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## **Singapore Health & Biomedical Congress 2014**

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SG-CIA-01

**Topical Tacrolimus in Endogenous Eczema and Cancer Association**

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**Background & Hypothesis:**

Topical tacrolimus, a topical calcineurin inhibitor (TCI), has been widely used as a steroid-sparing agent in eczema. There has been conflicting reports of cancer risk associated with its use. We aimed to determine if the use of TCIs in endogenous eczema was associated with development of malignancies.

**Methods:**

A retrospective cohort observational study was conducted on 66,176 patients diagnosed with endogenous eczema (including atopic dermatitis) at the National Skin Centre, Singapore between 1 January 2004 and 31 December 2012. Incident cancer development, obtained from the National Cancer Registry, was the primary outcome. Data were analysed using the Cox proportional hazards model.

**Results:**

The hazard ratios for overall development of malignancies, after adjusting for sex, age, ethnicity and use of systemic immunosuppressants, were 0.76 (95% CI, 0.42-1.37;  $P = 0.356$ ) for tacrolimus-exposed and 1.11 (95% CI, 0.53-2.35;  $P = 0.777$ ) for pimecrolimus-exposed versus unexposed patients, respectively. Lymphoid leukaemia was the only cancer found to be significantly associated with tacrolimus use (HR = 8.06, 95% CI, 2.19-29.72;  $P = 0.002$ ). All affected patients had young-onset B-cell leukaemia, and subgroup analysis of paediatric patients (below 16 years) revealed a significant association between tacrolimus use and B-cell leukaemia (HR = 26.27, 95% CI, 5.16-134;  $P < 0.0001$ ) after adjusting for sex, age, ethnicity, use of systemic immunosuppressants and eczema severity. A limitation of the study was the low incidence of B-cell leukaemia (3 cases/3537 person-years in tacrolimus-exposed cohort and 3 cases/65,156 person-years in unexposed cohort).

**Discussion & Conclusion:**

There was no significant association between exposure to TCIs and overall development of malignancies among patients with endogenous eczema. However, use of topical tacrolimus may be associated with an increased incidence of young-onset B-cell leukaemia among paediatric patients.

**SG-CIA-02**

**Resect and Discard (RD) Strategy for Colonic Polyps: An Asian Experience, Are We Ready?**

**CTW CHIA<sup>1</sup>, SKK TSAO<sup>1</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

The current practice of routinely resecting all diminutive (1-5 mm) and small (6-9 mm) colonic polyps and submitting them for histopathologic assessment may not be cost-effective. The resect-and-discard (RD) strategy has been proposed to reduce retrieval of diminutive and small polyps for histology (thought not to have advanced histologic features). In this cross-sectional study, we aim to find the prevalence of small and diminutive polyps resected that shows advanced histologic features such as high grade dysplasia (HGD) or carcinoma and determine if RD policy is feasible in the local tertiary setting.

**Methods:**

Data was retrieved from January to December 2009 with assistance from the pathology department to identify all submitted colonic polyp specimens. Each patient also had their colonoscopy report(s) and detailed histology report reviewed by 2 separate colleagues for data consistency.

**Results:**

There were a total 1482 polypectomy specimens retrieved for histology from 871 patients. The colonic distribution of the polyps was 45.4% right-sided, 46.1% left-sided and 8.5% rectal. There were 844 diminutive polyps, 447 small polyps and 191 large polyps with proportion of HGD being 18.7%, 37.6% and 56.5% respectively. The percentage of HGD present in these polyps was relatively high. There were no concurrent carcinomas seen in all polyps.

**Discussion & Conclusion:**

These findings showed that a significant proportion of diminutive polyps (18.7%) and small polyps (37.6%) harboured features of HGD, which is much higher than current literature. Based on size alone without the aid of image enhanced endoscopy (IEE), we find that RD strategy is not readily applicable in our local setting.

SG-CIA-03

**Sarcopenic Obesity (SO): Consideration of Fat Mass Beyond Lean Muscle in Functional Performance Limitations in Older Adults**

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**Background & Hypothesis:**

Skeletal muscle may be negatively influenced by the proinflammatory milieu associated with visceral fat, while the loading effect of obesity may enhance muscle anabolism. We set out to examine association of sarcopenic obesity (SO) with metabolic deregulation and relationship with functional performance limitations compared to obesity and sarcopenia alone.

**Methods:**

We studied 113 community-dwelling, cognitively-intact, well older adults >50 years. Clinical, demographic, anthropometric data and physical performance measures (short physical performance battery (SPPB) and chair-stand test) were collected. Blood biomarker and muscle mass measurements were performed. Standardised EWGSOP-sarcopenia and NCEP-obesity definitions were used. Univariate analysis and multivariable regression modeling were performed.

**Results:**

A total of 22.1% of study subjects were sarcopenic, 45% were obese and 13.3% were sarcopenic obese. Age, gender and hypertension prevalence (among cardiometabolic factors) significantly differed among SO versus non-SO subjects. There was no significant association of SO with metabolic blood biomarkers. They had lower mood and performed poorer on chair-stand test (2.7 +/- 4.5 SO vs. 3.7 +/- 0.6 no-SO) and SPPB (9.7 +/- 3.2 SO vs. 11.5 +/- 0.9 no-SO),  $P < 0.05$ . Multivariable regression models with sarcopenia, obesity and SO phenotypes were separately performed and SO was found to best predict functional performance abilities on SPPB ( $B = -1.63$ ,  $t = -3.81$ ,  $P < 0.001$  for SO,  $B = -1.06$ ,  $t = -2.96$ ,  $P < 0.001$  for sarcopenia and  $B = -0.43$ ,  $t = -1.49$ ,  $P = 0.14$  for obesity phenotype respectively) with model accounting for 20.2% of variance.

**Discussion & Conclusion:**

SO represents a distinct phenotype (“obesity paradox”) in older adults with performance limitations beyond sarcopenia-related lean mass alone. Further study of underlying pathogenic mechanisms will inform of specific biomarker-clinical phenotype for targeted interventions in future active ageing programmes.

SG-CIA-04

**Alcohol Handrubs are Effective for the Removal of Methicillin-resistant *Staphylococcus Aureus* on Healthcare Staff's Hands**

**A CHOW<sup>1</sup>, BF POH<sup>1</sup>, B ANG<sup>1</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Healthcare-associated infections (HAI) threaten the health of millions of patients around the world annually. HAIs are preventable through good hand hygiene. There is limited evidence on the effectiveness of different protocols on the removal of specific pathogenic organisms including methicillin-resistant *Staphylococcus aureus* (MRSA).

**Methods:**

We conducted a randomised controlled trial in the general wards of a 1300-bed tertiary care hospital, to compare the effectiveness of removal of hand carriage of MRSA and methicillin-sensitive *Staphylococcus aureus* (MSSA) using 3 hand hygiene protocols: 1) alcohol handrubbing covering all hand surfaces, 2) alcohol handrubbing using standard 7-steps, and 3) chlorhexidine handwashing. Hand samples were obtained from 60 medical and 60 nursing staff, before and after hand hygiene. Blinded bacterial evaluations were performed.

**Results:**

Postpatient contact but prehand hygiene, 4.2% of nurses and 2.5% of doctors carried MRSA on their hands, whilst 3.3% of nurses and 3.3% of doctors carried MSSA. After adjusting for hand hygiene protocol and staff category, MRSA- and MSSA-carriage were reduced by 88.4% (adj OR: 0.116, 95% CI, 0.014-0.947,  $P = 0.0444$ ) and 88.2% (adj OR: 0.118, 95% CI, 0.014-0.955,  $P = 0.0452$ ) respectively. The 2 alcohol handrubbing protocols were not different from chlorhexidine handwashing in the removal of MRSA (alcohol 1: adj OR: 1.536, 95% CI, 0.244-9.666; alcohol 2: adj OR: 2.098, 95% CI, 0.364 -2.083) and MSSA (alcohol 1: adj OR: 1.000, 95% CI, 0.192-5.214; alcohol 2: adj OR: 1.000, 95% CI, 0.192-5.214).

**Discussion & Conclusion:**

Alcohol handrubbing and chlorhexidine handwashing are effective for the removal of MRSA and MSSA on healthcare staff's hands during routine patient care in busy general wards.

