panel sequencing. Differential gene expression levels also corroborated with findings from orthogonal assays such as IHC and FISH.

Conclusion: To date, whole transcriptomic sequencing has provided useful cumulative evidence in our MTB to confirm the presence of biomarkers and genomic signatures that could specify treatment. Our preliminary evaluation of transcriptomic sequencing highlights its versatility and supports its further exploration to serve the evolving needs of the MTB.

00249 Archetypes of Family Health Climates in Singapore

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Aims: Poor lifestyle choices contribute to the global burden of non-communicable chronic disease. Effective health promotion requires conducive structural, social and cultural conditions (WHO, 2018). These conditions can be shaped by the family through the mechanism of the "family health climate" (FHC), i.e. perceptions/cognitions in a family regarding a healthy lifestyle. To design targeted family interventions, we aimed to derive archetypes based on the FHCs for physical activity (FHC-PA) and nutrition (FHC-NU).

Methodology: Survey participants: 200 Singaporean/PR family dyads ≥15 years old and living in the same household. Measures: Family Health Climate scales (SG version), International Physical Activity Questionnaire (IPAQ), diet screener, Pittsburgh Sleep Quality Index (PSQI), and a family lifestyle behaviours questionnaire. Analysis: Unsupervised cluster analysis of dyadic FHC scores was done with K-Means. FHC constructs that contributed most to the clustering were determined using a secondary Random Forest Model. Chi squares and ANOVAs tested differences in household and behavioural variables between clusters.

Result: Descriptives: 43% parent-child, 37.5% couples, 19% siblings, and 0.5% aunt-nephew dyads. 83% lived in public housing. 51% had ($7500 household income. Cluster analysis: 4 FHC clusters were identified with satisfactory robustness. FHC constructs in the physical activity domain that contributed most to the clustering were value and cohesion; for the nutrition domain, they were communication and consensus. No difference found in household sizes between clusters.

FHC Clusters	% Families	Associations with Household Factors	Associations with Individual Behaviour
Survivors: • Poor FHCs	16%	• Lower socioeconomic status (SES) • No domestic helper • Unhealthy foods in household • Fewer family meals • Little family-based physical activity	• Low level of recreational PA • Poor diet quality • Poor sleep quality
Satisficers: • Moderate FHCs	41%	• Moderate SES • Highest proportion with domestic helper, including meal preparation • Some family meals	• Moderate level of recreational PA • Moderate level of diet quality • Moderate level of sleep quality

		• Some family-based physical activity	
Flourishers: • Good FHCs	27%	• High SES • High frequency of family meals • Healthy foods present in household • Family-based physical activity	• High level of recreational PA • High level of diet quality • Good sleep quality
Nourished Sedentary: • Poor FHC-PA • Good FHC-NU	16%	• High SES • High frequency of family meals • Healthy foods present in household • Little family-based physical activity	• Lowest level of recreational PA • High diet quality • Moderate sleep quality

Conclusion: 4 distinct archetypes of the family health climate were identified, associated with sociodemographics, family and individual lifestyle behaviours, and sleep quality. The findings provide potential handles for designing targeted family-based health promotion, e.g. socioeconomic needs of Survivor households should be addressed concurrent to promoting healthy lifestyles, while the Nourished Sedentary may benefit from improving FHC-PA through interventions involving the value and cohesion constructs.

00250 Boundaries in Physician-Patient Relationships

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Aims: To better understand the concept of boundary crossings in physician-patient relationships (or breaches in professional standards), which are susceptible to ethical and professional violations.

Methodology: A semi-structured interview questionnaire was designed using the Tool Design Systematic Evidence-Based Approach (SEBA) guided scoping review. Following interviews with palliative care physicians, transcripts were analysed and combined using the Jigsaw Perspective.

Result: From 12 semi-structured interviews, catalysts and boundary-crossings were identified as domains. A physician's belief systems (catalysts) are highly individualized, and boundary-crossings are used to address threats ('catalysts') to these systems. The use of the boundary-crossings depends on the physician's sensitivity to the 'catalysts', judgement and willingness to act, and the ability to balance various considerations and reflect on their actions and possible consequences. These experiences may reshape belief systems, understandings of boundary-crossings, and impact decision-making and practice, spotlighting the potential for greater professional breaches when unchecked.

Conclusion: The study highlights the importance of longitudinal support, assessment and oversight of physicians, laying the foundation for a tool to be incorporated into portfolios

00251 A Communications, Ethics and Professionalism Portfolio for Medical Students and Physicians

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Aims: The role of portfolios in guiding the development of longitudinal competencies, through the capturing and evaluation of multiple appraisals and provide personalised support to clinicians is crucial, yet often eluded from in medical practice. Therefore, a systematic scoping review (SSR) was proposed to map portfolio use in training and assessments of communications, ethics and professionalism (CEP) competencies, particularly in its early stages of nurturing professional identity.

Methodology: Krishna's Systematic Evidence-Based Approach (SEBA) guided the SSR of portfolio use in CEP training and assessment.

Result: Four domains were identified from analysing the 82 included articles: indications, content, design and strengths and limitations.

Conclusion: This study uncovered that using a consistent framework, acceptable endpoints and outcome measures, longitudinal multisource, multimodal assessment data enhances professional and personal development, and identity formation. Future studies should focus on effective assessment tools and support mechanisms to maximise portfolio usage.

00252 Mapping the Prevailing Indications, Pedagogy, and Implementation Factors of Communication Skills Training in Undergraduate Medical Programmes from 2000-2020: A Systematic Scoping Review

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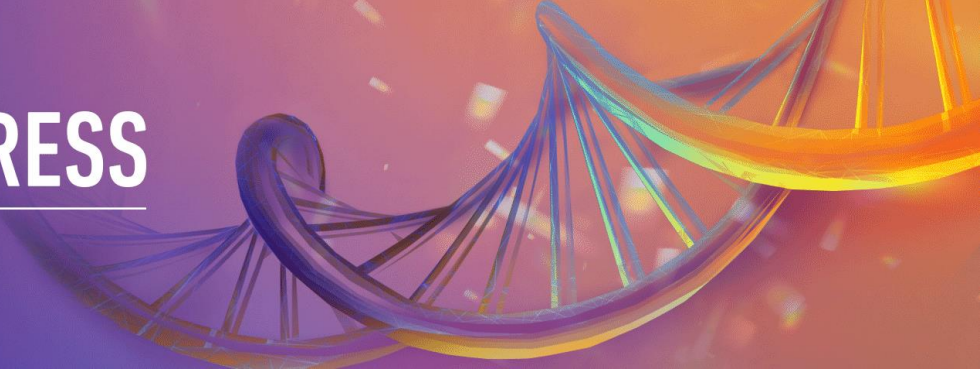
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Aims: Communication skills training (CST) is a hallmark of medical schools' curricula. Despite the common goal of equipping medical students with communication skills fundamental for medical practice, much variability exists among current CST pedagogies. This systematic-scoping review (SSR) aims to map prevailing approaches of CSTs via key domains to facilitate future practical implementations in medical schools.

Methodology: The Systematic Evidence-Based Approach (SEBA) guided this SSR. We performed independent database searches of teaching and assessment in CSTs in medical school. Following concurrent thematic and content analysis of included articles, we combined themes and categories with complementary data using the jigsaw perspective. We then compared our findings with tabulated summaries of included articles to generate funnelled domains.

Result: The study search yielded 52,300 articles and included 150 for analysis. We identified four funnelled domains: Indications, Design, Assessment, and Barriers and Enablers of CST. The goals of CST in medical schools mirror its favourable influences on care outcomes. These include boosting physicians' confidence in patient encounters, enhancing diagnostic capability, and improving patient satisfaction. CST should be included in the formal curriculum, covering core and advanced skills. Importantly, we found that the teaching and assessment strategies of CSTs cohere with Miller's Pyramid, which we employ to depict the prevailing approaches and frameworks identified (Fig. A). We further elucidated barriers affecting CST implementation, such as limited institutional emphasis or negative perceptions by individual students, and its enablers, such as trained faculty.

Conclusion: This SSR aids the navigation through diverse CST pedagogies and provides vital recommendations to inform future roadmaps of CSTs in medical school education. Further studies can explore the development of a universal approach to CSTs, the impact of longitudinal programs, and the effect of combining multiple teaching and assessment tools.

Core Curriculum		Advanced Curriculum	
Content	Teaching	Teaching	Content

1. Relationship building
2. Shared decision making
3. Clarity in communication
4. Non-verbal communication
5. Emotional aspects of communication (empathy, understanding patient perspective)
6. Handling own emotions
7. Basic consultation skills (e.g. History taking)
	• Real patient encounters
	• Meeting disadvantaged populations
	• Creative writing & reflective writing
		• Real patient encounters
		• Meeting disadvantaged populations
			1. Patient education and counselling (Informed consent, Medication counselling, Motivational Interviewing, Complementary medicine use, genetic counselling, Preventative health, dealing with myths and misconceptions)
			2. Breaking bad news
			3. Interacting with angry patients
			4. Disclosure of medical error
			5. Cultural competency
			6. Context-specific skills
			  • Palliative/End-of-life care
			  • Emergency department
			  • Psychiatry
			  • Oncology
			  • Obstetrics and Gynecology
			  • Surgery
			7. Specific groups of people
			  • Adolescents
			  • Children & Parents
			  • Elderly
			  • Speech-impaired patients, disabled patients, intellectually disabled patients
			  • Patients with diagnostic uncertainty/MUPS
			  • Loved ones of patients and caregivers

	Does *Assessed by* Real patient interaction, Workplace-based Mini-CEX, Formulation of own learning goals & self-reflection, Entrustable Professional Activities, Medical interaction process system		
	• SP role-play • Peer role-play • Role play with physician • Virtual simulation • Theatre in education *Simulation/role-play with self-reflection	• SP role-play • Peer role-play • Role play with physician • Virtual simulation • Theatre in education *Simulation/role-play with self-reflection	
	Shows *Assessed by* SP, Peer, Physician roleplay, Virtual reality/simulation (with self-reflection)		
	• Group discussions • debriefing, reflection • Project/Case-based learning	• Group discussions • Debriefings, reflection • Project/Case-based learning	
	Knows how *Assessed by* Participation in discussion, Case presentation, case/project-based learning, written report, reflective essay, interviews		
	• Lectures • Medical document translation into plain language • Observation of video vignettes • MCQ practice questions • Bedside observation	• Lectures with E-learning module • Consultation handbook • Animated video tutorial • Interactive smartphone-based game • Observations of video vignettes • Literature/Articles • Bedside observation	
	Knows *Assessed by* Theory tests (e.g. MCQ)		
Frameworks used			

1. Kalamazoo consensus statement
2. Calgary-Cambridge Framework
3. AGCME Guidelines
4. Jefferson Scale of empathy
5. Four Habits Model
6. 5 history taking skills.
7. Country-specific consensus papers (e.g. SCLO in Switzerland)
8. Key tasks in communication by Maguire and Pitceathly
9. NVC Checklist
10. Leventhal's Common-Sense Model
11. NURSE statements
12. Making Good Decisions in Collaboration (MAGIC) program
13. ECFMG scoring criteria for interpersonal skills in clinical skills examination and the Robert Wood Johnson College of Medicine, New Jersey assessment list for OSCEs.
14. German version of OPTION scale
15. R.E.D.E to Communicate: Foundations of Healthcare Communication
16. Maslach Burnout Inventory (MBI)
17. Rogerian model of emotion handling skills
18. Maastricht History-taking and Advice Scoring list with global items (MAAS-Global)
19. AACH 5-step communication strategy
20. AIDET Framework
21. DESC technique for constructive feedback

Breaking Bad News
- SPIKES for Breaking bad news (Set-up, Perception, Invitation, Knowledge, Emotion, Summary)
- ABCDE for breaking bad news
- Individual vs full vs nondisclosure models
- "Modified Breaking Bad News Assessment Scale" (mBAS)

Cultural Competency Skills
- CHAT: Culture and health belief assessment tool, Klienman's questions for eliciting a patient's explanation
- CRASH (Culture, Respect, Assess and Sensitivity and Self-awareness, Humility)

Context specific skills
- HEEADSSS for adolescents
- FRAME training programme for communicating with patients who have communication disorders.
- AMST (Ask More and Summarise Technique) for managing patients' emotionally charged questions.
- Motivational interviewing
- 5Cs of Consultation model
- KOKON CM training for advising the use of complementary medicine
- Comskil training program
- Kerns scholarly six-step approach; problem identification, targeted needs assessment, goals and objectives, educational strategies, implementation and evaluation and feedback

00253 The Potential of Group Reflections in Medical Education

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Aims: Reflection helps individuals recognize the impact of personal and professional views and emotions upon conduct, thus shaping a physician's professional and personal development, molding their professional identity formation (PIF). Logistical issues such as poor appreciation of its role, shortages in trained tutors and inadequate 'protected time' for reflections in packed medical curricula has hindered its employ in medical education. Therefore, systematic scoping review was proposed to study if group reflections could be a viable alternative to individual reflections.

Methodology: A Systematic Evidence Based Approach guided Systematic Scoping Review (SSR in SEBA) was adopted to guide and structure a review of group reflections in medical education. Independent searches of articles published between 1st January 2000 and 30th June 2022 in bibliographic databases, grey literature databases were carried out. The included articles analysed separately using thematic and content analysis, with the categories and themes identified being combined. The categories and themes were then compared to the tabulated summaries of included articles to create domains that framed the synthesis of the discussion.

Result: Following the reviewing of abstracts and appraisal of full-text articles, 66 articles were included, with the domains identified being Theories; Indications; Types; Structure; and benefits and challenges of group reflections.