SG-CIA-05

**Vitamin D Insufficiency is Associated with Endothelial Dysfunction in Type 2 Diabetes Mellitus: The DIMENSION Study**

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**Background & Hypothesis:**

Vitamin D insufficiency (25-hydroxyvitamin D (25(OH)D) <30 ng/mL) (LVD) in patients with type 2 diabetes mellitus (T2DM) has been associated with endothelial dysfunction and subsequent higher cardiovascular risk. We aim to evaluate the prevalence of LVD and its association with endothelial dysfunction in our Asian T2DM patients.

**Methods:**

We recruited 104 T2DM patients with eGFR >30 mL/min/1.73m<sup>2</sup> from a tertiary centre between August 2012 and December 2013. Demographic profile, blood pressure, BMI, 25(OH)D, calcium, parathyroid hormone, creatinine, HbA1c, lipid profile, and endothelial function (inferred from high sensitivity C-reactive protein, E-selectin and the reactive hyperaemia index (RHI) using peripheral tonometry (RHI-EndoPAT) were measured concurrently. Patients with LVD were compared to patients with 25(OH)D ≥30 ng/mL (NVD) using Student's t-test or Kruskal-Wallis test. All statistical tests were conducted at 5% level of significance.

**Results:**

Of the 104 patients screened, 81 (77.8%) had 25(OH)D <30 ng/mL. The median 25(OH)D in LVD was 18.0 (IQR: 9.0) ng/mL compared to 37.0 (IQR: 6.0) ng/mL in NVD ( $P < 0.0001$ ). The mean age was lower in LVD:  $54.5 \pm 9.3$  years versus  $61.8 \pm 5.2$  years in NVD ( $P = 0.0007$ ). The mean total cholesterol and LDL-C were higher in LVD:  $4.5 \pm 1.2$  mmol/L versus  $3.8 \pm 0.5$  mmol/L and  $2.5 \pm 0.8$  mmol/L versus  $2.0 \pm 0.4$  mmol/L, respectively ( $P = 0.01$ ). The median RHI was lower in LVD: 0.68 (IQR: 0.40) versus 0.92 (IQR: 0.42) in NVD ( $P = 0.019$ ) and mean E-selectin was higher in LVD:  $50.9 \pm 24.3$  versus  $38.5 \pm 25.4$  in NVD ( $P = 0.04$ ).

**Discussion & Conclusion:**

There is a high prevalence of LVD in our patients with T2DM. An association between Vitamin D insufficiency and endothelial dysfunction was seen in this preliminary study analyses.

**SG-CIA-06**

**Transarterial Chemoembolisation in Hepatocellular Carcinoma: Data on Survival and Side Effects**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

For operable hepatocellular carcinomas (HCC), resection, transplantation and thermo ablation (for <3 cm lesions) are curative options. For inoperable lesions which do not satisfy transplant criteria, transarterial chemoembolisation (TACE) or selective internal radiation therapy (SIRT) remains the primary mode of treatment. TACE is shown to improve survival. TACE is not free from morbidity and post-TACE syndrome is a common complication. Our aim of the study was to analyse survival rates and risk factors for side effects in patients undergoing TACE for HCCs.

**Methods:**

A retrospective study was carried out and 306 TACE sessions in 149 patients done from 2001 to 2013 were included in the study.

**Results:**

Out of the complications reported, post-TACE fever was the commonest documented complication noted with 83 (27.12%) reported cases postprocedure. Other common complications noted were groin hematoma 17 (5.55%), contrast nephropathy 6 (1.96%), pleural effusion 4 (1.3%) and liver abscess 4 (1.3%). TACE-related mortality was 4 (2.28%). Smaller tumour size, unifocal disease and absence of liver failure were associated with a lower risk of side effects following the procedure. The relative risk of side effects increases with each session of TACE in a single patient. In patients undergoing TACE, 12-month survival was 61.74%. Primary tumour size and Child-Pugh classification were found to be significant factors, which influence the survival.

**Discussion & Conclusion:**

TACE remains a formidable option in management of unresectable HCC with significant improvement in survival.

SG-CIA-07

**Noval Classification of Vascular Channel Filling in Polypoidal Choroidal Vasculopathy Predict its 5-year Clinical Outcomes**

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**Background & Hypothesis:**

Polypoidal choroidal vasculopathy (PCV) has high prevalence among Asians, with variable clinical course and visual prognosis. Confocal scanning laser ophthalmoscopy (CSLO) allows precise measurement of filling times for the microvasculature of PCV. We describe a novel classification system for PCV subtypes based on CSLO indocyanine-green (ICG) angiography, and correlate it with clinical outcomes.

**Methods:**

Interventional longitudinal 5-year study of 107 consecutive patients with PCV. Vascular filling times were independently graded by 2 consultant ophthalmologists. Risk factors for clinical outcomes were analysed using multivariate analysis.

**Results:**

Twenty-four eyes (22.4%) demonstrated interconnecting channels (Group 1) while 83 (77.6%) demonstrated branching vascular networks – 24.3% with high flow (Group 2) and 53.3% with low flow (Group 3). The vascular filling times were shortest in Group 1 and longest in Group 3 (22.9s vs. 24.0s vs. 28.6s). At all review periods, the highest rate of moderate visual loss occurred in Group 3, followed by Groups 2 and 1 (41.2% vs. 11.1% vs. 0% at 5 years,  $P < 0.001$ ). Good visual outcomes ( $\geq 6/12$ ) were highest in Group 1, compared to Groups 2 and 3 (83.3% vs. 62.5% vs. 20%,  $P = 0.034$ ). Independent risk factors for visual outcomes were PCV group (odds ratio [OR]: 15.7,  $P = 0.015$ ) and age (OR: 1.06,  $P = 0.04$ ).

**Discussion & Conclusion:**

PCV may be differentiated based on its vascular filling times using CSLO angiography. The clinical and visual outcomes are reliably predicted by this classification, demonstrating that PCV consists of distinct, previously unrecognised, clinical subtypes. This classification system has application in clinical practice and multicentre randomised trials.

**SG-CIA-08**

**Dual-energy CT of the Brain in the Evaluation of Cerebral Infarction**

**HS TEH<sup>1</sup>, MML TAN<sup>2</sup>, S SRINIVASAN<sup>1</sup>, TW CHOY<sup>1</sup>, KK YEOW<sup>1</sup>**

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**Background & Hypothesis:**

Early infarct may be difficult to visualise on conventional single-energy CT brain (SECT). Dual-energy CT (DECT) uses the attenuation differences at different energy levels for deriving additional information, such as artifact suppression, and material composition of various tissues. The aim of the study is to evaluate the value of dual-energy CT brain in the detection of cerebral infarction.

**Methods:**

Thirty-seven DECT of the brain obtained in 35 patients were included in the study. Twenty-three of these also had SECT brain acquired. Dual-source CT scanner was used to acquire images at 80 kVp and 140 kVp simultaneously. Conspicuity of ischaemic infarcts and prominence of grey white matter differentiation (GWMD) were evaluated for 80 kVp, 140 kVp as well as routine blended (mixed) images, using 5-point Likert scale. Image quality was assessed by comparing base of skull related artefact between the DE and SE images.

**Results:**

Conspicuity of ischaemic changes was significantly higher for 140 kVp images compared with routine images. GWMD was more prominent, and the presence of edema which resulted in loss of GWMD was better observed in 80 kVp compared to routine images. Image quality was better in DECT images compared to SECT images, with less base of skull related artefact. Recent infarction showed relatively higher attenuation on 80 kVp, compared to chronic infarction.

**Discussion & Conclusion:**

DECT brain allows better detectability of infarcts and conspicuity of cerebral edema, with improved image quality. It is a potential application in the assessment of the cerebral infarction.

**SG-AH-01**

**Evaluation of Dietitians' Knowledge, Confidence and Perceptions on the Nutrition Care Process and International Dietetics and Nutrition Terminology in Singapore**

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**Background & Hypothesis:**

Nutrition care process (NCP) is a systematic approach to provide nutrition care while International Dietetics & Nutrition Terminology (IDNT) is a standardised language to document the care. Both guide dietitians in providing high quality nutrition care but have yet been widely implemented in Singapore. This study aims to evaluate dietitians' current practice, knowledge, confidence and perceptions on the understanding and implementation of NCP/IDNT in Singapore.

**Methods:**

Survey participation was publicised through professional association and various hospital dietetics managers. Sixty-seven dietitians voluntarily participated in this anonymous electronic 22-item survey.

**Results:**

Fifty-seven percent (n = 38) reported that NCP/IDNT has been partially or fully implemented in their organisation with 63% (n = 24) implementing it for less than a year. Over half agreed that they were familiar with NCP (63%, n = 42) and IDNT (55%, n = 37), supported with more than 60% demonstrating good knowledge of NCP/IDNT. Fifty-two percent (n = 35) rated NCP/IDNT implementation as important. Most agreed that NCP/IDNT were applicable to their area of practice (71%, n = 48), however only 18% (n = 12) perceived implementation to be easy. Main concerns highlighted were training hours needed (n = 48), knowledge deficit (n = 36) and need to change current practices (n = 35). Twenty-one percent (n = 14) reported being not confident to implement NCP/IDNT while 34% (n = 23) reported being neutral. Electronic system (n = 10), training workshops (n = 9) and access to NCP/IDNT manual (n = 8) were the main strategies proposed to increase confidence level.

**Discussion & Conclusion:**

Low confidence in implementing NCP/IDNT was identified despite recognition of its importance and applicability amongst dietitians in Singapore. More support and resources are required to increase confidence and encourage adoption.

SG-AH-02

**Progressive Volume Deficits in Specific Subfields of the Hippocampus in Schizophrenia: A Cross-sectional and Longitudinal Study**

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**Background & Hypothesis:**

Volume deficits of the hippocampus in schizophrenia have been consistently reported in many magnetic resonance imaging (MRI) studies. In these studies, the hippocampus has been examined as a single unit, disregarding its cellularly and functionally distinct subfields. Here, we sought to determine whether the volume deficits: 1) are initially confined to specific hippocampal subfields, 2) extend to other hippocampus subfields over the course of illness, and 3) correspond with clinical symptom progression.

**Methods:**

A cross-sectional MRI study of 109 patients with schizophrenia (aged 27.8 ± 5.0 years) and 61 healthy controls (aged 27.2 ± 4.7 years) was first performed; a novel probabilistic method based on ultra high resolution MRI images of postmortem brains was applied to segment the hippocampus into 12 cytoarchitecturally-defined subregions. A longitudinal follow-up (time interval 5.0 ± 1.1 years) was then performed in a subset of the initial cohort. Linear mixed effects modelling (to account for the tight relationship among the subfields) was used for hypotheses testing.

**Results:**

Cross-sectionally, patients with schizophrenia, compared to healthy controls, showed significant initial volume deficit only in the left CA1 subfield ( $t = -3.57$ ,  $P = .0004$ ), and to a smaller extent the right CA1 ( $t = -1.81$ ,  $P = .07$ ). Longitudinally, patients showed progressive bilateral volume decline in other subfields besides CA1: the CA3 and dentate gyrus (subfields along the trisynaptic signalling pathway). The left CA1 atrophy predicted the increased negative symptom severity over time ( $r = .56$ ,  $P = .0005$ ).

**Discussion & Conclusion:**

We demonstrate for the first time the differential trajectories of hippocampal subfield-specific volumetric abnormalities in schizophrenia. Current findings could serve as an *in vivo* biomarker for monitoring of disease progression and cellularly-targeted therapeutic interventions.

**SG-AH-03**

**Predictors of Treatment Dropout: A Survival Analysis of Pathological Gambling Patients Treated in a Singapore Addictions Clinic**

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**Background & Hypothesis:**

Studies examining treatment outcomes of pathological gamblers have associated demographic and clinical correlates with treatment dropout. This exploratory study examined predictors of treatment dropout, of which we hypothesised that previous treatment and baseline gambling severity would be associated with dropout.

**Methods:**

Participants comprised 911 outpatients, seen at the Singapore National Addictions Management Service (NAMS) from April 2009 to March 2013, and diagnosed with pathological gambling. Variables included demographics, baseline gambling and quality of life measures. Data was retrospectively reviewed from medical records and questionnaires administered as part of a treatment monitoring programme. Time-to-dropout was defined as time between first visits to when outpatients dropped out (i.e. no attendances within 6 months from their last consultation) within a 1-year window. Cox regression analysis for survival data was conducted, with treatment dropout and time-to-dropout as survival outcome and time variables respectively.

**Results:**

Participants were predominantly Chinese (90.1%), males (89.4%), with a mean age of 39.6 years. Mean time-to-dropout was 151.0 days. Lower age and having a secondary education or below were associated with higher likelihood of early dropout, while having a diagnosed psychiatric comorbidity, previous treatment for gambling problems and online gambling participation were associated with lower dropout likelihood.

**Discussion & Conclusion:**

Our hypothesis was supported, with additional findings. Our findings highlight the efficacy of addressing comorbid psychiatric disorders in tertiary treatment settings such as NAMS, and the need for attention to be paid to particular demographics, in particular lower educated and younger patients. Additional research should assess latent differences (e.g. personality), motivation and other factors affecting treatment dropout.

**SG-AH-04**

**Return-to-work Coordination – A Model of Care for Return to Work in Singapore**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Return-to-work (RTW) coordination has been found to be an important facilitator to assist workers to remain at or return to work safely after an injury overseas. The study seeks to determine the effectiveness of RTW in facilitating the return to work process for injured workers in Singapore.

**Methods:**

A randomised controlled trial was used. One-hundred-and-sixty injured workers in a general hospital were randomly allocated to either control (usual hospital care) or intervention (assigned an occupational therapist RTW coordinator) group. The OT RTW coordinator closely supported and monitored RTW arrangements and proactively liaised with employers and healthcare professionals on RTW solutions for the injured worker. The RTW coordinator also conducted functional assessments and provided recommendations on work accommodations. Outcome measures at 3 and 9 months postinjury included days taken to first RTW, RTW duties, work injury notification and quality of life.

**Results:**

At 3 months postinjury, workers in the intervention group returned to work 10 days earlier than the control group (control = 48 days, intervention = 38 days,  $P = 0.029$ ). A higher proportion of workers in the intervention group returned to modified jobs (control = 4.1%, intervention = 13.7%,  $P = 0.004$ ). Work injury notification rate in the intervention group was significantly higher than the control group (control = 72%, intervention = 89%,  $P = 0.009$ ). There was no significant difference in the work status of workers between the 2 groups at 9 months.

**Discussion & Conclusion:**

Incorporating RTW coordination into current RTW services is effective in facilitating the RTW process for injured workers. This could be a potential model of care for RTW in Singapore.

**SG-AH-05**

**Cervical Movement Sense: Normative Data for Clinical Tool**

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**Background & Hypothesis:**

Abundant research studies had examined the cervical movement sense (CMS) in chronic neck pain and whiplash population using advanced equipment but none has developed normative data. Our primary aim was to create a simple clinical tool that can assess CMS without using advanced equipment. The secondary aim was to establish normative values for time, frequency of error and magnitude of error for different patterns, speed and directions of the test.

**Methods:**

Design: Prospective observational study. Intervention: 43 healthy subjects were fitted with a laser on the head and asked to trace 2 randomised patterns left and right, as accurately and as fast, and as accurately as they could, by moving the laser with head. The frequency and magnitude of error were assessed. Two methods of assessment, on-site and video analysis were compared for intertest and inter-rater reliability (n = 10) of video analysis was performed.

**Results:**

The 2 assessment methods demonstrated high intertest and video method had high inter-rater reliability. Subjects made more errors when tracing the figure 8 pattern compared to the zigzag pattern and when instructed to perform the task faster. There was no learning effect or differences when performing the task to the left or right.

**Discussion & Conclusion:**

Normative ranges for frequency of error and timing for task completion are proposed. Assessment of CMS is feasible in a clinical setting. Future research is needed to determine age- and gender-specific normative and pathological ranges. This protocol also needs to be tested for validity against a known gold standard method.

SG-AH-06

## Stress and Burnout Among Healthcare Professionals Working in a Mental Health Setting in Singapore

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### Background & Hypothesis:

High levels of stress in healthcare professionals have been shown to be associated with decreased work efficiency. To date, there has been no reported study that investigates the extent of stress and burnout in mental healthcare professionals working in Singapore. The aim of the study is to investigate the extent of stress and burnout experienced by mental healthcare professionals in Singapore, and to identify demographic characteristics that are associated with stress and burnout.

### Methods:

This study utilised a cross-sectional survey design. A total of 220 healthcare professionals completed the survey. The survey includes measures of participants' demographic details and published scales that measure stress and burnout. Independent t-tests, one-way anova and multiple regression analyses were conducted to analyse the data.