Conclusion: Scaffolded by current approaches to individual reflections and theories and inculcated with nuanced adaptations from other medical practices, this study suggests that structured group reflections may fill current gaps in training. However, design and assessment of the evidence-based structuring of group reflections proposed here must be the focus of future study.

00254 From Mentees to Peer Mentors: Advancing Peer-Mentoring in the Palliative Mentoring Initiative

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Aims: Mentoring programs facing shortages of experienced clinical mentors have been supplemented with peer-mentoring, which not only addressed gaps in practice, structure, support and mentee oversight but have offered mentees charged with peer-mentoring duties the opportunity to take on mentoring roles under senior supervision. This study aims to evaluate the experiences of peer-mentors within a local research mentoring program, the Palliative Mentoring Initiative, to better understand and advance this endeavor.

Methodology: Literature reviews on mentoring were used as the basis of the semi-structured interviews and post-interview surveys. Adapting the Systematic Evidence Based Approach, data was analysed using thematic and content analysis. Results were combined, while ensuring that key elements of the different mentoring stages were identified.

Result: The interviews and surveys revealed the following domains: Motivation, Initiation, Practicing, and Mentoring Environment.

Conclusion: These findings provide insight into a structured framework that may help guide the experiences, training, assessment, and oversight of peer-mentors beyond the auspices of local programs. These general observations will equip host organizations with the direction needed to take in designing and executing peer-mentoring training and assessment programs of their own. Whilst the stages of peer-mentoring need further evaluation and an effective means of assessment and support pivotal, our findings suggest that peer-mentoring may not only help to address the shortfall in mentors but is an invaluable learning experience that prepares and instils key values, beliefs and principles in young would-be mentors.

00255 The Usage of Portfolios in Postgraduate Medical Education

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Aims: The Tool Design Systematic Evidence-Based Approach methodology was used to map current understanding by conducting recent reviews on mentoring processes, effects, professional identity formation (PIF) and its assessment tools. Semi-structured interviews and mentoring diaries were then designed and implemented to evaluate the characteristics of successful mentoring relationships and its impact on PIF. The data from the tools was then evaluated, whilst changes in PIF were assessed using the Ring Theory of Personhood.

Methodology: The interviews revealed the following themes: stakeholders, mentoring stages, mentoring relationships and PIF, whilst the diaries revealed mentoring processes and relationships. The final domains were mentoring relationships and PIF.

Result: The PMI's approach, stakeholders, environment, assessment-directed and personalized support reveal revealed seven developmental stages of mentoring relationships. These changes culminate in the values, beliefs and principles that mold mentees' perceptions, feelings and behaviors as professionals. The findings posit that PIF can be further developed and refined through mentoring programs.

Conclusion: Mentoring relationships are critical to the overall success of mentoring, but yet poorly understood. Therefore, a study of mentee experiences in the Palliative Medicine Initiative (PMI), a research-based mentoring program was proposed.

00256 Understanding Role Modelling's Part in Professional Identity Formation of Physicians

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Aims: To enhance the appreciation of the mechanism which role modelling integrates and attends to 'conflicts' within a physician's belief system using the Ring Theory of Personhood (RToP)

Methodology: A systematic scoping review was conducted on articles published between the year 2000 to 2021, zooming in on the experiences of medical students and physicians in training.

Result: Of the articles identified and evaluated, 145 articles were analyzed for themes and content. Five domains were identified: Existing theories, definitions, indications, characteristics and the impact of role modelling upon the belief system. The dissonance between introduced and regnant beliefs is uncovered, highlighting the influence of narratives, cognitive base, clinical insight, contextual considerations and belief system on the ability to detect address and adapt to such experiences.

Conclusion: The ability of role modelling to introduce and integrate beliefs, values and principles into the belief system of a physician, spotlights its effects upon the formative process of a professional identity. However, these effects are dependent on environmental influences, as well as the characteristics of the educator and learner and the nature of their relationship. The RToP appreciates the variations on the efficacy of role modelling and may direct personalised and longitudinal support for leaners.

00257 Tracing ESBL Spreading Across Different "One Health" Sectors with ISEcp1-CTX-M-15/55-Wbuc-like Gene Cluster

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Aims: Through a WGS data mining of ESBL-producing isolates from humans, food, and the environment we have indicated a circulating ESBL gene cluster, ISEcp1-CTX-M-15/55-WbuC-like, in multiple "One Health" sectors in Singapore. As this cluster can randomly insert in bacterial chromosomes and plasmids, we hypothesize that the insertion position and surrounding genetic environment of the ISEcp1-CTX-M-15/55-WbuC-like cluster are identical and can be used to identify ESBL transmission events.

This study aims to investigate whether ISEcp1-CTX-M-15/55-WbuC-like can be used as a genetic indicator to trace ESBL transmission events and investigate potential ESBL transmission pathways across different "One Health" sectors.

Methodology: WGS data of 294 ISEcp1-CTX-M-15-WbuC-like harbouring E. coli and Klebsiella pneumonia strains were revived from the NCBI database, these strains were originally collected from Patients (n=148), Healthy donors (n=51), Food (n=79) and Environmental samples (n=16). The genetic environment of ISEcp1-CTX-M-15/55-WbuC-like (particularly, 2 kbp upstream and downstream of the cluster) was aligned to identify the close-related pair of strains. The relationship between close-related pairs of strains was validated with core genome MLST and SNP alignment.

Result: Five clusters of inter-sector-related strains were identified as sharing the same genetic environment of the ISEcp1-CTX-M-15/55-WbuC-like cluster. Four of these clusters represent the ISEcp1-CTX-M-15/55-WbuC-like cluster inserted at the same chromosomal position. Two pairs within these clusters exhibit a close genomic relationship with core genome allelic differences below 1%, while the other three clusters display allelic differences ranging from 2% to 5%. These findings suggest potential whole-organism transmission events. Additionally, one pair of strains was found to carry the same plasmid, indicating an alternative transmission strategy.

Conclusion: The ISEcp1-CTX-M-15/55-WbuC-like cluster presents potential as a genetic marker to trace both whole-organism and plasmid transmission events. The advantage of this short fragment indicator lies in its compatibility with Sanger sequencing, making it a suitable tool even in settings without access to WGS facilities. Furthermore, this cluster can be modified as a target for replicon sequencing, aiding in tracing ESBL transmission across complex microbial communities.

00258 Development and Validation of a Deep Learning System for Detection of Small Bowel pathologies in Capsule Endoscopy

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Aims: Capsule Endoscopy (CE) is an invaluable test for the investigation of small bowel pathology, but presents considerable challenges and limitations, such as long and laborious reading times, risk of missing lesions due to fatigue, and lack of locomotion. Careful examination of the videos can potentially take 2 to 3 hours. This creates a heavy diagnostic burden on clinicians. We develop and pilot an automated Diagnosis Assistant System (DAS) with modern machine learning (ML) methods that can accurately classify small bowel endoscopy images, and potentially incorporate this algorithm into existing workflows. The DAS consists of 2 ML models: (1) Bowel Preparation Model (BPM); (2) Abnormality Detection Model (ADM) (see Figure 1). The DAS can aid in accurate detection and diagnosis of small bowel luminal pathologies in a timelier manner, hence translating into enhanced patient care.

Methodology: The images for train and test were acquired from two sources: (1) the Kvasir-Capsule (KC) dataset comprising of 32,524 images, and; (2) the study hospital (SH) dataset with 413,346 images. The SH hospital dataset was collected from 30 individual patients who underwent small bowel capsule endoscopy in our centre from January 1st, 2017 till December 31st, 2021. These capsule recordings were performed using Pillcam SB 3 system by Medtronic. The BPM and ADM models are first trained on the open-source KC Dataset. The partially trained models are then transferred to the secured workstation disconnected from the internet within the study site for additional fine-tuning on the SH proprietary dataset. Prediction quality metrics are evaluated through F1-Score, Area Under Precision at Recall Curve (AU-PRC) and Area under Receiver Operating Characteristic (AU-ROC).

Result: Out of the 413,346 derived from the SH dataset, 36,171 small bowel images were selected for analysis. The best performing BPM model was the BPM VGG16 base w/ CNN with an F1-score of 98.19% and an AU-PRC of 99.84% while the best performing ADM model was the ADM DenseNet121 base w/ CNN with an F1-score of 74.6% and an AU-PRC of 84.15%. The BPM model has an inference time of 166 seconds on the set of 18,096 images (109 images/sec) while the ADM model has an inference time of 86 seconds on the set of 12,098 images (140 images/sec). This performance is much faster than a completely manual diagnosis from Gastroenterology (GE) specialists.

Conclusion: The DAS framework will be able to serve as a decision support system to partially automate the CE diagnosis process, and ultimately benefit GE specialists, reducing the attention capacity and time required for diagnosis. Several DNN models were developed based on open source and proprietary data. We demonstrate the potential for a locally developed AI-based DAS framework to serve as a physician

assistant device for GE specialists in the CE procedure. The DAS framework comprises 2 stages: (1) filtering out usable images (BPM module), and; (2) classifying images with abnormalities (ADM module).

00259 Evaluation of Prevalence and Risk Factors in Children with Recurrent Fractures

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Aims: The aims of this study were to (i) determine the Bone Mineral Density (BMD) in healthy Singaporean children with recurrent fractures, (ii) identify the risk factors predisposing to recurrent fractures, (iii) identify barriers that contributed to school absenteeism if school attendance was affected by fractures.

Methodology: Healthy children, 7-18 years of age, with no history of fractures (Control) or a history of ≥1 upper or lower limb fractures associated with low-energy trauma, were recruited. All subjects completed a DXA scan,

Result: 12 Control children and 13 children with recurrent fractures completed the study. Both groups were comparable in terms of age, BMI, household size, and use of medications. Compared to the Control group, the Recurrent Fracture group had more females, more preterm subjects, and more subjects of Indian descent. After adjusting for height, lumbar and total body BMD trended lower in those with recurrent fractures. The Recurrent Fracture group also had higher PAQ scores, lower median dietary intakes of energy, fats, protein, calcium, phosphorous, and magnesium, median serum levels of total calcium, magnesium, inorganic phosphate, and 25-hydroxy-vitamin D, but higher median levels of alkaline phosphatase and intact parathyroid hormone. Those with recurrent fractures also showed a trend of having higher percentage of total body fat and Fat Mass Index (Fat Mass/Height2, kg/m2). Although the median day of absent from school in the preceding 1 year was higher in the Recurrent Fracture group, in general, schools provided sufficient flexibility for case subjects to return to classes.

Conclusion: Findings from this study suggest that there is a need to monitor BMD in pediatric patients above 6 with recurrent fractures. DXA of the lumbar spine and total body less head is the chosen method to measure BMD in order to access bone health. However, data analyses are recommended to be carried out using pediatric software with adjustments to age, sex, and height. For children who are suspected from suffering of low BMD, lab work for serum bone turnover markers is recommended. Regardless of fracture histories, healthy lifestyle and dietary habits must be established. For children with a lower-limb fracture that require clutches or wheelchair, it is crucial for patients, parents and educators to take proactive measures in negotiating alternative learning modes, time requirements, desks and seating, and frequency of physical education classes.

00260 Value Based Oral Healthcare – Lesson on Implementation

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Aims: Value in healthcare is measured by the improvement in a patient's health outcomes for the cost of achieving that improvement. The objectives of adopting a value-based approach in a healthcare system is to enable the system to reduce variations in care, improve quality outcomes and create value for patients. The current definition of value not only includes outcomes and cost, but also places importance on patient experience and the appropriateness of care. This study aims to describe the implementation of value based oral healthcare at the National Dental Centre Singapore.

Methodology: The NDCS approach to value-based care is as follows. The first step is targeting a specific condition and defining the condition. The second step is defining the quality measures including clinical outcomes, patient reported outcomes, cost and appropriateness of care and to design interventions that add value. The third step is to do a value data analysis and finally implement quality improvement plans to scale and sustain efforts. NDCS piloted with 3 main conditions in 2018 and expanded to a total of 6 conditions in 2020. These included root canal treatment, dentures, orthodontics, dental implants, wisdom tooth surgery and periodontal treatment. When developing our clinical quality indicators, NDCs focussed on 3 main areas. These includes clinical quality indicators, access to care indicators and patient reported outcomes measures (PROMS) and patient reported experience measures (PREMS). Interventions that added value include creating access, process enhancements to cut waste, right siting of care and partnering for value and leveraging on technology.

Result: The results of implementation of value-based care are as follows. Firstly, there were significant improvements in waiting times to access treatment while maintaining quality indicators. There was also the creation of a community are partnership programme (CAPP) where simple cases were right sited to care partners in the community. The emphasis on improving patient experience and empowering patient care decisions have also led to a creation of patient experience council which looks into patient education, service training and service delivery.

Conclusion: NDCS is one of the first dental institutions to embrace and implement value based dental care using a system wide approach. This poster describes the evolution and implementation of value-based care in NDCS. This will serve as a model to improve the delivery of public dental healthcare in Singapore as we move towards population health.

00261 Impact of Mental Health Capacity Building Programme for Community Partners: A Preliminary Study in Singapore

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Aims: Health Wellness Programme (HWP) is Changi General Hospital's community mental health programme, offering (1) timely outpatient clinical services to individuals with moderate to severe conditions (2) mental health capacity building programme to community partners (e.g. primary care doctors, mental health service providers) so that they have clinical competency to manage individuals with mild to moderate conditions in community setting and only those who require complex care are referred to CGH specialist outpatient clinic (SOC). HWP also allows SOC to right-site suitable individuals back to community for continuity care, thus providing more sustainable care model and eco-system. This study aims to evaluate the impact of mental health capacity building programme for community partners.