### Results:

Level of stress of healthcare professionals in Singapore was higher than the normative data collected in United States for healthy adults. They reported similar level of stress as nurses in Taiwan, and similar level of exhaustion and lower level of disengagement when compared to healthcare professionals in Australia and UK. Comparing the means across different demographic variables also revealed that healthcare professionals with lower income level, and with less than 5 years of working experiences, reported higher level of stress and burnout.

### Discussion & Conclusion:

Results of this study highlighted the extent of stress and burnout experienced by healthcare professionals in Singapore, and deepened our understanding of factors associated with stress and burnout. These findings provide the foundations for future studies designed to better support healthcare professionals in Singapore.

SG-NA-01

## Effectiveness of Interventions to Reduce Physical Restraint in Psychiatric Settings: A Systematic Review

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### **Background & Hypothesis:**

Physical restraints are commonly employed by nurses to manage patients' challenging behaviour and to prevent falls despite the adverse outcomes associated with their use. Though there is a worldwide move towards the reduction of restraints, the effectiveness of non-pharmacological alternatives to restraints in psychiatric settings remains to be investigated. This study aims to critically review the literature to synthesise the best available evidence on non-pharmacological interventions to reduce the use of restraints in psychiatric settings.

### **Methods:**

An extensive literature search was undertaken over multiple databases and libraries using specified keywords and related terms to retrieve published and unpublished studies. Primary studies in line with the eligibility criteria such as adults with acute and chronic mental health conditions residing in mental health settings were considered. Retrieved articles were critically appraised and only articles deemed to be of adequate methodological rigour were included in the review.

### **Results:**

Across 26 articles, the evidence suggested that the use of restraints can be safely reduced with multi-interventions involving close monitoring of patients' conditions, interventions tailored to patients' needs, as well as staff education and administrative support. In addition, the multi-intervention approach also improved staff's acceptance about alternatives to restraint, reduced the occurrence of patients' falls, and improved the behavioural symptoms and cognition among patients with mental health conditions.

### **Discussion & Conclusion:**

Multi-interventional effort could support the reduction of physical restraint use in psychiatric settings. Findings could inform mental health professionals of alternatives to the utilisation of physical restraints to manage patients' challenging behaviour and to prevent falls.

SG-NA-02

## Examining the Effectiveness of a Peer-Led Self-Management Programme for People With Schizophrenia: A Randomised Controlled Trial

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### Background & Hypothesis:

Peer-led self-management programmes (PLSMP) have been used widely, aiming to empower psychiatric patients in achieving recovery to maintain hopeful, self-responsible and functional lives. However, there lacks credible research evidence specific for its effectiveness for schizophrenia. This study hypothesised that participants with schizophrenia who receive PLSMP would report significant improvements in their level of empowerment, perceived recovery, medication adherence, perceived social support and symptom severity after 6 months of follow-up.

### Methods:

A randomised controlled trial was conducted at 3 community psychiatric rehabilitation centres. A sample of 122 for both control and intervention groups was recruited. The PLSMP was developed based on a meta-analysis conducted, and implemented in the intervention group. Self-rated and clinician-rated questionnaires were used to measure the outcomes of empowerment, medication adherence, perceived recovery, social support and symptom severity at pretest, post-test immediate, and post-test at 6-month follow-up.

### Results:

Per protocol analysis using Repeated Measures ANOVA was conducted on 56 participants from the intervention group and 38 from the control group. At 6 months follow-up, significant improvements were found in intervention group participants' level of empowerment ( $F(1, 92) = 46.335, P < 0.001$ ), perceived recovery ( $F(1, 92) = 46.729, P < 0.001$ ), social support ( $F(1, 92) = 69.899, P < 0.001$ ), and symptom severity ( $F(1, 92) = 72.596, P < 0.001$ ).

### Discussion & Conclusion:

The significant results suggested that PLSMP is an effective programme to support patient's recovery in rebuilding hope and self-responsibility, promoting practical wellness maintenance and social support, and improving active role in their self-management of condition. This programme will further support patient's community remission through active self-management.

SG-NA-03

**Predetermined Postoperative Surveillance in General Surgical Ward: Are We Efficient?**

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**Background & Hypothesis:**

The current frequency of postoperative surveillance practised at the general wards following the return from the recovery room is ritualistic and resource-demanding. The benefit of intense monitoring in our local context is unclear. The study aims to describe our practices and determine clinical predictors of physiological deterioration.

**Methods:**

The study is a prospective case control design. We followed up postoperative patients up to 6 hours after admission to our surgical ward between February and April 2014. The cases were patients whose aggregated vital sign scoring (an early warning tool) was consecutively 0; the controls were patients who scored otherwise. We modeled clinical factors that may predict physiological deterioration postoperatively such as age, ASA status, intraoperative events, and prior monitoring location in a logistic regression. The monitoring frequency and subsequent adverse events were also recorded.

**Results:**

The study analysed 80 patients undergoing diverse surgical procedures with median age and ASA status 61.4 years and 3 respectively. About 60% were prescribed hourly monitoring, of which 16.3% were fully complied (n = 8). Only 41.3% hourly-monitored exhibited physiological derangement and were mild, commonly hypotension and tachycardia. No patients escalated to higher level of care thereafter. Patients who were earlier monitored in high dependency appeared less likely to develop physiological derangement (OR: .25 95% CI, 0.03-1.89) compared those returned direct. No prior predictors were statistically significant.

**Discussion & Conclusion:**

The study queried the validity of a blanket surveillance frequency when the patients were deemed safe to leave the recovery room. Poor compliance further implied such inefficiencies and a need for an individualised postoperative care.

**YIA-BSTR-01**

**The Interplay Between Musical Training and Working Memory Performance**

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**Background & Hypothesis:**

Musical training has been shown to enhance cognitive domains in a wide variety of areas such as IQ, verbal, attention span and visuospatial abilities. Research suggest that the working memory might play a role in mediating the cognitive benefits seen in musicians. Thus, the present study aimed to investigate the cognitive benefits of musicians and non-musicians using the framework of Baddeley's (2000) working memory model.

**Methods:**

Sixty-nine participants from James Cook University (Singapore) were recruited through convenience sampling. Participants completed a demographic questionnaire and an Advanced Measures of Music Audiation test (Gordon, 1989) to confirm the self-reported data of musicians. Then, participants completed 6 experimental tasks designed to measure the different aspects of working memory: verbal memory, visuospatial memory, and attentional capacity. The study was approved by the human research ethics committee.

**Results:**

The results revealed musicians outperformed non-musicians only in 2 working memory tasks, which involved visual-motor coordination, visual perceptual speed, sequencing skills, rote learning, and spatial and motion memory. No benefits were found regarding verbal memory.

**Discussion & Conclusion:**

This study provides evidence that musical training produces positive effects related to specific aspects of visuospatial memory and attentional capacity. According to Cheong et al (2013), persons with early cognitive impairment face risk of diminished mental capacity. This study opens doors to new research on if musical training could help promote cognitive functioning in those with early cognitive impairment. This will help to promote patients' reintegration into community living (Saifudin, Eu, & Hendriks, 2013).

**YIA-BSTR-02**

**A Composite Risk Score of Novel Biomarkers Predicts Arteriopathy in Predialysis and Dialysis Children**

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**Background & Hypothesis:**

Children with chronic kidney disease (CKD) have increased risk of death from cardiovascular disease. This study explored novel biomarkers for early detection of arteriopathy among high-risk children with CKD.

**Methods:**

A total of 16 predialysis CKD stages 3 to 4 (Group 1), and 25 CKD stage 5D patients (Group 2) were recruited. An arteriopathy score was derived using B-mode ultrasonography performed on carotid, brachial and femoral arteries. Ambulatory blood pressure (ABP) monitoring was performed. Traditional biomarkers such as uric acid, calcium, phosphate and parathyroid hormone; and novel biomarkers such as serum GDF-15, ST2, hsTNT, homocysteine, ADMA, hsCRP, NT-proBNP and urine NGAL were examined. An ROC model using the odds ratios as the risk-score from a multivariate logistic regression on the univariate significant parameters was developed.

**Results:**

All patients, mean age  $16.2 \pm 6.6$  years and CKD duration  $4.2 \pm 3.7$  years, had at least 1 abnormal arteriopathy parameter (median arteriopathy score = 4). Only pulse wave velocity/height [PWV(ht)] was significantly different between Group 1 ( $3.3 \pm 0.7$  m/s) and Group 2 ( $4.1 \pm 0.9$  m/s) ( $P = 0.006$ ). Parameters which were associated with abnormal PWV (ht) (defined as  $\geq 3.74$  m/s) were uric acid, ABP score  $\geq 5$ , GDF-15, hsTNT, ADMA and NTproBNP. The risk score model developed including these parameters had AUC of 0.806. Using a threshold score of 15, the sensitivity, specificity, PPV and NPV were, 76.2%, 85.0%, 84.2% and 77.3% respectively.

**Discussion & Conclusion:**

Arteriopathy abnormalities were detected in all patients with CKD, with significant worsening of vascular reactivity as measured by PWV in advanced CKD stage 5. The composite risk score model developed is a useful predictor of severe arteriopathy in CKD.

**YIA-BSTR-03**

**Nanoparticle Hybrid Bone Scaffold for Human Mesenchymal Stem Cells Differentiation into Osteoblasts: A Novel Bone Regeneration Therapy**

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**Background & Hypothesis:**

Bone grafts are currently being employed in Singapore to remedy fractures and enhance new bone formation. However, implantation of large grafts has slow healing rate and even result in apoptosis under poor vascularisation. With the advancement in nanotechnology applications, the ability to imitate bone extracellular matrix and incorporate other biomolecules could provide a better alternative to bone regeneration therapy. This study aims to determine if poly caprolactone/silk fibroin/hyaluronic acid/minocycline hydrochloride (PCL/SF/HA/MH) nanoparticle hybrid scaffold would be optimal for human mesenchymal stem cells (hMSCs) to proliferate on and subsequently differentiate into osteoblasts to produce new bone.

**Methods:**

We fabricated PCL, PCL/SF, PCL/SF/HA and PCL/SF/HA/MH scaffolds using the electrospaying method. The scaffolds were then characterised for nanoparticle morphology by SEM, hydrophilicity and FT-IR analysis. The cells on the scaffolds were studied using cell-proliferation, SEM and CMFDA analyses. Osteogenic differentiation was confirmed by using osteocalcin protein expression and alkaline phosphatase activity. Further mineralisation study was performed by ARS staining.

**Results:**

The scaffolds showed nanoparticles with diameters ranging from 1.5 to 5 mm and increased hydrophilicity with the addition of SF, HA and MH to PCL. The functional groups in the scaffolds were confirmed using FT-IR analysis. Cells interacted well with the surrounding nanoparticles in PCL/SF/HA/MH scaffold. In addition, the number of cells was significantly increased ( $P < 0.01$ ) when compared to other scaffolds. The protein expression of osteocalcin and mineralisation appear to be increased in PCL/SF/HA/MH scaffold.

**Discussion & Conclusion:**

Electrosprayed PCL/SF/HA/MH nanoparticle scaffold has provided significant increase in cell proliferation, osteogenic differentiation and mineralisation, which holds great potential for bone regeneration.

**YIA-CR-01**

**Functional Assessment of the Liver Using Hepatobiliary Magnetic Resonance Imaging: Correlation with Serum Indocyanine Green**

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**Background & Hypothesis:**

Preoperative assessment of liver functional reserve is critical to liver resection success. Indocyanine green (ICGR15) is currently favoured but gadolinium-enhanced magnetic resonance imaging (MRI) indices are gaining popularity, with studies revealing correlation between gadoxetate acid (Gd-EOB-DTPA)-based indices and liver function. Although Gd-EOB-DTPA saves more time compared to gadobenate dimeglumine (Gd-BOPTA) due to its earlier hepatobiliary phase, the latter is equally effective in detecting lesions and 10 times cheaper. We aim to relate Gd-BOPTA-based indices and ICGR15.

**Methods:**

Seventeen Chinese patients (14 male, 3 female) who underwent Gd-BOPTA-enhanced MRI were studied. Fourteen had hepatocellular carcinoma and 3 metastatic sigmoid colonic carcinoma. The mean age of diagnosis was 65 years. We calculated these signal intensity-based indices: relative enhancement of liver, pre-enhancement and postenhancement liver-to-spleen ratios, corrected enhancement of liver to spleen ratio, normalised liver-to-spleen ratio, pre-enhancement and postenhancement liver-to-muscle ratios and increased rate of liver-to-muscle ratio. Biochemical parameters were also considered: platelet count, prothrombin time, albumin, bilirubin and liver enzymes. Correlation between each index and ICGR15 was assessed via Spearman analysis.

**Results:**

Among the MRI indices, liver-muscle indices correlated more strongly with ICGR15 than liver-spleen indices, with the postenhancement liver to muscle ratio yielding the strongest correlation ( $r = -0.4488$ ,  $P = 0.1074$ ). Among the biochemical parameters, the platelet count had the strongest correlation ( $r = -0.3916$ ,  $P = 0.1661$ ).

**Discussion & Conclusion:**

Gd-BOPTA-based indices have potential for evaluating liver reserve preoperatively. Notably, they permit regional assessment of function, unlike ICGR15. Combining them with volumetry may produce a more holistic evaluation for patients undergoing liver surgery.

**YIA-CR-02**

**Implantable Cardioverter Defibrillator Use to Prevent Sudden Cardiac Death in Eligible Heart Failure Patients is Rare in Singapore**

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**Background & Hypothesis:**

Sudden cardiac death in patients with heart failure with reduced left ventricular ejection fraction (LVEF) is preventable by the use of implantable cardioverter defibrillator (ICD). We aimed to ascertain the ICD implant rate and outcomes in HF patients.

**Methods:**

Patients admitted with HF from January 2007 to December 2011 were recruited into the Heart Failure Disease Management Programme (HFDMP). We included those who were in the HFDMP for at least 1 year, or who died within 1 year while in the HFDMP. We identified those who had device implant and evaluated their outcomes.

**Results:**

We recruited 1981 patients to the HFDMP, 1719 met the study criteria. Demographics are: age  $68.2 \pm 13.3$  years, 61.3% male, LVEF  $32\% \pm 14\%$ . Coronary artery disease was the main HF aetiology (62.77%); 1150 (66.9%) had LVEF  $\leq 35\%$  upon recruitment. Only 52 (4.52%) had ICD (n = 34) or cardiac resynchronisation therapy defibrillator (CRTD) (n = 18) implant. Another 53 had pacemaker and 4 had CRT-pacing implanted. The crude average 1-year mortality was 16% (15.74% LVEF  $\leq 35\%$ , n = 181; 16.52% LVEF  $\geq 35\%$ , n = 94). There was a trend to lower 1-year mortality in patients with ICD/CRTD (n = 6, 11.5%) compared to non-ICD/CRTD (n = 269, 16.1%),  $\chi^2 = 0.793$ ,  $P = 0.373$ . Notable complications within 1 year include 1 periprocedural death, 1 skin erosion, 1 infection, and 1 failed conversion of pacemaker to CRTD.

**Discussion & Conclusion:**

There is a high 1-year mortality in HF patients. Patients with ICD/CRTD had a trend to lower mortality. This was not statistically significant likely due to the small number of ICD/CRTD implanted. Procedural complications are infrequent and outweighed by the potential benefits. However, ICD/CRTD use is rare (4.52%), thus measures to improve ICD/CRTD use in Singapore should be explored.

**YIA-CR-03**

**Difficult Intertrochanteric Fracture Variants: Morphology and Fixation**

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**Background & Hypothesis:**

Our study reports our experience with a difficult rare intertrochanteric fracture variant not described in current classification systems, its radiological morphology and potential fixation pitfalls.

**Methods:**

Over 1 year, surgically treated intertrochanteric fractures with the X-ray criterion of low intertrochanteric fracture, basicervical fracture fragments, thin or fractured lateral wall and/or greater trochanteric comminution were retrospectively reviewed. Preoperative CT scans were obtained where possible. A total of 12 patients were identified, median age of 80 years with mean follow-up periods of 6 months. Five cases underwent surgery with an intramedullary nail and 7 cases used a locking plate technique.

**Results:**

From the intramedullary nail group, there was 1 mechanical failure, 1 death from implant infection and 1 case of avascular necrosis of the femoral head. From the locking plate group, there were 3 mechanical failures, 1 implant failure despite fracture union in alignment and 1 case that died 2 weeks postoperatively from an unrelated cause. Out of the 12 patients, 9 underwent a preoperative CT scan which showed coronal plane involvement with loss of posterolateral support.

**Discussion & Conclusion:**

This intertrochanteric variant is highly unstable with a high failure rate postfixation. Initial recognition on X-ray with CT imaging is crucial in operative management.