Methodology: A model was structured – (1) awareness (2) essential (conceptual) (3) empowerment (skill sets). Relevant training topics were developed to enable partners to identify, manage and refer to appropriate care settings.

In our quasi-experimental (before-after) cohort intervention study, participants self-rated their knowledge on the mental health topic that is being taught. Post training survey was administered to assess their perceptions on trainers' effectiveness, training content relevancy, achieving learning objectives and self-confidence level in care delivery. Responses collated from 2676 participants of about 250 workshops conducted from FY2020 to FY2022 were analyzed.

Result: Total of 3,500 manhours were invested to conduct about 250 trainings of various modes - workshops, case discussions, balint groups etc. 3243 evaluation forms were distributed with 2676 responses collected. About 82% indicated positive change in their knowledge. Of 83 annual partners' satisfaction surveys collected, at least 50% expressed strong satisfaction towards training received and agreed strongly that they are better equipped to deliver care to their clients. With more being trained, annual number of individuals referred by psychiatrists for co-management by partners has increased from 28 to 215. Evidently, HWP has enabled more partners to be clinically competent and confident in managing mild to moderate mental health conditions within the community setting.

Conclusion: Results shown, HWP has successfully helped to improve knowledge and confidence level amongst our partners in the east - (1) identify individuals with mild to moderate mental health conditions (2) manage or to provide timely relevant interventions within community setting (3) refer to appropriate higher level of care.

Over 3 years, the number of co-managed cases increased by 7.7 times. This shows that our psychiatrists now have stronger confidence in our partners in co-managing their patients and there is an alternate pathway to offer suitable patients, who need urgent psycho-therapy interventions, to receive it in a timely manner. This helped to avoid increasing current waiting lead time for a psychologist appointment as we tap on the un-utilised capacity in the community.

00262 Psychological Well-being among Patients Admitted to a General Hospital During the Covid-19 Pandemic

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Aims: Research on the psychological impact of COVID-19 has focused mainly on healthcare workers and the general population. This study examines psychological well-being among non-COVID19 patients admitted to hospital during the pandemic, when there were disease-related fears and various restrictions, including those on visitors.

Methodology: Data was obtained from questionnaires completed by 20 patients (17 males; mean age = 54 ± 12.9 years) admitted to medical wards between April to June 2020.

Result: Most of the patients were married (70%; n = 14), employed (75%; n = 15), did not live alone (95%; n = 19), had no past psychiatric history (95%; n = 19) and no past hospitalizations (70%; n = 14). 90% (n = 18) had at least 1 other patient in the same cubicle during their admission. The majority of participants endorsed normal to mild levels of depression (90%; n = 18), anxiety (75%; n = 15) and stress (95%; n = 19). 55% (n = 11) felt that their job was affected and 30% (n = 6) felt that their social relationships were affected by their hospital stay. Half (55%, n = 11) felt they contacted their family less often than usual, although most (80%, n = 16) felt they were able to confide in their family and felt supported by them. Most were satisfied with the medical care (90%; n = 18) and information provided (95%; n = 19). On open-ended questions, 3 main groups of worries were reported: financial (45%; n = 9), health (60%; n = 12) and employment (20%; n = 4). Patients spent an average of 2 hours using their mobile phones and 25.8 minutes ruminating over their worries each day.

Conclusion: The results help us to understand the psychological status of patients admitted to hospital during the COVID-19 pandemic.

00263 Measuring Patients' Satisfaction and Information Needs of a Nurse-led Breast Cancer Survivorship Programme in Singapore

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Aims: The aims of this study were to determine the levels of patient satisfaction with and acceptance of care provided by APN as well as examine the information needs of breast cancer survivors.

Methodology: This was a quantitative and cross-sectional descriptive study conducted in a tertiary specialist medical centre at the National Cancer Centre Singapore. A purposive sampling strategy was used to recruit participants for this study from the APN-Led Breast Cancer Survivorship Clinic. The survivors were more than 21 years old with breast cancer stage 0 to 3 who were in their five years and above post-interventions.

The data was collected from May 2018 to June 2021. A standardised follow-up protocol was designed in which the APN perform history taking and physical examination, review mammography and other imaging results and discuss with patients, provide latest developments in breast health, educational and support events for patients, discuss patient's concerns, clinical and radiological findings with Dr. A demographic data questionnaire and a Survivors' Satisfaction Questionnaire were used to assess the levels of patient satisfaction with and acceptance of care provided by APN and information needs of breast cancer survivors.

Result: A total of 100 patients were recruited with a mean age of 62 which range from age 42-75. The Survivors' Satisfaction Questionnaire has good reliability with Cronbach's alpha =0.89. More than 90% of patients had reported that APN had good clinical knowledge and skills, APN had good communication skills, APN provided adequate general health education. 83% of survivors would recommend this programme to others who require breast cancer follow up. Compared with previous study in NCCS in 2012, the acceptance of survivors who felt comfortable to be checked by APN alone improved from 60% to 76% in 2021. In addition, survivors rated the medical care provided by APN was equivalent to that provided by the Dr had increased from 90% to 96%. Only about 24% of survivors were willing to be followed up by trained family practitioners after ten years of post-treatments.

The fear of recurrence, lifestyle changes after diagnosis of breast cancer, and the long-term side effects of treatment were the top three information needs reported by the breast cancer survivors.

Conclusion: In conclusion, more education would be needed to meet the information needs for survivors with breast cancer. Moreover, continuous education and support efforts would be required for breast cancer survivors to transit from oncology in tertiary setting to primary care setting for their follow up cancer care.

00264 Impact of Social Determinants of Health (SDOH) on Severe Asthma Patients: A Population-based Study

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Aims: Asthma is a chronic respiratory condition that poses considerable economic burden in Singapore and worldwide. Our study aims to identify Social Determinants of Health (SDOH) and its association with severe asthma exacerbations in Singapore.

Methodology: We conducted a population study using electronic health records of 21,215 asthma patients (2015-2020) from SingHealth Polyclinics and Singapore General Hospital. We matched patients with history of severe exacerbation (n=2,770) to those without (n=2,770) for the analysis. Severe asthma exacerbation is defined as requirement for hospitalisation or emergency visit. SDOH data (education level, household income, and employment) were integrated from OneMap governmental data based on residential postal codes. A multivariate logistic regression analysis, adjusting for demographic factors and asthma severity (GINA Step), was employed to investigate the association between these SDOH and severe asthma exacerbations.

Result: Our analysis (Table 1) revealed significant associations between severe asthma exacerbations and lower education levels (OR=0.732, $p<0.001$), unemployment (OR=0.88, $p<0.001$), and blue-collar occupations (OR=1.386, $p<0.001$). An increase in household income was also positively associated with severe exacerbations (OR=1.15, $p=0.03$). However, household size, use of public transport, and religion showed no significant associations.

Conclusion: By elucidating social risk factors for severe asthma exacerbations in Singapore, we can tailor our interventions to reduce health disparities, inform policy decision making at the national platform in order to improve asthma care and outcomes.

00265 Individual and Combined Associations of Sarcopenia, Osteoporosis and Obesity with Frailty in a Multi-Ethnic Asian Older Adult Population

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Aims: Physical frailty is a common aging consequence, but its association with concurrent risk factor outcomes in Asia is not well understood. This study explored the relationships between sarcopenia (SP), osteoporosis (OP), obesity (OB), (alone and in combination) with PF in a multi-ethnic, population-based study of Asians aged $\geqslant$ 60 years.

Methodology: Participants were enrolled from the PopulatION HEalth and Eye Disease PRofile in Elderly Singaporeans Study (PIONEER) study. PF was defined using the Fried phenotype; SP using the Asian Working Group for Sarcopenia 2019 cut-points; OP using bone mineral density scores (T-score, $\leqslant$−2.5) in any of the following sites: hip, femoral, neck, and lumbar spine.; and OB using the fat mass index >7.63kg/m2 for men, and >9.93kg/m2 for women. Modified Poisson regression models were used to investigate the associations between our three exposures and PF, and the relative excess rates of PF due to interactions (RERI) to determine synergistic or antagonistic interactions.

Result: Of the 2643 PIONEER participants, 54.8% was female; and 49.8%, 25.1%, 25.0% were Chinese, Indians, and Malays, respectively. 25%, 19.0% and 6.7% of our participants had OB only, SP only, and 6.7% OP only, respectively. A total of 356 (17.5%), 151 (7.4%) and 97 (4.8%) had osteosarcopenia (OSP), sarcopenic obesity (SOB) and osteo-obesity (OOB), respectively; while 70 (3.5%) had all three morbid conditions (osteosarcopenic obesity, OSO). Both SP only and OB only were strongly associated with increased rates of PF (RR: 2.53, 95% CI: 1.95, 3.29; RR: 2.05, 95% CI: 1.58, 2.66 respectively); but not OP. Those with OSP, OOB and SOB were also associated with high risks of PF (RR: 2.82, 95% CI: 2.16, 3.68; RR: 2.34, 95% CI: 1.69, 3.23; and RR: 2.58, 95% CI: 1.95, 3.41, respectively) compared to robust individuals. Critically, individuals with OSO (all 3 exposures combined) had the highest relative risk of having PF (RR: 3.06, CI: 2.28, 4.11). Potential interactions between exposures were investigated and only the sarcopenia-obesity interaction was significant, demonstrating negative synergism (antagonism). The concomitant presence of SP and OB was associated with a 100% lower rate of PF compared to the sum of the relatively rates of SP only and OB only.

Conclusion: The prevalence of SP, OB and OP, alone and combined, is substantial in community living older individuals in Asia and their early identification is needed to mitigate the risk of frailty. OB may interact with SP in an antagonistic manner to moderate rates of frailty. Further longitudinal studies are needed to address causality and mechanistic underpinnings our current findings

00266 Effect of Probiotic (Vivomixx) on Gut Microbiome and Short Chain Fatty Acids in Healthy Asian Volunteers - A Pilot Exploratory Randomized Controlled Trial

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Aims: Gut dysbiosis is implicated in various gastrointestinal and metabolic diseases. Probiotics is known to have favorable effects on gut microbiota and the production of essential short chain fatty acids (SCFA), albeit with inconsistent findings. The effects of bowel cleansing on the intestinal microbiota have been characterized, however the impact of administering probiotics following a colonic lavage on the intestinal microbiota has not been studied. Rifaximin has also been shown inconsistently in studies to affect the gut microbiome. In addition, treatment with probiotic for a duration of 4 weeks was demonstrated to modulate intestinal bacterial taxa in healthy adults. This pilot study examined the effects of a probiotic (vivomixx), with and without pre-treatment with colonic lavage or rifaximin, on the gut microbiome, SCFA and its recovery.

Methodology: This is a single centre, exploratory randomized controlled study on healthy Asian adult volunteers. Participants were randomized equally to four study groups: (A) Colonic lavage using polyethylene glycol (PEG), followed by 4 weeks of vivomixx; (B) Colonic lavage, followed by 4 weeks of placebo; (C) 4 weeks of vivomixx; and (D) 2 weeks of rifaximin, followed by 4 weeks of vivomixx. Stool samples were collected at baseline, 4 weeks and 8 weeks after the administration of vivomixx or placebo. Additionally, Group A, B and D had stools collected before and after administration of PEG (Group A, B) or rifaximin (Group D). All stools were subjected to 16S rRNA sequencing for microbiome and SCFA analysis by gas chromatography mass spectrometry.

Result: A total of 32 participants were recruited, 1 in Group C dropped out after the first visit, leaving 31 in the final analysis. All three exposure elements – PEG, rifaximin and vivomixx resulted in large microbiome composition changes. Exposure of PEG also led to changes in SCFA such as a reduction in butyric acid and increase in acetic acid. Pre-treatment with colonic lavage deterred engraftment as evidenced by the smaller increase in abundance of Bifidobacterium in Group A and B as compared to those without PEG (Group C). There was apparent selective engraftment of Lactobacillus after rifaximin treatment (Group D) and this was also shown in the SCFA analysis where the concentrations of Acetic, Butyric and Propionic acids, which are byproducts of Lactobacillus increased after Rifaximin treatment prior to vivomixx. This increase seems sustained at 8 weeks. There was also a trend of sustained vivomixx effects on gut microbiome at 4 weeks after stopping the probiotic.

Conclusion: Vivomixx demonstrated favorable impact on gut microbiome composition but its impact on SCFA in this study was minimal. Rifaximin however, has been shown to increase SCFA concentrations and this increase was sustained 8 weeks after probiotics was given. The data provide valuable insights

for designing future trials. The modulation of gut microbiome and SCFA is a potential treatment target in diseases associated with gut dysbiosis.

00267 Integrative "Multi-Omics" Analysis to Identify Potential Biomarker for Graves' Orbitopathy

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Aims: To identify common potential biomarkers between tear proteome and orbital fibroblasts obtained from patients with severe Graves' Orbitopathy to predict the development of the condition in patients with Graves' disease.

Methodology: Orbital fat tissue was obtained from three patients with Graves' Orbitopathy(GO) undergoing orbital decompression surgery and three normal controls undergoing blepharoplasty. Orbital fibroblasts were grown from the fat tissue obtained. Fibroblasts from both GO and normal patients were induced to accumulate lipid. Whole transcriptome sequencing was performed using Illumina HiSeq2000. Expression data of GO fibroblasts was normalized against normal fibroblasts. Tear proteome data from patients with severe GO was obtained from published open-source literature (Science Reports 2018, 8:16936). Differential expression (DE) analysis for each time point was performed using DEseq2. The identified DE genes were used to compare to significantly express protein from the published dataset. Network and Pathway analysis was performed using KEGG and STRING.

Result: A total of 46 matched hits in genes were observed when orbital fibroblasts transcriptome data was compared to the tear proteome data. Out of the 46 hits, a total of 12 genes displayed similar expression trend (fold change> 1.6 or fold change < 1.6, p<0.05) in the comparison drawn between the two datasets. Four genes (PRR4, CHI3L2, GOLM 1 and PSMB9) were observed to share similarity in expression pattern when transcriptomes data of un-induced GO orbital fibroblasts and tear proteome data were compared. At 48 hours after GO fibroblasts are induced to accumulate lipid, eight genes (PRH1, CHI3L2, ASS1, S100A6, S100A4, ADH1C, PSMB 9 and LXN) were observed to share expression profile similarity to tear proteome.

Conclusion: Un-induced fibroblasts vs TED tear proteome

PRR4, CHI3L2 and GOLM1 were upregulated in orbital fibroblasts and tear proteome of patients with severe GO. PRR4 has been found to be a marker for dry eye disease. Biologically, this gene has been implicated in retina homeostasis and visual perception. PSMB 9 is a multisite proteinase complex and function's as an immune-proteasome.

Induced fibroblasts vs TED tear proteome

S100A4 is downregulated in our trancriptome data for fibroblasts and tear proteome. The in-vitro trancriptome data partly emulate the pathological process of fat accumulation in the eye with Graves Orbitopathy   This observation supports published data that S100A4 promotes inflammation but

suppresses lipid accumulation via the STAT3 pathway as observed in chronic ethanol-induced fatty liver (J. Mol. Med. (Ber), 2019 (10):1399).

Further analysis of datasets from clinically well-defined patients from different platforms to identify potential biomarkers/and or treatment strategy needs to be considered. This can assist clinicians with better management of patients with Graves' disease at risk of development of severe Graves' Orbitopathy.

00268 Blood Pressure Management for Community Dwelling Older Adults in the Singhealth Community Nursing Programme

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Aims: This study aimed to determine if participation in the SingHealth community nursing programme is associated with an improvement in the control of blood pressure levels over time.

Methodology: A retrospective study of newly enrolled older adults at 65 SingHealth Community Nurse Posts (CNPs) in Singapore between 01 April 2020 and 31 March 2021 was conducted. Systolic and diastolic blood pressure levels were measured at each successive CNP visit up to 31 March 2022. Health coaching, medication review, and scheduled blood pressure monitoring were provided during the CNP visits.

Linear and logistic mixed-effects model were used to model systolic/diastolic blood pressure levels and unacceptable blood pressure ($\geq$140/90mmHg) respectively, with fixed effect of time, random intercept and slope for patient, and an unstructured covariance matrix. The beta coefficients and odds ratios compared the outcome at each three-month interval (t=3/6/9/12) to the outcome at baseline (t=0), i.e. index community nurse post visit. Multiple imputation by chained equations was performed as a sensitivity analysis.

Result: 924 older adults with hypertension were included in the analysis. The mean age was 73.9±10.1 years and 517 (56.0%) were female. The mean systolic and diastolic blood pressure levels at baseline were 141.6±20.9mmHg and 77.1±12.5mmHg respectively.

At three months post baseline, there was a mean decrease in systolic and diastolic blood pressure levels of 5.24mmHg (B -5.24, 95% CI -6.60 to -3.89), and 2.28mmHg (B -2.28, 95% CI -3.11 to -1.45) respectively. The effect was also maintained up to 12 months post baseline (table 1). Similarly, there was a 48% decrease (odds ratio 0.52, 95% CI 0.41 to 0.66) in the odds of having an unacceptable blood pressure level at three months post baseline, and the effect persisted up to 12 months post baseline (table 1).

Conclusion: Participation in the SingHealth community nursing programme is associated with an improvement in the control of blood pressure levels over time. There is a value proposition for older adults with hypertension to have their condition monitored and managed at the Community Nurse Posts in the community.

Table 1. Mixed-effects regression of blood pressure-related outcomes on time.

Outcome and months post index community nurse post visit	All participants with hypertension at baseline and available blood pressure data (n=924)		
	Mean±SD or %	B coefficient or odds ratio (95% CI)	P value
Outcome: Systolic blood pressure in mmHg			
Baseline	141.6±20.9	0 (ref.)	–
3 months	135.7±16.7	-5.24 (-6.60 to -3.89)	<0.001
6 months	133.4±17.1	-8.28 (-9.86 to -6.69)	<0.001
9 months	135.1±17.1	-6.86 (-8.66 to -5.06)	<0.001
12 months	133.4±15.9	-8.40 (-10.44 to -6.36)	<0.001
Outcome: Diastolic blood pressure in mmHg			
Baseline	77.1±12.5	0 (ref.)	–
3 months	74.0±10.6	-2.28 (-3.11 to -1.45)	<0.001
6 months	72.3±10.5	-4.05 (05.01 to -3.10)	<0.001
9 months	72.7±10.3	-3.62 (-4.68 to -2.57)	<0.001
12 months	72.3±9.8	-4.34 (-5.49 to -3.19)	<0.001
Outcome: Unacceptable blood pressure (≥140/90mmHg)			
Baseline	55.8	1 (ref.)	–
3 months	46.9	0.52 (0.41 to 0.66)	<0.001
6 months	38.6	0.33 (0.25 to 0.43)	<0.001
9 months	40.3	0.32 (0.24 to 0.44)	<0.001
12 months	33.9	0.29 (0.21 to 0.41)	<0.001

00269 Domain and Item Generation for a Diabetes-Related Quality of Life Item Bank and Computerized Adaptive Testing System (DiabCAT)

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Aims: Most quality of life (QoL) questionnaires for type 2 diabetes (T2DM) are paper-based, fixed-length, burdensome to administer, and require data entry. To overcome these limitations, we are developing cloud-based T2DM-related QoL item banks (IBs, i.e., domains), operationalized using computerized adaptive testing-CAT ("DiabCAT"). Here, we report on the process of generating and refining IBs and items for DiabCAT.

Methodology: In this qualitative, clinical study, T2DM-related QoL IBs and items were generated from: 1) a comprehensive literature review of existing diabetes-related QoL questionnaires (N=30); 2) semi-structured interviews and focus groups with patients with T2DM (N=37) recruited from the Singapore General Hospital and the Singapore National Eye Centre between September 2021 and April 2022 and 3) semi-structured interviews with diabetes healthcare practitioners (N=8). Data were analyzed using the constant comparative method. Items were grouped into IBs based on similarities in meaning and then refined to a representative set using systematic criteria (e.g., deletion of duplicate items or those with unclear wording).

Result: Of the 37 participants (mean ± standard deviation age: 60.6 ±11.8 years; 59.5% male), 16 (43.2%) were Chinese, 10 (27.0%) were Malays and 11 (29.7%) were Indians. Of these, 2 (5.4%) were on diet control, 25 (67.6%) on medication, and 10 (27.0%) on a combination of medication and insulin injection. Of the 8 healthcare practitioners, (mean ± standard deviation age: 43.5 ± 9.0 years; 25% male), 2 were specialists (ophthalmologist and endocrinologist), 5 were diabetes nurses/nurse educators, and 1 was a dietician. Initially, 9 QoL IBs comprising 1146 items were identified, of which 336 were from qualitative interviews. After refinement, 266 items across 7 related QoL domains (Symptoms, Activity Limitation, Emotional, Concerns, Diabetes Management, Diet and Work) were retained. Our IBs were able to capture QoL challenges and concerns relating to financial burden and social roles and responsibilities, that are not well represented in existing questionnaires.

Conclusion: Following a rigorous developmental process, our DiabCAT comprising 7 IBs and 266 items are ready for further testing in patients with T2DM, using cognitive interviews to ensure item comprehensibility. The IBs will then undergo psychometric testing in a large sample of individuals with T2DM to generate item calibrations. Once operationalised using our CAT online digital platform, DiabCAT will provide precise, rapid, and comprehensive assessment of the QoL impact of T2DM and the effectiveness of associated management modalities across a range of QoL domains.

00270 Decision Analysis Modelling Approach to Population Level Fracture Risk Screening and Mitigation

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Aims: Fracture risk is a significant health issue that is multifactorial and difficult to mitigate effectively. Population screening for fracture risk is not cost-effectiveness because of poor predictive validity of fracture risk screening tests. While many groups are now advocating for the population level screening of fracture risk with better technologies, there are no cost-effectiveness models that evaluate the use of falls risk screening to determine a population level fracture risk screening strategy.

Methodology: We developed a Markov model for four treatment strategies for preventing fractures. The model accounts for probabilities of falls and fractures, mortality rates and associated costs and utilities over the course of 5 years. We then generate a plot for the most cost-effective treatment strategy across a range of falls and fracture probabilities. Possible post-test probabilities of falls and fractures using current predictive methods are then superimposed on the plot to determine the usefulness of novel technologies in changing treatment decisions for mitigating fracture risk.

Result: A combined prevention strategy of bisphosphonates and falls prevention program is more cost effective than bisphosphonate treatment at 5% fracture risk and 30% risk of falls.
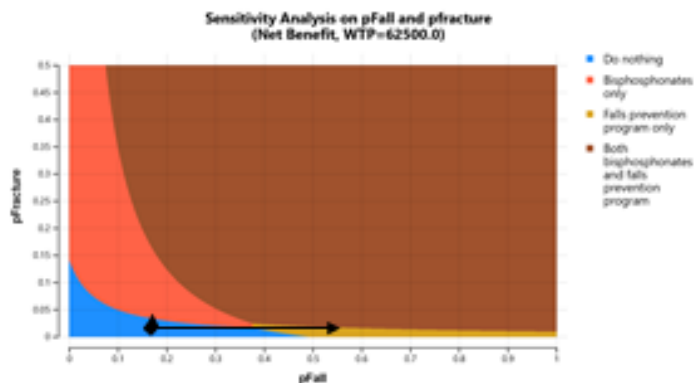
Conclusion: Falls prevention programs consisting of group-based exercise interventions are cost-effective if the risk of falls and fractures are sufficiently high. Novel technologies to improve falls and fracture risk screenings can expand the range of cost-effective treatment strategies available for patients. A decision analysis tool that incorporates new information on falls and fracture screening and treatment strategies will be useful to improve clinical decision making.

00271 Participation in the SingHealth Community Nursing Programme on Healthcare Utilization

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Aims: SingHealth community nurses provide various health services to residents at community nurse posts in Singapore. This study aimed to determine if participation in the SingHealth community nursing programme is associated with changes in healthcare utilization over time.

Methodology: A retrospective study of newly enrolled senior adults at 65 SingHealth community nurse posts in Singapore between April 2020 and March 2021 was conducted. SingHealth healthcare utilization data between April 2019 and December 2021 were obtained from the electronic medical records system.

An interrupted time series analysis compared monthly healthcare utilization trends up to 12 months before and 9 months after the index community nurse post visit. Segmented Prais–Winsten and Cochrane–Orcutt regression accounted for first-order autocorrelation. A level and/or slope change in the time series following the index community nurse post visit was taken to suggest a possible effect of programme participation on the outcome.

Result: 1,615 adults (mean age 73 years) were included, of whom 878 (54.4%) were female. The monthly rate of emergency department visits was increasing pre-index community nurse post visit (slope 9.9 visits, 95% CI 3.8 to 16.0). Following the index visit, there was a decrease in the rate of emergency department visits (level change -46.8 visits, -89.3 to -4.4; slope change -16.0 visits, -25.4 to -6.5; figure 1).

We observed a similar decrease in the unplanned inpatient admission rate (level change -42.3 admissions, -83.3 to -1.3; slope change -15.2 admissions, -22.3 to -8.1), and a decrease in slope only for unplanned inpatient length of stay (-118.1 days, -161.4 to -74.7) and polyclinic visit rate (-175.9 visits, -250.9 to -100.9). There was an increase in level for specialist outpatient clinic visit rate (903.2 visits, 606.6 to 1197.7), and no evidence of change for the rate of day surgeries.

Conclusion: Participation in the SingHealth community nursing programme may be associated with a decrease in unplanned healthcare utilization over time, and an increase in specialist outpatient clinic visits in the short term.
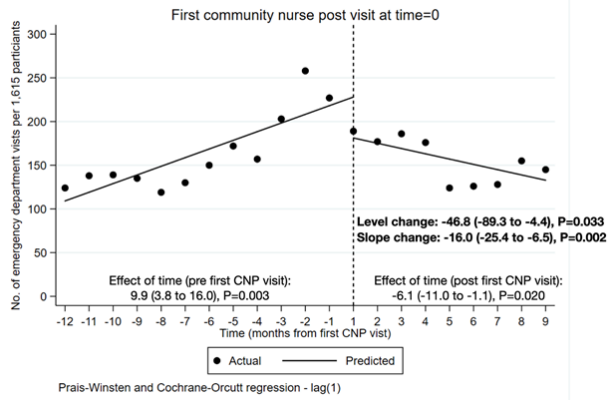
Figure 1. Interrupted time series of the rate of emergency department visits following the first community nurse post visit.

00272 Open Access Upper Gastrointestinal Endoscopy: A 4-Year Experience at an Academic Medical Centre

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Singapore General Hospital

Aims: Open access oesophagogastrodudenoscopy (OAO) is defined as the performance of oesophagogastrodudenoscopy procedures requested by referring physicians without a prior gastroenterology clinic consultation. With the ever increasing demand for specialist outpatient clinic appointments, the use of OAO have increased to reflect the drive to reduce healthcare costs via decreasing potentially unnecessary clinic visits. This also allows endoscopy to be scheduled and performed in a more timely fashion.

The aim of this study is to highlight and evaluate our experience in providing OAO services to patients with non-alarming dyspepsia symptoms under the age of 60 years old.