**YIA-CR-04**

**Inflammation and the Interaction Between Anabolic-catabolic Pathways in Sarcopenia**

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**Background & Hypothesis:**

Correlations among individual biomarkers with sarcopenia remain inconsistent. This study examines interactions between markers of skeletal muscle anabolism and catabolism in sarcopenia among older adults.

**Methods:**

We studied 44 community-dwelling older adults  $\geq 50$  years. Sarcopenia was defined according to EWGSOP and examined in relation to anabolic hormones (insulin-like growth factor-1 (IGF-1) and vitamin D), biomarkers of muscle catabolism (inflammatory markers: interleukin-6 (IL-6) and C-reactive protein (CRP); and myostatin), white blood cell count, fasting glucose and lipid, and serum albumin. Anabolic-deficient state was defined as vitamin D deficient and/or serum IGF-1 below the 25<sup>th</sup> percentile of the study cohort, with hypercatabolism defined as any of IL-6 or myostatin above the 25<sup>th</sup> percentile, or CRP  $\geq 5$  mg/L.

**Results:**

A total of 19 (43.2%) subjects were sarcopenic, with trend for being older. Markers of inflammation were significantly higher in sarcopenic subjects (median IL-6: 1.80 (1.20 to 3.60) vs. 1.16 (0.67 to 2.49) pg/mL,  $P = 0.05$ ; mean white blood cell count:  $6.47 \pm 1.25$  vs.  $5.62 \pm 1.49 \times 10^9$ ,  $P = 0.05$ ). While sarcopenic subjects had lower albumin (mean albumin:  $38.0 \pm 2.8$  vs.  $39.8 \pm 2.2$  g/L,  $P = 0.02$ ), neither anabolic hormone showed a significant relationship with sarcopenia. There was no relationship between an isolated anabolic deficient or hypercatabolic state with sarcopenia. However, combined anabolic deficiency and hypercatabolism was more prevalent in sarcopenia (36.8% vs. 12.0%,  $P = 0.05$ ), associated with 14-fold higher odds for sarcopenia (multiple logistic regression OR: 14.4, 95% CI, 1.1-188.5).

**Discussion & Conclusion:**

Our findings support a multimodal approach incorporating cumulative burden of anabolic deficiency and hypercatabolism in sarcopenia that, if established in longitudinal studies, will facilitate targeted interventions to prevent or reverse sarcopenia.

**YIA-CR-05**

**Novel Central Stentoplasty – Is There Real Height and Kyphotic Deformity Correction?**

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**Background & Hypothesis:**

As a useful adjunct in the management of both osteoporotic vertebral compression and metastatic fractures, our institution developed a novel unipedicular percutaneous single stent central implantation in a vertebral body—combined with cement. This rivals the traditional bipedicular paramedian implantation of stents. There is inherent cost savings and improved safety profile with a single wound with our unipedicular approach.

**Methods:**

This retrospective review of 14 patients (11 osteoporotic; 3 metastatic), treated with central stentoplasty over a period of 9 months from July 2013 to April 2014, evaluates for vertebral height (Vh) and kyphotic angle (Ka) corrections. These were measured from patient's intraprocedural cone beam computed tomography. Anterior, middle, and posterior vertebral body heights of both the affected and referenced vertebral segments were measured. Secondary endpoints include subjective pain relief, functional and ambulatory status. In this study cohort, central stentoplasty was performed on a total of 16 vertebral levels. Procedure was performed at a mean of 7.1 days (range, 0 to 18) from date of admission.

**Results:**

The mean vertebral body reduced height ratio (taken at the middle) was 70.4% at preop, and 82.9% at postop; an improvement of 12.5%. The mean Ka was 11.3° at preop, and 7.8° at postop; a mean improvement of 3.5°. All patients showed a decrease in reported pain relief, and demonstrated clinical improvements in both functional and ambulatory status from time of admission to discharge.

**Discussion & Conclusion:**

Improved Vh and Ka radiological indicators, and clinical outcome measures were observed in our study.

**YIA-CR-06**

**Cerebrospinal Oligoclonal Band Testing for Multiple Sclerosis in Our Population**

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**Background & Hypothesis:**

Multiple sclerosis (MS) is an inflammatory disorder with diagnostic challenge due to its myriad presentations especially in the early stages. We reviewed the use of cerebrospinal fluid (CSF) oligoclonal band testing (OCB) in aiding the diagnosis of MS.

**Methods:**

CSF OCB results done in our laboratory between June 2013 and June 2014 were reviewed and compared against other CSF results and the clinical diagnoses. Statistical analysis was performed using Microsoft Excel and SPSS version 17.0.

**Results:**

There were 220 patients requiring OCB testing, with male:female ratio of 1.10 and median age of 46 years. There were 122 Chinese, 22 Indians, 23 Malays and 51 of other ethnic groups. A subanalysis of 79 patients from our hospital (female:male ratio of 0.75, median age of 47 years, with 53% Chinese, 14% Indians, 8% Malays and 25% others) showed no statistical association between presence of OCB and CSF: serum glucose, CSF protein, WBC or RBC counts (although WBC and RBC counts were higher in OCB cases). A total of 15 patients had positive CSF OCB, with 4 having final diagnosis of MS, 3 with autoimmune causes, 1 with viral encephalitis, 1 with subacute sclerosing panencephalitis, 1 hereditary cause, 2 with no diagnosis and 3 lost to follow-up. Three out of the 64 negative OCB cases had final diagnosis of MS, giving a sensitivity and specificity of 57% and 85%.

**Discussion & Conclusion:**

CSF OCB testing has a fairly good specificity but poor sensitivity in diagnosis of MS, and can only be used for supportive testing.

**YIA-HSR-01**

**Sun-related Knowledge, Attitudes and Protective Behaviours of Recreational Cyclists in Singapore**

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**Background & Hypothesis:**

Cycling is currently now the third favourite sport in Singapore. This number is expected to increase in the near future. Previous studies have found that recreational and competitive cyclists are exposed to high amounts of ultraviolet radiation. Although the incidence rate of skin cancer is relatively low, its impact on other health aspects is high and the treatment of undesired aesthetic damage is costly. The study intends to study the solar protection knowledge and attitudes of recreational cyclists in Singapore.

**Methods:**

A total of 891 recreational cyclists were recruited across Singapore for between January 2013 to December 2013. They were asked regarding their demographic information, sun-related knowledge, attitudes and behaviours. A scoring system was used to assign a knowledge, attitude and behaviour score to each child. A univariate and multivariate analysis was performed to understand the associations with weak sun protection behaviours.

**Results:**

The sun-related knowledge of our group was comparable with other studies, however, the attitude and behaviours were weaker. A large proportion of the recreational cyclists had high-risk sun-related behaviours. There was a general trend of lower scores for sun-related knowledge, attitude and behaviour for those of more advanced age. Female, a higher education status and being in a healthcare field are predictive of higher scores.

**Discussion & Conclusion:**

The sun-related knowledge, attitude and behaviours of recreational cyclists in the study group were weak in comparison to the sun-related risks they undertook. Education efforts would be relevant to reduce the risks faced by this group.

**YIA-HSR-02**

**Worry About Caregiving Performance: A Confirmatory Analysis**

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**Background & Hypothesis:**

Recent exploratory studies on the Zarit Burden Interview (ZBI) supported the existence of a unique factor, worry about caregiving performance (WaP), comprising items 20 and 21. Our current study uses confirmatory factor analysis (CFA) to determine if WaP improves the model fit compared to the traditional 2-factor model developed by Whitlatch and colleagues (1991).

**Methods:**

A total of 466 patient-caregiver dyads were recruited. The 2-factor ZBI was compared to a 3 and 4 factor model containing WaP derived from previous work (Cheah et al 2012). Analysis was conducted using CFA. Relationships between the optimal factor model and characteristics of the subjects were analysed using linear regressions.

**Results:**

The 4-factor model has the best fit amongst the models compared. Linear regressions suggests that different variables significantly predict WaP (being a spouse and Neuropsychiatric Inventory Questionnaire (NPI-Q) severity) and the other 3 factors (being a spouse or sibling, caregiver education, instrumental activities of daily living (IADL) and NPI-Q distress). Caregiving burden of spouses was found to be low through the Clinical Dementia Rating (CDR) stages and rise sharply in CDR 3 compared to that of the adult child and sibling which experience a steady rise in caregiving burden throughout the stages.