Methodology: The records of patients scheduled for OAO from Jan 2019 to Dec 2022 at Singapore General Hospital (SGH) Department of Gastroenterology & Hepatology were reviewed and analyzed.

The inclusion criteria for OAO included patients within the age of 21 to 60 years old with Non alarming dyspepsia symptoms such as reflux, heartburn, recurrent abdominal pain and bloating. Exclusion criteria include patients who are physically unfit, patients at higher risk of endoscopy (severe ischemic heart disease/cardiac devices/heart valve replacements, severe pulmonary disease, poorly controlled hypertension or diabetes, acute coronary syndrome or stroke within the last 6 months, difficult airway issues, anticoagulation users) or those that require urgent endoscopy (signs of gastrointestinal bleeding).

Result: A total of 569 patients were scheduled for OAO and 436 patients underwent the procedure. The mean age of patients was 45.7 (SD = 10.9) years old. 36% were males while 64% were females and in terms of racial demographics, there were 82.9% Chinese, 4.3% Malay, 7.7% Indian and 5.1% Others.

The median waiting time to endoscopy was 23 days (IQR 16-36) and there were no major adverse events reported. More than half of the endoscopies were unremarkable (231, 53%). There were 25 (5.7%) patients with major findings, 3 had gastric/oesophageal adenocarcinoma, one had incidental varices and 21 had peptic ulcer disease. Rapid urease test was conducted for 409 patients and 55 (13.4%) returned positive. One-fifth of the patients were given a Gastroenterology follow-up appointment (85, 19.5%) after the oesophagogastrodudenoscopy.

Fifteen patients, representing only 2.6% of the total patients referred, were rejected over the last 4 years as they did not meet the inclusion criteria for OAO.

Conclusion: OAO is a safe and effective strategy in providing timely oesophagogastrodudenoscopy to low risk patients at our centre. Of the 436 patients that underwent OAO, 5.7% had major findings. There were no major adverse events. Compliance to our inclusion and exclusion criteria was also good. Hence, polyclinics are encouraged to refer patients under 60 years with non-alarming dyspepsia to OAO.

00273 Artificial Intelligence-guided Segmentation and Path Planning Software for Transthoracic Lung Biopsy

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Aims: To evaluate the efficacy of lesion detection and optimal path planning for lung biopsies using a 3-Dimensional Convolution Neural Network (3D-CNN) artificial intelligence (AI) software.

Methodology: Retrospective computed tomography (CT) scans from three hospitals were obtained for this study. This study consisted of two phases. In the lesion detection phase, 2147 nodules in 219 patient scans were used to develop and train the deep learning 3D-CNN to detect lesions. Performance of lesion detection was validated with 235 patient scans (containing 354 lesions) for sensitivity and specificity; area-under-the-curve (AUC) analysis of receiver operating characteristic curves was also performed. In the path planning phase, which involved 150 patients, the system utilized Bayesian optimization to propose needle trajectories for lesion biopsy, while avoiding vital structures (bone, lung fissures, airways, and vessels). Software-proposed needle trajectories compared against actual biopsy path trajectories obtained from intraoperative CT scans, with a match defined as angular deviation of <5 degrees between the two.

Result: The 3D-CNN achieved an overall AUC of 97.4% (95%CI=96.3-98.2%) for lesion detection, with a mean sensitivity of 93.5% and mean specificity of 93.2%. Software-proposed needle trajectories achieved an overall 82.0% match with actual biopsy needle trajectories, with similar performance between supine and prone/oblique patient orientations (p=0.311). Average angular deviation between matching trajectories was 2.30±1.22o; average path deviation was 2.94±1.60mm.

Conclusion: Segmentation, lesion detection and path-planning for CT-guided lung biopsy using an AI-guided software showed promising results. Future integration with automated robotic systems may pave the way towards fully automated biopsy procedures.

00274 Sublobar Resection Versus Lobectomy for Stage IA Non-Small-Cell Lung Cancer ≤ 2cm: A Systematic Review and Patient-Level Meta-Analysis

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Aims: Despite lobectomy being the standard of care for early-stage non-small-cell lung cancer (NSCLC), sublobar resection (segmentectomy or wedge resection) has recently been suggested to achieve similar outcomes. We aimed to compare survival outcomes of sublobar resection against lobectomy for stage IA NSCLC using data from high-quality studies.

Methodology: An electronic literature search was conducted to retrieve randomized controlled trials (RCTs) or propensity score-matched studies (PSMs) comparing lobectomy to sublobar resection in stage IA NSCLC ≤2cm in size, with provision of Kaplan-Meier curves for overall survival (OS) and disease-free survival (DFS). A graphical reconstructive algorithm was used to obtain OS and DFS of individual patients, which was then pooled under random-effects individual patient data meta-analysis using Cox-models to determine hazard ratios (HRs). Sensitivity analyses for OS and DFS were also performed, restricting to results from RCTs only.

Result: Seven studies (2528 patients) were retrieved. There were no significant differences in OS (shared-frailty HR 0.92, 95%CI 0.77-1.11, p=0.378) or DFS (shared-frailty HR 1.06, 95%CI 0.90-1.24, p=0.476) between lobectomy and sublobar resection. This comparison remained non-significant even when restricted to RCTs only. Pooled Kaplan-Meier curves of OS appeared to diverge over time, in favor of sublobar resection; this was confirmed on analysis of restricted mean survival time curves.
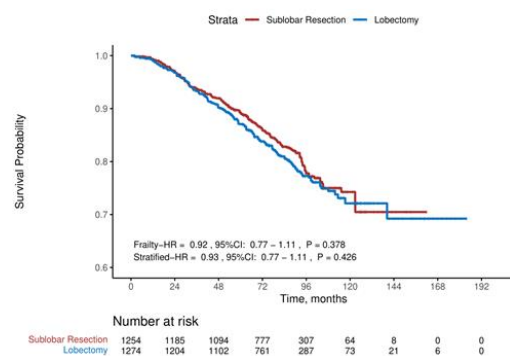
Conclusion: This patient-level meta-analysis of high-quality studies demonstrates that sublobar resection is equivalent, and possibly superior, to lobectomy in patients with small stage IA NSCLC. Sublobar resection offers greater down-the-road benefits in patients who experience recurrence or a second primary tumor, since the lung-sparing index surgery allows patients to receive further treatment

safely. This heralds sublobar resection as the new standard of care in carefully selected early-stage patients.

00275 Comparison between Holmium:Yag Laser with Moses Technology versus Thulium Fiber Laser Lithotripsy in Retrograde Intrarenal Surgery for Kidney Stones in Adults: A Propensity Score-matched Analysis from the Flexible Ureteroscopy Outcomes Registry (FLEXOR)

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Aims: To evaluate stone-free rate (SFR) and complications after flexible ureteroscopy (F-URS) for renal stones, comparing Thulium fiber laser (TFL) and Holmium:YAG laser with Moses technology (HLM).

Methodology: Data from adults who underwent F-URS in 20 centers worldwide were retrospectively reviewed (January 2018-August 2021). Patients with ureteral stones, concomitant bilateral procedures, and combined procedures were excluded. One-to-one propensity score-matching (PSM) for age, gender, stone characteristics was performed. SFR was defined as absence of fragments >2 mm on imaging within a follow-up period of 3-months. Multivariable logistic regression was performed to evaluate independent predictors of being stone-free.

Result: Of 2075 included patients, HLM was used in 508 patients and TFL in 1567 patients. After PSM, 284 patients from each group with comparable baseline characteristics were included. Pure dusting was applied in 6.0% of cases in HLM compared with 26% in TFL. There was a higher rate of basket extraction in HLM (89% vs 43%; p<0.001). Total operation time and lasing time did not differ significantly. Nine patients had sepsis in TFL versus none in HLM (p=0.007). Higher SFR was achieved in TFL (85% vs 56%; p<0.001). At multivariable analysis, TFL (OR 39.3, 95%CI 12.0-154; p<0.001) was a predictor for higher SFR, while lasing time (OR 0.96, 95%CI 0.94-0.99, p=0.004), multiple stones (OR 0.40, 95%CI 0.17-0.90; p=0.028), and stone diameter (OR 0.88, 95%CI 0.82-0.93; p<0.001) had lower odds of being stone-free.

Multivariable analysis of predictive factors for stone-free rate from the propensity score matched population.

	OR (95% CI)	p-value
TFL (compared to Moses)	39.3 (12.0 – 154)	**<0.001**
Age	0.98 (0.96 – 1.00)	0.12
Female sex	1.27 (0.68 – 2.40)	0.46
Total operation time	1.00 (0.99 – 1.02)	0.70
Lasing time	0.96 (0.94 – 0.99)	**0.004**
Multiple stones (vs single)	0.40 (0.17 – 0.90)	**0.028**
Maximum stone diameter	0.88 (0.82 – 0.93)	**<0.001**
Presence of normal kidney	2.18 (0.81 – 5.81)	0.12
Stone location		
Upper pole	0.63 (0.27 – 1.47)	0.29
Middle pole	0.56 (0.26 – 1.17)	0.12
Lower pole	1.23 (0.56 – 2.74)	0.61
Pelvis	1 (0.42 – 2.43)	0.99
Pre-stented	0.55 (0.29 – 1.06)	0.08
UAS >8 Fr (vs ≤8 Fr)	11.8 (2.32 – 63.7)	**0.003**
Disposable scope (vs reusable)	0.32 (0.10 – 0.96)	**0.044**
Stone clearance modality (vs combination)		
Dusting only	3.87 (0.95 – 18.3)	0.07
Fragmentation only	3.73 (0.69 – 29.8)	0.15

TFL: Thulium fiber laser. **UAS:** ureteral access sheath. **OR:** odds ratio. **CI:** confidence interval. **Bold character:** significant p value

Conclusion: This real-world study favors the use of TFL over HLM in F-URS for renal stones by way of its higher single-stage SFR.

00276 Dementia Risk of Direct Oral Anticoagulants Versus Warfarin for Atrial Fibrillation: Systematic Review And Meta-Analysis

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Aims: Direct-acting oral anticoagulants (DOAC) have demonstrated superior efficacy in preventing stroke and death compared to warfarin in patients with atrial fibrillation (AF), but their influence on dementia risk remains unclear. We aimed to evaluate the relative risks of dementia in DOAC versus warfarin in patients with AF.

Methodology: An electronic literature search was conducted to retrieve studies reporting comparisons of dementia incidence between patients treated with DOAC and warfarin for AF. Hazard ratios (HRs) and 95%CI were pooled in a random-effects meta-analysis. Meta-regression was performed to identify prognostic baseline variables. Network meta-analysis (NMA) was performed to determine dementia risk between individual DOACs and warfarin.

Result: Ten studies (342,624 patients) were retrieved. DOAC was associated with a significantly lower risk of developing dementia compared to warfarin (HR=0.88, 95%CI=0.80-0.98, p=0.017, I2=75%); significance was also seen in Asian patients (HR=0.81, 95%CI=0.68-0.86) but not non-Asian patients. Subgroup analyses of propensity score-matched studies and patients aged 65-75 years showed similar significance, but not for patients aged $\geq$75 years. Meta-regression found that a lower mean age corresponded to significantly greater favoring of DOAC over warfarin. NMA found significant reductions in dementia risk over warfarin for rivaroxaban (HR=0.854, 95%CI=0.763-0.955), apixaban (HR=0.881, 95%CI=0.778-0.997) and dabigatran (HR=0.871, 95%CI=0.770-0.987); the highest-ranked treatment by P-scores was edoxaban.
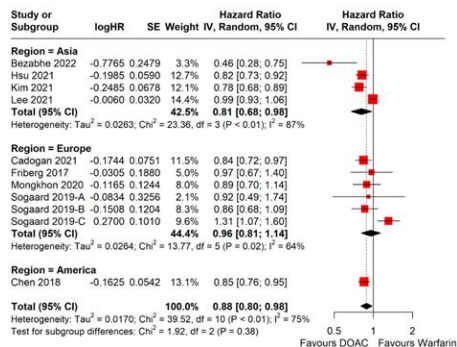
Conclusion: The use of DOAC in AF significantly reduces dementia risk compared to warfarin, particularly in Asian patients. The possible reversal of this effect with increasing age merits further randomized trials with long-term follow-up.

00277 A Time-Series Analysis of the Association between Population Aging and Emergency Department Use in a Tertiary Hospital Over More Than a Decade

Hanzhang Xu[1,2], Nan Liu[2], Fahad Javaid Siddiqui[2], Andrew Fu Wah Ho[2], Kenneth Boon Kiat Tan[3], Marcus Eng Hock Ong[2]

[1]Duke University, [2]Duke-NUS Medical School, [3]Singapore General Hospital

Aims: Prior studies have shown a steady increase in the number of emergency department (ED) visits in Singapore over the last decade. In the meantime, Singapore is one of the fastest ageing nations in the world. Using time-series analysis, this study aimed to assess the relationship between population aging and ED admissions in a tertiary hospital in Singapore over a recent 11-year span.

Methodology: Data on monthly ED visits and admission rates from January 2008 to December 2019 were extracted from the SingHealth electronic health records. During the same period, the proportion of the population aged 65 years or over was obtained from the Department of Statistics, Singapore. The autoregressive integrated moving average (ARIMA) model was used to assess the association between the proportion of ED visits by elderly patients and ED admission rates. Statistical significance was set at $p<0.05$.

Result: A total of 1,315,064 ED visits occurred at the Singapore General Hospital between January 2008 and December 2019. Although the average monthly number of ED visits decreased from 9070 in 2008 to 8574 in 2019, the ED admission rate increased from 35.1% to 47.0%. During this period, the proportion of elderly in the ED population also increased from 32.0% to 43.9%, which is reflective of the increasing trend of population ageing nationwide. After the temporal effect of the series was removed by using the adjusted ARIMA model, the proportion of elderly in the ED population was positively associated with the ED admission rates (estimate coefficient=0.35; 95% confidence interval: 0.18-0.53; $p<0.001$). This positive association was consistent between men and women and across racial/ethnic groups

Conclusion: A positive association between population aging and ED admission rates was observed in a large tertiary hospital from 2008 to 2019. Further studies are warranted to validate our findings at the national level and ultimately promote high quality ED care for the aging population

Number of ED Visits by Age and Admission Rates: 2008-2019
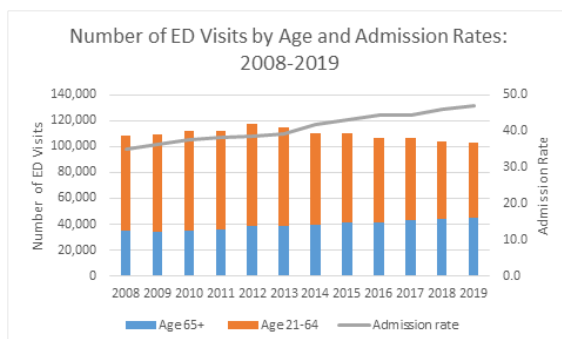
00278 Promoting Child Health through Community Outreach for Good Health at Adulthood

Khoo Shi Min

KK Women's and Children's Hospital

Aims: Childhood, an essential part of a lifecycle is a fundamental branch of population health. Conforming with the Nation's vision of enhancing population health, it is paramount to ensure the capacity and capability of nurses to serve this vulnerable population.

However, the focus cannot be only child-focused as in the well-known maternal and child dyad together with the concept of the first 1000 days of life, the child is tightly linked with the mother. Thus, there is an equal importance in focusing on woman's health from pre-conception to antenatal and through motherhood.

Methodology:

Phase 1: Establishment of an educational program for nurses based in the community to enhance their knowledge and skills in two main specialty components: obstetric, gynaecological health and child health.

These nurses are also given the opportunity for attachment to the clinical units to supplement their learning, putting theory to practice.

Phase 2: Practice Nurses (APN), Midwives and Lactation Consultants (LC) are seconded to provide in-person support to the community to assist in capacity and capability building during the initiation and establishment of services.

Result:

Phase 1: A total of 13 nurses were enrolled and 12 had completed the didactic classes and clinical practicums.

Phase 2: 2 groups of the above trained nurse had commenced with the expansion of their respective services, alongside with the APN support on-site during the initiation of the services. They provide health coaching for dietary concerns, recommend age-appropriate activities and behavioural interventions for children whom present with developmental concerns. They are also mostly able to identify common paediatric conditions, and bring up for case discussions with the APN.

As the nurses in the community continue to provide child health service, the team is moving on to preconception and perinatal health coaching and support for women and mothers. Public educational resources and workflows are being collated and built to complete the cycle of maternal and child health.

Conclusion: With the burgeoning metabolic and mental health challenges faced in the maternal and child health spectrum, there is an urgent need to transform the current system. One fraction of the

healthcare system is undeniably nursing services. To move alongside with the change in healthcare trends, we need to start from one of the pillars of the system, enhancing their capabilities and capacity to embrace family centred care. This is undoubtably one of the most important first steps to bring us towards an all-encompassing population health for our people.

00279 Feasibility and Initial Efficacy of a Mobile App-facilitated Self-directed Rehabilitation in Total Knee Arthroplasty: A Randomized Controlled Trial

Woon Ee Lin, Pua Yong Hao, Pang Hee Nee, Tan Wei Ming John, Darren Tay Keng Jin, Pang Hee Nee, Chen Yongqiang Jerry Delphi, Tan Hwee Chye Andrew, Pua Yong Hao

Singapore General Hospital

Aims: Adherence to exercise in the acute stages post total knee arthroplasty (TKA) is important in optimising clinical outcomes. Although exercise adherence is higher with supervised rehab, regular supervised care is challenging to sustain from a manpower perspective. With the shift toward unsupervised, self-directed rehab, the ability of patients to stay engaged is needed more than ever. We have developed a mobile app to support self-directed rehab with features to promote exercise adherence. We aimed to evaluate the feasibility and initial efficacy of this app in patients post TKA.

Methodology: In this pilot feasibility RCT (NCT05434767), 29 patients undergoing unilateral TKA were randomised to receive standard rehab (SR) (n=14) or app-facilitated self-directed rehab (AR) (n=15). SR comprised 1-2 outpatient sessions over 6 weeks. AR comprised an onboarding session, followed by a 6-week self-directed exercise program. To promote adherence, the app provides personalised exercise prescription, feedback, and recovery progress (Figure 1). The primary outcome was feasibility which included adherence measured using the Exercise Adherence Rating Scale (EARS) and safety. Secondary outcomes include measures of pain, range of motion and physical function.

Figure 1:
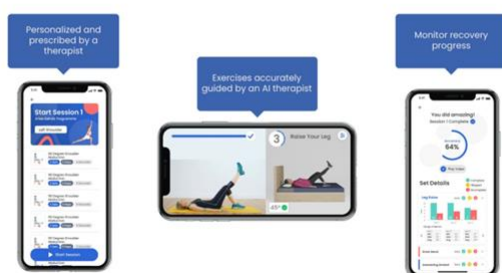
Result: More patients in the AR group than SR group (14 vs 4) reported performing most of the prescribed exercises. In ordinal regression analysis adjusted for BMI, the AR group had 13.5 times (95% CI = 2.9-72) greater odds of having higher EARS scores relative to the SR group. All patients were able to use the app. No adverse events were reported. After adjusting for baseline outcomes and BMI, the observed between-group differences for the various outcomes were small and statistically non-significant. However, the associated confidence intervals were wide.

Conclusion: In patients post TKA, self-directed rehab facilitated using our app improved exercise adherence without compromising safety and clinical outcomes. As the app is a convenient and inexpensive alternative to in person rehab, more studies are needed to determine its long-term clinical and cost effectiveness.

00280 Assessing Generalisability of Deep Learning Model for 3D Teeth Recognition: From Adolescent Cohort to Geriatric Cohort

Jeffry Hartanto[1], Jonathan Lim Ching Loong[1], Lim Chi Wan[2], Yu Na[1]
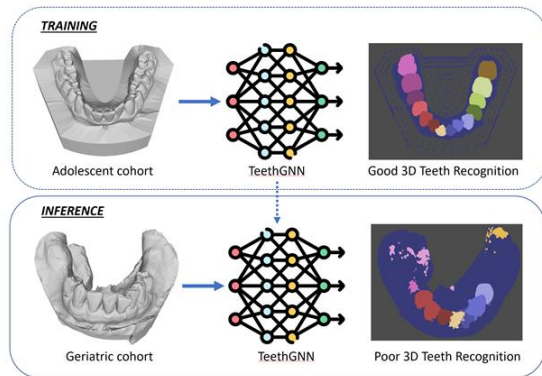
[1]National Dental Centre Singapore, [2]A*STAR

Figure 1. Workflow overview for assessing TeethGNN generalisability. The TeethGNN [1] was first trained on adolescent cohort, which achieves good 3D teeth recognition. Then, the trained model was used to perform inference on the geriatric cohort, which gives poor 3D teeth recognition. This finding indicates that TeethGNN fails to generalize its teeth recognition capabilities.

Aims: To allow automatic dental diagnosis, many deep learning models have been applied on teeth recognition task on 3D jaw models, which involves segmentation and labelling, such as FDI notation, of each tooth region. [1-11]. These proposed models achieved good performance, i.e., mean intersection-over-union (mIoU) metric above 90%, on a dataset of adolescent cohort (< 50 years-old) where the cases have almost complete dentition. However, no study has examined the performance of the models on geriatric cohort ($\geq$ 50 years-old), i.e., its generalisability, where the cases have almost complete edentulism. Thus, this study aims to evaluate the generalisability of the state-of-the-art deep learning model for 3D teeth recognition on geriatric cohort.

Methodology: Out of the 12 reviewed recent studies [1-11], most of them used small cohorts of around 100 cases, which are unlikely to generalise well [5-11]. Among the rest that used hundreds of cases [1-4], we re-implemented TeethGNN [1] that reported high performance of mIoU of 97.37%. We trained and tested the model on Teeth3DS dataset [12] which has 1200 3D adolescent jaw models. Then, the generalisability of the model was evaluated by performing inference on 36 manually segmented and labelled 3D geriatric jaw models which consists of 20 upper jaws and 16 lower jaws.

Result: On Teeth3DS dataset, the model achieved overall mIoU of around 85% for inference, which is approaching that reported in [1]. This performance shows that the re-implementation of the model is generally correct while considering the differences in hyperparameter settings and exclusion of post-processing step. When tested on the geriatric cohort, the overall mIoU drops significantly to 25.4%, i.e.,

33.2% for upper jaws only and 19.2% for lower jaws only. This result highlights the inability of the TeethGNN to generalise its teeth recognition capability from adolescent cohort to geriatric cohort.

Conclusion: TeethGNN performance drops significantly on geriatric cohort, which indicates its poor generalisability. Further studies are necessary to enhance the model's generalisability, such as across age groups.

00281 Role of Pharmacogenomics in Oncology

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[1]National Cancer Centre Singapore, [2]SingHealth

Aims: The uptake of pre-emptive genotype testing in clinical practice has been relatively low in Singapore. There is increasing interest in the implementation of pharmacogenomics as a mainstream service in National Cancer Centre Singapore (NCCS). The gene-drug pair of CYP 2D6-tamoxifen is regarded as the most relevant. This study aims to determine the acceptance of patients on tamoxifen for genotype testing as well as the facilitators and barriers for acceptance, and to make recommendations for the establishment of a pharmacogenomics service.

Methodology: This was a cross-sectional survey of patients collecting tamoxifen from 1st September 2022 to 28th February 2023 at NCCS. Patients were evaluated on their acceptance of pre-emptive genotype testing using a questionnaire derived from the Theory of Planned Behaviour. The patients' demographics, social history, knowledge of and prior experience with genetic testing were recorded.

Result: A total of 202 patients responded, all of whom were female. Seventy percent of patients responded that they intend to undergo pre-emptive genotype testing for CYP 2D6 if offered, 76.1% felt that pre-emptive testing for CYP 2D6 should be offered up front to all patients taking tamoxifen while 42% indicated they were willing to pay for testing. High overall scores for attitude, subjective norms and perceived behavioural control were independent predictors of acceptance. Potential facilitators for acceptance include adequate data security, strong family/ social support, convenient testing procedures, 3rd-party payer support, and adequate patient education. Lack of physician support, high cost of testing and lack of information and guidance from healthcare providers would discourage patients from testing.

Conclusion: There is a high level of acceptance among patients in this study for pre-emptive genotype testing. Further research is required to demonstrate the cost-effectiveness of testing. Training on pharmacogenomics should be provided to healthcare professionals to increase competency which would help in the establishment of pharmacogenomics services.

00282 A Pilot Study on the Long-Term Impact of COVID-19 on Quality of Life, Pulmonary Physiology and Imaging Abnormalities

Rachel Teo Ying[1], Poh Kai Chin[1], Ruby Poh Li Choo[1], Wong Hwei Rong Wendy[2], Tang Yiting[3], Soh Rui Ya[1], Kiran Sharma[1], Ganesh Kalyanasundaram[1]

[1]Sengkang General Hospital, [2]SingHealth Community Hospitals, [3]Ministry of Health Holdings

Aims: Coronavirus Disease 2019 (COVID-19) is an ongoing pandemic. The aim is to report and understand the long-term impact of COVID-19 infection on the quality of life and pulmonary physiology of infected patients.

Methodology: This is a cohort study on recovered COVID-19 patients discharged from a regional teaching hospital between 1st January and 31st July 2020. Patients aged between 21 and 80 years with a diagnosis of COVID-19 were eligible. COVID-19 diagnosis was defined as having at least 1 positive polymerase chain reaction (PCR) test for COVID-19 from oropharyngeal swabs or lower respiratory tract specimens obtained either before or during hospitalization. Patients performed pulmonary function tests (PFTs): spirometry, single breath hold carbon monoxide test for diffusing capacity of lung for carbon monoxide (DLco) and body plethysmography at 9-12 month after COVID-19 infection. They also completed the 36-Item Short Form General Health Survey (SF-36) at each visit. The questionnaire involves assessment of eight different health domains. These include physical function, social function, role limitation due to physical problems, role limitation due to emotional problems, mental health, bodily pain, vitality, and general health. Each domain is measured based on a score from 0 (worst) to 100 (best). Computed Tomography (CT) scan of the thorax was performed for patients with abnormal PFTs. The baseline demographics, body mass index (BMI), smoking status and self-reported underlying diseases for subjects were also collected.

Result: 21 patients completed the pilot study and were stratified into the following two groups according to COVID-19 severity grades stated by WHO: 1. Mild disease, or moderate disease with clinical signs of pneumonia and SpO2 ⩾90% (mild/moderate), 2. Severe disease with pneumonia and SpO2 <90%, respiratory rate >30/min, or critical disease such as ARDS, sepsis, septic shock, and multi organ failure (severe/critical)(17).

5/21(23.8%) patients had severe/critical COVID-19 disease. Patients with severe/critical COVID-19 disease recorded reduced SF-36 scores in certain domains. 3/21(14.2%), 5/21(23.8%) and 1/21(4.76%) patient(s) had abnormal spirometry, DLco and lung volume results respectively.