**Discussion & Conclusion:**

Our study confirmed that WaP improved model fit which provides evidence of WaP as a unique factor. Further work needs to be done to ascertain how the various factors in ZBI fluctuate across CDR stages and across different caregiving relationships.

## YIA-HSR-03

### Recommendations for Help-seeking in Singapore

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#### Background & Hypothesis:

Agents or institutions perceived to be helpful to those with mental health problems are a vital component of mental health literacy, reflecting people's knowledge and beliefs about avenues for help. We aimed to identify variables related to help-seeking recommendations among Singapore residents aged 18 to 65 years who participated in a household survey.

#### Methods:

The present study utilised data from the pilot phase of a national survey on mental health literacy. Participants (n = 123) were read a vignette describing someone (e.g. Mr/Ms X) suffering from alcohol abuse, dementia, major depressive disorder, obsessive compulsive disorder (OCD) or schizophrenia, then asked from whom they thought he/she should seek help. Participants were also asked whether they had ever experienced similar problems and whether they knew someone with similar problems. Multinomial logistic regression was used to adjust for demographic variables.

#### Results:

Participants who received the OCD and schizophrenia vignettes were most likely to recommend mental health services ( $P < .05$ ) as a source of help. Participants who had experienced problems similar to Mr/Ms X were significantly more likely to recommend seeking help from mental health services ( $P = .03$ ), whereas those who knew someone with similar symptoms were more likely to recommend social services ( $P < .05$ ) and social support (e.g. family;  $P = .02$ ).

#### Discussion & Conclusion:

OCD and schizophrenia were viewed as conditions specifically warranting mental health services, perhaps due to considerable perceived deviation of their symptoms from "normal behaviour". Help-seeking recommendations differed between those who had experienced and those who knew someone with similar symptoms, though mental health services appeared to be perceived as beneficial by the former.

**YIA-HSR-04**

**Recognition of Mental Disorders in Singapore**

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**Background & Hypothesis:**

Mental health literacy (MHL) refers to knowledge and beliefs about mental disorders which aid their recognition, management or prevention. This study describes the extent and predictors of recognition for 5 mental disorders among Singapore's resident population.

**Methods:**

The pilot phase (n = 123) of the Mind Matters Study was a cross-sectional survey using a convenient sample of Singapore residents aged 18 to 65 years. Vignettes were randomly assigned and read to respondents, describing someone with major depressive disorder (MDD), schizophrenia, obsessive compulsive disorder (OCD), alcohol abuse or dementia. Respondents were asked a series of questions relating to the vignette including what the person in the vignette was suffering from and whether someone they knew had problems similar to those described in the vignette.

**Results:**

A total of 44 (36%) respondents correctly recognised the disorder described in the vignette. Alcohol abuse had the highest recognition (n = 16; 59.3%), followed by dementia (n = 9; 42.9%) and MDD (n = 11; 42.3%). Considerably fewer people correctly recognised OCD (n = 6; 22.2%) and schizophrenia (n = 2; 9.1%). After adjusting for differential effects of vignettes, gender, ethnicity and education, 18- to 34-year-olds were 7.8 times more likely to correctly recognise the vignette, compared to 35- to 49-year-olds, while the odds of recognition were 3.0 times higher among those who knew someone with problems similar to those described in the vignette, after adjusting for age, gender, ethnicity and education.

**Discussion & Conclusion:**

These findings highlight important gaps in MHL including poor recognition of schizophrenia and OCD, emphasising the need for tailored community interventions promoting MHL in the population.

**YIA-HSR-05**

**An Evaluation of the Dover Park Hospice Integrated Home Hospice Care Pilot**

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**Background & Hypothesis:**

We aimed to evaluate the impact of the Dover Park Hospice (DPH) integrated palliative home care programme on acute care service usage compared to the existing model of care.

**Methods:**

The retrospective study cohort comprised Tan Tock Seng Hospital (TTSH) patients who were diagnosed with cancer; had an expected prognosis of 1 year or less; and were referred to a home hospice. The intervention group comprised deceased patients enrolled in the DPH hospice care programme in 2012 and 2013. The historical comparison group comprised deceased patients who were referred to other home hospices between 2007 and 2011. A logistic regression model was used to examine differences in the risk of hospitalisation and emergency department visits at 30- and 90-days prior to death.

**Results:**

The sample comprised 155 cases and 325 comparator subjects. After adjusting for differences in age, home hospice duration, mobility, independence in activities of daily living (ADL), cognitive status, and oncological treatment status, we found that the DPH group to have statistically significantly lower odds of hospitalisation at 30-days (odds ratio (OR): 0.20, 95% CI, 0.13-0.33) and 90-days (OR: 0.22; 95% CI, 0.12-0.40) prior to death. Similar results held for emergency room attendances at 30-days (OR: 0.20; 95% CI, 0.12-0.31) and 90-days (OR: 0.23; 95% CI, 0.14-0.39) prior to death.

**Discussion & Conclusion:**

Our results demonstrated that by integrating services between acute care and home hospice care, it could lead to a reduction in acute care service usage. This will inform policymakers on the development of an efficient model of home hospice care.

**YIA-HSR-06**

**The Use of Geospatial Clustering in Analysing Health Risk Profile**

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**Background & Hypothesis:**

The first law of geography states that “everything is related to everything else, but near things are more related than distant things”. This study aims to demonstrate how local indicator of spatial association (LISA) statistics are used to group patients with similar chronic diseases into natural clusters of hotspots found within northern Singapore by incorporating the proximity of their home locations explicitly.

**Methods:**

Anonymised chronic patient data collected from Khoo Teck Puat Hospital in 2013 were used for analyses. The data was mapped based on patients' residential addresses. A layer of hexagonal grid objects, each with a radius of 250 metres, was then generated and subsequently used to transform individual point data into area data. The local Moran statistical method was used to compute and test on each hexagonal grid object for significance by randomisation to identify clusters of hotspots.

**Results:**

Clusters of patients with chronic diseases were found in Nee Soon, Canberra and the intersection of Woodlands and Admiralty political divisions. For hypertension, clusters of patients aged 40 and above were found concentrated in Nee Soon political division.

**Discussion & Conclusion:**

The results showed that LISA statistics were more effective in delineating natural clusters as compared to conventional clustering method. The study also reported the statistical significance of each cluster. With these hotspots identified, healthcare intervention programmes can be customised according to the clusters found.

## HPR-RI-01

### The Challenges that Physiotherapists Face When Managing Palliative Care Patients in the Acute Care Hospital Setting: A Multicentre Survey

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#### **Background & Hypothesis:**

Many physiotherapists appeared uncomfortable in managing palliative care patients. This survey aimed to identify existing challenges and learning points from the perspective of physiotherapists working with palliative care patients in the acute care hospital setting. The results would help in identifying education and training needs for physiotherapists in Singapore.

#### **Methods:**

Physiotherapists from 4 acute general hospitals were recruited for this cross-sectional paper survey. A total of 130 questionnaires were given out to eligible physiotherapists. We asked all respondents 2 open-ended questions regarding the management of patients under palliative care: 1) the unique challenges; and 2) the experiences they have gained. Their responses were encoded and underwent thematic analysis.

#### **Results:**

Response was received from 125 subjects (96% response rate). We identified 10 recurring themes concerning the challenges of managing palliative care patients. The 3 most frequently cited challenges were “planning appropriate therapy goals” (n = 45), “treatment limited by patient's medical condition” (n = 20), and “managing patient's (and/or family's) motivation or expectation level (n = 20). Regarding the learning experience gained in the management of palliative care patients, 4 key learning points emerged: 1) holistic care, 2) empathy and communication, 3) coming to terms with life and death, and 4) job satisfaction.

#### **Discussion & Conclusion:**

We identified numerous challenges in managing palliative care patients, such as difficult goal setting, complex medical conditions, and psychosocial issues. On the other hand, the on-job experience of managing these patients appeared to benefit physiotherapists. Physiotherapy training in palliative care could be focused on understanding complex medical conditions and practising soft skills to manage psychosocial issues.

## HPE-RI-02

### **GP Partnership Programme – A Model of Successful Interprofessional Collaboration and Possible Lessons for Interprofessional Education**

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#### **Background & Hypothesis:**

The team has noted that although there have been many studies on interprofessional education (IPE), none have managed to conclude that IPE had resulted in effective interprofessional collaboration (IPC) and improved patient outcomes. Therefore the research study aimed to evaluate if the successes of IPC in the GP-Partnership Programme (GPPP) could contribute to the development of relevant IPE training programmes or IPE modules to enhance current training programmes. The study's hypothesis was that just as the intent for IPE is to foster improved IPC, likewise the success of existing IPC can contribute to the development of a relevant IPE.