Conclusion: Majority of patients with severe/critical COVID-19 disease continue to report a lower quality of life and are a higher risk of developing functional impairment 1-year post COVID-19 infection. 40% of severe/critical COVID-19 disease had evidence of residual pulmonary fibrosis based on CT imaging.

00283 Roles and Value-added Services Provided by Pharmacist in a Prostate Cancer Clinic

Chang Wee Ting Cassandra, Chen Kenneth SGH, Yuen Shyi Peng John, Lim Kiat Wee, Tin Kwai Sum Janice, Norlela Binte Hashim

Singapore General Hospital

Aims: Prostate cancer is the second most common cancer among men in Singapore. The recent approval of secondary hormonal agents such as abiraterone and enzalutamide, has transformed the treatment landscape of prostate cancer. However, the need for frequent monitoring of efficacy and side effects may be over-whelming for patients and the healthcare team. Hence, a prostate cancer clinic run by a multidisciplinary team (MDT) in the Urology Department in Singapore General Hospital was established to provide holistic care for these patients. The MDT comprise pharmacists, nurses, physiotherapists, and an onco-urology consultant. We aim to describe the roles and value-added services provided by pharmacists in this clinic.

Methodology: Patient visits between Jan 21 to Apr 23 were included. Patient safety was assessed from the incidence of side effects from drug therapy. Efficacy measures included assessment of cancer symptoms and blood tests. Preventive health interventions were evaluated by assessing patient's exercise regimen, ensuring annual lipid and glucose assessments as well as 2 yearly bone mineral density (BMD) assessments.

Result: 57 patients with 215 visits were included. Pharmacist optimised 23 drug therapies and 7 lifestyle modifications due to side effect. 4 drug therapies were optimised due to new symptoms and suboptimal cancer control. 11 drug interactions and 23 drug non-adherence were identified and addressed accordingly. 49/57, 49/57, 43/57 and 50/57 had lipids test, glucose tests, BMD test and exercise regimen assessed and managed respectively. 11/57 were referred for dental clearance before prescribing bone modifying agents. Pharmacist made 10 phone calls to patient to follow up on blood pressure check, handle patient's enquiry and update blood test results.

Other value-added services provided during the visits included medication reconciliation and review, providing fall precaution advices, resolving drug supply issue, patient education on disease and symptoms management, making referrals to other healthcare professionals, encouraging covid vaccinations, smoking cessation counselling, counselling on healthy lifestyle, handling medication refunds, and financial counselling.

Conclusion: The addition of a clinical pharmacist to a uro-oncology clinic providing care to patients with prostate cancer improved patient care by addressing to drug related interventions and patient education. Through the pharmacist's active intervention, the clinical pharmacist may improve the safety and optimisation of drug use. Through the patient education, clinical pharmacist may improve the patient active involvement in treatment and outcomes of therapy. Further research in this area to assess the efficacy and outcomes of such MDT can be done.

00284 Epidemiological Trends and Outcomes of Early-onset Colorectal Cancer (EOCRC) in Singapore

Chen Hui Lionel Raphael[1], Brenda Tay[1], Tan Sze Huey[2], Zhou Siqin[2], Tan Kwong-Wei Emile[1], Tan Bee Huat Iain[1]

[1]Singapore General Hospital, [2]National Cancer Centre Singapore

Aims: The incidence of early-onset colorectal cancer (EOCRC) among people aged less than 50 years has been rising in Western countries. EOCRC is associated with more advanced stage and poorly differentiated tumours at diagnosis. Our study evaluates the trends and outcomes of EOCRC in Singapore.

Methodology: Patients with CRC diagnosed at age 20 and above from 1968 to 2019 were identified from the Singapore Cancer Registry. EOCRC, average-onset CRC (AOCRC) and late-onset CRC (LOCRC) were defined as age of diagnosis from 20 - 49, 50 - 64 and $\geq$ 65 years respectively. Temporal trends of incidence rates were modelled with Joinpoint Regression. Birth cohort models were fitted with an age-period-cohort analysis tool. Survival analysis was performed with Cox-proportional hazards model.

Result: 53044 CRCs were included with 32880 (62%) colon and 20164 (38%) rectal cancers. 6183 (11.7%) EOCRCs were diagnosed. Age specific incidence rate (ASR) of EOCRC rose from 5 in 1968 to 9 per 100,000 in 1996 at 2.1% annually and rose to 10 per 100,000 in 2019 at 0.64% annually. The ASR for AOCRC rose at 3% annually from 1968 and plateaued from 1987 while the ASR for LOCRC rose at 4.1% from 1968 to 1989 and 1.3% annually from 1989 to 2003 but decreased from 2003 onwards at 1% annually. There was no change in ASR of CRC among those aged 20 -29 and 30 – 39 years. Among those aged 40 - 49, the ASR of CRC rose at 0.46% per year. (Figure 1)

Compared to the 1950 – 1954 birth reference cohort, there was no change in the incidence rate ratio (IRR) for colon cancer for later cohorts. However, the 1980 – 1984 birth cohort had a higher IRR of 1.36 (95% CI 1.07 – 1.73) for rectal cancer. Among 27939 (52.7%) CRC patients with TNM stage, there was a higher proportion of stage 3 EOCRC (37.4%) compared to LOCRC (32.4%) (p <0.001). EOCRC also had better cancer-specific survival compared to LOCRC (HR 0.73, 95% CI 0.68 - 0.79, p <0.001) after adjusting for covariates.

Conclusion: The rise in EOCRC incidence in Singapore highlights the need for screening of young individuals to detect cancer early and reduce cancer related morbidity.
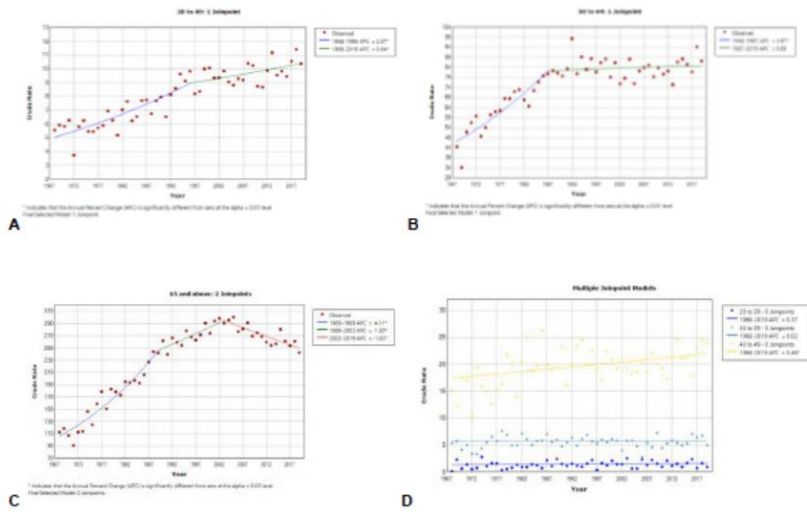
Figure 1: Age specific incidence rates of colorectal cancer among (A) 20 - 49 years, (B) 50 - 64 years, (C) 65 and older, (D) 20 - 29 vs 30 - 39 vs 40 - 49 years

00285 The Effectiveness of Prophylactic Multi-layered Polyurethane Foam Dressing in Preventing Pressure Injuries in Elderly Patients in an Acute Tertiary Hospital : A Randomized Trial

Png Gek Kheng, Chew Samuel Teong Huang, Zhou Linfang, Catherine Loo Jiet Cheng, Anitah Bte Rahmat, Hafiszah Bte Hashim, Meng Lianmei, Janet Toh Lay Siang, Jismy Theetaikochppu Jose, Huang Qiaoping, Yong Jiin Chong, Joyce Chen Qiu Yan, Zhang Yanli, Ratnawati Hassan, Zheng Yiling, Wang Xia

Changi General Hospital

Aims: The aim of this study was to determine efficacy of prophylactic multi-layered polyurethane foam dressing on sacrum and heels in reducing risk of sustaining pressure injuries in elderly patients as compared to a standard preventative measure in a tertiary hospital.

Methodology: This is a randomized control trial to compare current standard practice of prevention pressure bundle to adding of multilayer foam dressing into standard practice of care. All participants randomized in the study will be monitored for the duration of their treatment and all study participants will receive standard CGH pressure injury prevention strategies. Verbal consent will be obtained from all patients with capacity to make decisions after provision of an information sheet. For patients who lack capacity to make decisions, consent will be discussed and obtained from the next of kin.

Result: 145 patients were randomly assigned to the intervention or control group, of whom three (2.1%) patients developed pressure ulcers during hospitalization. The mean age was 84.4±8.0 years old, and 59.3% (86/145) of patients were female. The median length of stay in the control and intervention group were 18 (IQR 9–29) and 13 (IQR 7–25) days respectively. 3.4% (5/145) of patients died during the follow-up period, of whom four were from the intervention group, and one was from the control group. Among the patients who developed pressure injuries during the follow-up period, two of the control group had developed stage 1 sacral pressure injury and one intervention group had a stage 1 pressure injury at the left hip which the location is not on the trial of multilayer foam dressings.

Conclusion: The study had demonstrated with the additional foam applied none had developed any pressure injuries over these two frequently pressure injuries occurrence sites. There may be remaining potential risk for developing pressure injuries with patient's comorbidities and deteriorating medical condition and thus is worth putting multilayer foam as an additional standard preventive care.

00286 Diabetes Risk Assessment in Oral Healthcare Settings: Role of the Dental Team in Population Health Strategies

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Aims: Type 2 diabetes mellitus (T2DM) is a growing global health burden and 1 million Singapore adults is estimated to have T2DM by 2050. As there is a bidirectional link between DM and periodontal disease, evidence exists to demonstrate that oral healthcare settings have been used for risk assessment and identification of individuals who may be at high risk for T2DM or who may already unknowingly have the condition. As value-based care creates new services for holistic healthcare delivery, the role of the dental team in population health management especially in early detection of DM with timely intervention is in line with Singapore's war against diabetes and a healthy nation. This cross-sectional study aims to screen dental patients for undiagnosed DM and prediabetes (PDM) and develop a clinical risk model for DM using data available at the dental visit.

Methodology: The study included 1074 adult patients with no known DM. Patients' socio-demographic characteristics, general health variables and periodontal parameters were recorded as potential predictors. Full periodontal examination and point-of-care (POC) capillary test for HbA1c were performed and all participants immediately informed their results. Patients with HbA1c >5.7% were advised to seek further medical confirmation for PDM and DM and followed-up on the definitive diagnosis of their hyperglycemia on subsequent dental visits. The confirmed DM group (CDM) was considered the outcome and a prediction model developed using univariable analysis of CDM by logistic regression followed by multivariable logistic regression analysis.

Result: Screening by POC HbA1c test showed 66(6.15%) and 386(35.94%) patients with potential DM and PDM respectively. Follow-up with those advised for medical consultation revealed 65(6.05%), 83 (7.73%), 806 (75.05%) with CDM, CPDM and normoglycemia respectively. 120(11.17%) did not seek further medical confirmation or were not contactable regarding their true hyperglycemic status. The final model included BMI >23kg/m2, family history of diabetes, smoking and a periodontal predictor where the ROC analysis for CDM in patients with Stage III or IV Periodontitis had a sensitivity of 52.3%, specificity of 82.6%, and AUC of 0.719(95% CI: 0.689, 0.747) whereas in patients with Severe Periodontitis had a sensitivity of 53.9%, specificity of 82.9%, and AUC of 0.724(95% CI: 0.694, 0.752).

Conclusion: This study demonstrates the beneficial role of the dental team in opportunistic identification of undiagnosed T2DM in a diabetes population health continuum of intervention approaches. A clinical risk model that includes BMI >23kg/m2, positive family history of diabetes, smoking and a periodontal predictor of severe periodontitis could be used as a targeted screening approach during dental visits for patients at risk of DM, thus facilitating early diagnosis and management

of DM and prevention of prediabetes to DM. Further validation is required to determine the viability of using such a model on a larger dental population in the public and private healthcare sectors.

00287 Periodontal Health Screening as Part of Integrated Diabetes Care: Role of the Dental Team in Diabetes Population Health Improvement

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Aims: Diabetes mellitus (DM) and periodontal disease have a bidirectional relationship that is well documented. Periodontitis is considered the sixth complication of DM, yet is often overlooked by physicians and people living with DM. Integrating proper prevention and treatment of periodontitis may lower the risk of long-term diabetic complications. Systematic incorporation of standardized periodontal screening into routine diabetes care is a practical first step toward such integration. This study aims to examine the association of Type 2 diabetes (T2DM) and the clinical periodontal status in a multi-ethnic population receiving tertiary public healthcare in Singapore.

Methodology: 181 non-smoking T2DM patients (case group) were recruited from the Diabetes & Metabolism Centre Singapore and 181 non-smoking dental patients without diabetes (control group) matched with age, gender and ethnicity were consecutively recruited from the National Dental Centre Singapore. Participants completed a questionnaire on socio-demographic characteristics (gender, age, ethnicity, family history of DM and past gestational diabetes, duration of DM, diabetes complications and current medications). Point-of-care HbA1c test and measurements for BMI were performed. Full-mouth periodontal examination and plaque score was performed. All periodontal parameters were recorded and periodontal diagnosis determined according to the 2017 EFP/AAP classification. The primary outcome was the periodontally-inflamed surface area (PISA).

Result: The T2DM group had significantly higher ($p < 0.01$) proportion of subjects with Stage III and Stage IV Periodontitis (62.0%) than the non-DM control group (41.0%), with significantly increased severity of periodontal parameters in median (IQR) number of teeth loss ($p < 0.01$), percentage sites of probing depths >5mm ($p < 0.01$), clinical attachment loss ($p < 0.01$), bleeding on probing ($p < 0.01$), PISA ($p < 0.05$) and plaque score ($p = 0.05$).

Conclusion: Our data confirms that T2DM patients have increased risk of periodontal disease and tend to have more advanced stages of periodontitis. Integrated and cross-disciplinary approaches that reorganize provider teams around patients are required for successful management of type 2 diabetes with its inherent complexity, phenotypic heterogeneity, and frequent multimorbidities. Hence, integrated medical-dental collaboration to screen for and manage periodontitis in DM patients is warranted to reduce chronic periodontal host inflammation which otherwise may negatively affect the glycemic status and aggravate other pertinent diabetes complications.

00288 A Mixed Blended Model in Vestibular Rehabilitation Therapy Training for Physiotherapists

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Aims: Dizziness is the most common complaint in the adult population, and evaluating its cause is often difficult yet crucial for its effective management. Vestibular rehabilitation has been shown to be effective in the management of dizziness secondary to vestibular disorders. However, vestibular curriculum is covered minimally in undergraduate physiotherapy modules.

Vestibular rehabilitation is largely taught in postgraduate workshops. The physiotherapy department of Singapore General Hospital (SGH) used a traditional learning model which included 16 hours of face to face workshops, followed by proctored written and video examination, and a practical examination. This model led to time wasted in delivering didactic lectures and reduced time for hands-on practice. Performance in written examination of course participants were often mediocre. Anecdotal feedback from previous course participants revealed lower levels of confidence in assessing and treating patients with vestibular disorders, especially in the emergency department settings.

Hence, a structured blended training program was developed according to the Barany Society guidelines to standardize practice. We aimed to describe the development of the new training program and investigate whether this model would be able to reduce contact time between the workshop participants and instructors, and also improve the competency of physiotherapists in vestibular rehabilitation.

Methodology: The new training model comprised of voice annotated presentations with embedded quizzes, interactive case studies and videos demonstrating assessment and treatment uploaded to the elearning platform. 23 participants attended the workshop between November to Dec 2022, which utilised the new training model. Nine participants were from the Singapore General Hospital, and underwent the online exam. We compared the differences in scores between these 9 participants and previous ones who experienced the old training model using the unpaired T-Test. Significance was set at p <0.05.

Result: We successfully reduced the teaching hours from 16 contact hours to 7.5 contact hours. The feedback of participants who completed the blended version remained high, comparable to previous ratings of 4.5/ 5. There was a statistically significant change in participants' online exam scores (current mean score = 78.6% (SD 4.5), old mean score= 70.2% (SD 6.3), T= 2.85, p=0.015).

Conclusion: A blended learning approach appears to reduce face to face contact time, and led to a significant increase in competency scores of participants compared to those who underwent the older model of training. This new model of training of vestibular physiotherapists appears to be more time

efficient for the training institution and could be recommended to other institutions which utilised the traditional training approach.

00289 Direction-changing Nystagmus on Position Testing: A Case Report on an Unusual Vestibular Entity

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Aims: Direction-changing nystagmus on positional testing is classically thought to be due to a central pathology. In Benign Paroxysmal Positional Vertigo (BPPV), spontaneous reversal of nystagmus while maintaining the same head position is rarely observed. We herein report a case of a patient who demonstrated the unusual phenomenon of positional nystagmus spontaneously reversing without further position changes.

Methodology: Magnetic Resonance Imaging of the brain revealed no intracranial mass or infarct. Videonystagmography was conducted to quantify the amplitude and frequency of the positional nystagmus. On body roll to the right, the patient demonstrated geotropic nystagmus alone (11 rightwards beat); when turned to the left however, the patient initially showed geotropic nystagmus (28 leftwards beat) and this reversed to become apogeotropic nystagmus (7 rightwards beats).

Result: The patient was managed as per right lateral canal canalithiasis as the amplitude of the nystagmus was greater on the right side, and the patient felt more symptomatic on the right as well. One theory in existing literature for this phenomenon includes that there is simultaneous ampullopedal and ampulofugal forces during a single head position, due to the possible coexistence of canalolithiasis and cupulolithiasis. Another possible theory is the endolymphatic reflux theory which suggests there is a rebound flow of otolithic debris.

Conclusion: This case highlights the diagnostic challenge the otolaryngologists and vestibular therapists face. However, it remains a priority to rule out central pathologies first before confirming the diagnosis of BPPV and managing as per a peripheral cause for vertigo.

00290 Operating Theatre Game-based Pre-training in Enhancing Learning Experience, Knowledge and Self-Efficacy Scores for Novice Nurses

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Aims: This study aimed to measure novice nurse's pre and post knowledge and their perception of self-efficacy scores after training. This student also aim to evaluate novice nurse's satisfaction on the Operating Theatre (OT) game-based pre-training.

Methodology: Experiential Learning Cycle Theory (Kolb, 1984) consisting of 4 stages was used to design and measure the study's outcome. Serious game was created customizing as close to the OT setting and specific to cataract surgery as the main scenario in this game-based pre-training. The game was incorporated into novice nurses' pre-orientation training allowing nurses to play multiple times to familiarize with the learning objectives set into the game. It is playable in mobile devices and computer.

23 peri-operative students and new employed nurses were recruited as novice nurses and given access to play the game before orientation from a period of September 2022 to May 2023.

In the concrete and reflective experience stage, a pre-test questionnaire was administered before the game-based training and a post-test questionnaire was given after game-based training to reflect on the knowledge acquired. After the game-based training, participants completed post-training survey on their perceived self-efficacy in non-technical skills and scores were captured using 5-point Likert scale after exposure to actual clinical posting. 15 items were included in the self-efficacy questionnaire which were categorized into situation awareness, decision making, leadership, communication and teamwork.

Satisfaction of the OT game-based pre-training was measured through the number of completed responses in the questionnaire after they have completed the game. Satisfaction was measured using 5-point Likert scale with 15 items in the questionnaire.

Result: Data were collected from 23 participants whom have completed the OT game-based pre-training. The paired t-test reported statistical significant increase in post-test knowledge score, $p < 0.05$ after OT game-based training. Among the 23 participants, 19 participants perceived their self-efficacy with an average score of 66, while 4 participants scored an average of 52 out of total score 75 after OT game-based training. Average satisfaction was 67 out of total possible score of 75 was collated from all participants' satisfaction questionnaire.

Conclusion: With the significant increase in knowledge score before actual clinical postings, it proved that novice nurses can acquired the learning objectives from the game itself with enhanced satisfaction in using game-based method in their pre-training and improved perceived self-efficacy during their clinical posting.

00291 Whole Genome Sequencing of Wastewater Reveals the Prevalence of Novel and Treatment-Resistant Infectious Diseases

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Aims: The COVID-19 pandemic in the United States was exacerbated by the inability to track infections in a timely manner. Testing of humans revealed new public health challenges due to the lack of test kits and perhaps equally important, the lack of symptoms in up to 70% of infected communities. To address the testing challenge, we and others utilized wastewater monitoring programs to provide a cost-effective and scalable method to track the transmission of SAR-CoV-2, influenza, mpox, and other pathogens at the community (wastewater treatment plants and interceptor lines) and facility (dormitories, elementary schools, airports, homeless shelters, and senior living homes) level.

Methodology: Over the last three years, we have demonstrated that we can sequence microbial genomes (SARS-CoV-2, influenza, and mpox) from sewage with a genome coverage of more than 80% and more than 100X depth using tiled-amplicon library preparation kits. These metrics have enabled our team to use whole genome sequencing to track every SARS-CoV-2 variant, vaccine-resistant influenza strains, and mpox novel lineages in Nevada using wastewater. Here we demonstrate the utility of a new sequencing panel for 200 pathogens at high genome coverage and depth

Result: Wastewater surveillance using our new NGS panel with the corresponding bioinformatic tools can provide surveillance (quantification and variant identification) of several key pathogens responsible for respiratory infections, common and treatment-resistant sexual transmitted infections (Gonorrhea, Chlamydia, and Syphilis), fungal infections (Candida auris), and emerging diseases (Lyme and Marburg). Interestingly, viral genomes are not restricted to wastewater and we show that genomes can be present in stormwater due to a contribution from homeless populations living in tunnels and wildlife (primarily feral cats) in the area. These findings also revealed the identification of ultra-rare SARS-CoV-2 mutations in the spike protein, novel mutations in mpox, and mutations associated with treatment-resistant conditions that have never been identified in human samples.

Conclusion: Taken together, wastewater monitoring programs can be leveraged to complement public health efforts to track new and emerging pandemics.

00292 TAAP001, A Novel Gatekeeper of Adiposity and Systemic Metabolic Health

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Aims: Obesity is a disease of chronic positive energy balance leading to abnormal white adipose tissue (WAT) accumulation. While lifestyle modification, pharmacotherapy, and bariatric surgery remain as the standard of care, emerging data raises concern about the limited long-term efficacies and undesirable side effects. Interestingly, recent dominant view suggests WAT expandability is highly dependent on the growth of new blood vasculature and concomitant differentiation of resident adipogenic progenitor cells into functional adipocytes. Thus, molecular mediators regulating angiogenesis and adipogenesis emerged as attractive therapeutic targets. We recently identified TAAP001 as an attractive novel therapeutic target to limit excessive adiposity.

Methodology: Age-matched wild-type (WT) and TAAP001-deficient mice were subjected to diet-induced obesity. Following the endpoint necropsy, we processed WAT for histological staining, immune profiling, transcriptome, and proteome studies. Adipose explants from 4-week-old mice were collected and subjected to ex vivo cultures to recapitulate in vivo findings. In addition, cellular and molecular mechanism modulating TAAP001-mediated adipose remodeling was validated through adipose stromal-vascular cell fraction (SVF) and mouse embryonic fibroblast (MEF) isolated from matched WT and TAPP001-deficient littermates.

Result: TAPP001-deficient mice suffer from significant post-natal development delay and lower post-natal survival rates compared to their WT littermates. We also observed significantly lower body mass and attenuated adipose development. Histological analyses suggested defective adipose angiogenesis and abnormal de novo adipogenesis in the TAPP001-deficient mice. Mechanistically, TAAP001 exerts its functions by modulating a context-dependent transforming growth factor β1 (TGFβ1) signaling pathway. TAAP001 promotes pre-existing endothelial cells to undergo angiogenesis by activating the TGFβ1-Smad1/5/8 signaling axis. LRG1 also facilitates progenitor cells to differentiate in mature adipocytes by promoting the expression of CCAAT/enhancer-binding protein δ (C/EBPδ) which drives peroxisome proliferator-activated receptor γ (PPARγ). Interestingly, intra-adipose administration of adenovirus-associated virus serotype 8 (AAV8)-mediated shRNA targeting the TAAP001 gene appears to be a viable therapy to limit excessive adipose expansion and helps to prevent obesity-associated metabolic changes.

Conclusion: The unmet medical challenges and raising obesity epidemic had renewed interest in the identification of new targets and the development of new single-/multi-target adipose-centric pharmacotherapeutics. Here, we present TAAP001 as a novel therapeutic candidate to attenuate adipose expandability by limiting angiogenesis and adipogenesis. We believe that our work provided the

early foundations for further development of a novel anti-adiposity candidate effective in long-term suppression of adipose expansion.

00293 Community Facilitator Led Participatory Learning and Action (PLA) Women's Groups to Improve Infant Feeding, Care and Dental Hygiene Practices in South Asian Infants Aged < 2 Years in East London – A Study Protocol

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Aims: The NEON programme aims to collaborate with South Asian (SA) families using the Participatory Learning and Action (PLA) approach to optimize infant feeding and care in SA infants aged <2 years in East London. Effective intervention in early life in these ethnic groups has great potential to reduce the incidence of short- & long-term health inequalities.

Methodology: PLA is an iterative community engagement process led by multilingual facilitators who support participants through identifying contextual issues, designing strategies, implementing strategies and subsequently evaluating those strategies.

A 3-arm single blinded pilot feasibility cluster randomized controlled trial (RCT) across 2 London boroughs: Tower Hamlets and Newham is being conducted. Randomization occurred at the ward level. 6 wards with the greatest number of South Asian residents were selected. These were randomized to receive one of the three arms: usual care, face-to-face women's group PLA cycle or online women's group PLA cycle study arm. Participants were recruited via snowballing through community facilitators, NHS staff (HVs, GPs, or Midwives). Interventions was delivered by trained multi-lingual community facilitators. Data was collected from both the intervention and control arm throughout at three different time points – baseline, end of PLA cycle meetings and at 6 months follow-up from baseline. Measures such as recruitment and retention of trial participants, intervention support and acceptability will be analyzed using mixed-methods to understand intervention and trial feasibility.

Result: We recruited 253 participants (206 – Newham, 57 - Tower hamlets). Throughout the 14-week PLA meeting cycle a dropout rate of 40% (45% - Newham, 34% - Tower Hamlets) was observed. We had an overall retention rate of 60%, 71% mothers/eligible participants consenting to the study, 40% attendance rate, 65% shared the primary outcome which was recording height and weight of their child. The intervention support with respect to content, frequency, duration, and quality of the PLA meeting sessions was observed to be good overall based on attendance levels, report forms, direct observation and feedback from participants and community researchers, with the Bangladeshi sessions performing particularly better than the other communities. This was mainly attributed to the dedication and hard work of the Bangladeshi community facilitators.

The Trial will conclude in May 2023. We will then further analyze the data collected.

Conclusion: This study will inform a definitive trial to compare the approach of utilizing community assets and champions to usual care and deliver an innovative, scalable health service model to reduce

ethnic health inequalities. This study could strengthen the case for programs that recognize socio-cultural determinants of health to improve health outcomes through interventions that are effective and acceptable by members of ethnically diverse communities.