#### **Methods:**

The study employed a mixed methods evaluation approach. A questionnaire was sent to the GPPP's GP partners, 2 focus group discussions (FGDs) were conducted, and a plot of correspondence between GP partners and mental health professionals in the GPPP was done.

#### **Results:**

From the study, 4 broad themes were identified as contributing factors to IPC within the GPPP. The themes were “Mutual Benefit”, “Support Network”, “Communication” and “Understanding Different Roles and Limitations”. From these themes, some possibilities were identified for development into IPE modules within existing educational programmes. The study also identified specific patterns of communication between the mental health professionals and the GPs, during the referral process and follow-up of patients in the community.

#### **Discussion & Conclusion:**

The study has identified some components that have possibly contributed to the positive IPC within the GPPP and these findings appear to prove the study's hypothesis.

**HPE-RI-03**

**Educational Innovations to Enhance the Transition of Junior Medical Students into General Medicine Ward Teams: Development, Rationale and Lessons Learnt**

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**Background & Hypothesis:**

Recent advances in medical simulation have led to novel learning methods to better transit students into incumbent ward teams. This study compares 2 recent educational innovations: 1) Embedding (2010 to 2011), and 2) Simrounds (2013 to 2014). By examining the data and learning theories underpinning each method, specifically Situated Learning Theory and Cognitive Load Theory, we aim to determine how Simrounds has complemented embedding in enhancing the transition of junior medical students into general medicine ward teams.

**Methods:**

We used mixed methods to analyse qualitative and quantitative data from both Embedding (n = 35) and Simrounds (n = 72) based on survey responses from third-year students doing their medical clerkship in Tan Tock Seng Hospital. For Embedding, we performed thematic analyses of open-ended responses to corroborate themes identified from explorative factor analysis. These themes were then compared with the Simrounds data to determine programme effectiveness.

**Results:**

In embedding, despite the benefits in learning relevance and increased resident interaction from situated learning, students reported difficulty integrating into the ward team. They were unsure of their role, and felt overwhelmed and unable to cope. Simrounds addresses this by enabling deliberate learning in a controlled and authentic setting with interprofessional participation. The reduction of cognitive load enabled students to assimilate the necessary knowledge and skills that they can apply to the ward round setting.

**Discussion & Conclusion:**

By reducing the cognitive load through deliberate practice in a secure and authentic environment, Simrounds complements embedding and facilitates the integration of junior students into the community of practice of incumbent ward teams.

## SGPCR-O-01

### Determinants of Prevalence of Anaemia in Diabetic Mellitus in Primary Care

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#### **Background & Hypothesis:**

WHO estimates that almost 30% of the world's population has anaemia and it accounts for 8.8% of total disability in patients. Anaemia in diabetes mellitus (DM) affects interpretation of glycosylated haemoglobin (HbA1c) and signals onset of diabetic nephropathy. Currently there are no guidelines suggesting when one should perform full blood count (FBC) to investigate for anaemia in DM.

#### **Methods:**

A retrospective cross-sectional study was conducted among 9 polyclinics on patients who had FBC done during a 12-month period. Data were extracted from electronic medical records system. The primary outcome is to find prevalence of anaemia in diabetics, and determine the risk profile in patients with WHO definition of anaemia.

#### **Results:**

Among 25,480 diabetic patients with FBC done, the prevalence of anaemia is 42.7%. Majority of these diabetics has normochromic normocytic type (65.6%) anaemia. In subgroup of 10,895 patients prescribed with metformin, there are 13.9% (95% CI, 13.3 to 14.5) macrocytic anaemic diabetics. There is a higher prevalence of anaemia in females (48.8%) compared to males (36.1%,  $P < 0.01$ ). The odds of having macrocytic anaemia with metformin is 29% lower than that of DM anaemic patients not taking metformin (OR = 0.71, 95% CI, 0.63 to 0.81). However, among patients on metformin with reduced vitamin B12 level, a higher proportion is found in females (24.8%) than males (22.8%;  $P = 0.680$ ).

#### **Discussion & Conclusion:**

Early detection of anaemia in diabetics is necessary, especially as undetected B12 deficiency results in neuropathy, cognitive impairment and increased homocysteine. The prevalence of anaemia in DM is 1 in every 2 females and one in every 3 males; therefore, an annual screening of FBC among all DM patients is important.

**SGPCR-O-02**

**A Study on the Knowledge in Diabetic Foot Care Among Diabetic Patients in Singapore**

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**Background & Hypothesis:**

Diabetes mellitus is a chronic disease with a significant disease burden. Overseas studies have shown that a significant portion of the diabetic population was not aware of the risks of the diabetic foot, and that with education, there was a significant increase in foot self-care. This study aimed to assess the level of knowledge that patients with diabetes mellitus in Singapore have towards diabetic foot care (DFC) and analyse the factors influencing their knowledge towards diabetic foot care.

**Methods:**

A total of 200 diabetic respondents were randomly surveyed at Jurong Polyclinic from 10 June 2013 to 5 July 2013. The anonymous and voluntary survey included a list of 26 questions based on good DFC as stipulated in the NHGP Foot Care Advice Handout.

**Results:**

The mean score of correct answers was 18, which was also taken as the cut-off point when defining whether the participants scored well or poorly in their knowledge of DFC. Among those who scored poorly, 31.6% had never been educated on DFC by a diabetic foot nurse before, compared to 18.5% in the group who scored well. A total of 21.8% of those who scored well do not practise DFC, compared to a larger 38.2% of those who scored poorly.

**Discussion & Conclusion:**

The results suggest that proper education on DFC by a trained professional such as a diabetic foot nurse is associated with better knowledge of DFC among diabetic patients, and that better knowledge is associated with an increased practice of DFC among diabetic patients. We recommend further evaluation in this area of diabetic foot care.

**SGPCR-O-03**

**The Effects of Psychological Interventions on Patients With Depression and Anxiety, and Their Functioning in Primary Care**

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**Background & Hypothesis:**

Prevalence of depression and anxiety in primary care warrants psychological intervention. In Singapore, integration of psychology services in primary care has increased accessibility of mental health services to the public. Given the nature of the setting, most patients only attend 1 to 2 sessions of psychological consultation. It reflects the need of delivering effective brief intervention. The present study aimed to compare the effects on patients' depression, anxiety, and functioning before and after 2 sessions of psychological interventions for primary care in Singapore.

**Methods:**

Forty-four adults not consuming psychotropic medications, with no drug abuse, and not receiving mental health services in the past 12 months throughout psychological interventions were identified. Patients' medical records were retrieved to obtain scores of Patient Health Questionnaire 9-item (PHQ-9) for depression, Generalized Anxiety Disorder 7-item (GAD7) for anxiety, and Global Assessment of Functioning (GAF) for functional impairment, respectively, on their first and third consults.

**Results:**

A sign test indicated significant reduction in patients' depressive and anxiety symptoms after psychological interventions ( $Z = -4.17, P = .00$  and  $Z = -3.549, P = .00$  respectively). A paired sample t-test showed significant improvement in patients' functioning after psychological interventions (1st session:  $M = 61.33, SD = 7.69$ ; 3rd session:  $M = 70.28, SD = 8.84$ ),  $t(42) = -7.345, P = .00, d = -1.13$ .

**Discussion & Conclusion:**

The present findings showed improvement in symptoms of depression, anxiety and functioning after receiving psychological interventions in primary care. The findings suggest the significance of integrating psychology services with medical services in primary care.

**BP-AH-01**

**Correlation of Monosomy 13/del(13q) and 1p32/1q21 in Disease Progression of Multiple Myeloma**

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**Background & Hypothesis:**

Multiple myeloma (MM) is a plasma cell malignancy in which chromosomal aberrations play a major role in patient outcome and disease management. Routine fluorescence in-situ hybridisation (FISH) panel for MM detects t(11;14), del(13q)-13, t(4;14), t(14;16) and loss of TP53, the latter 3 being indicators of poor prognosis. Recently, del(1p) and amp(1q) are assumed to be associated with poor prognosis. 1p/1q abnormalities arise in a later stage of the disease, whereas del(13q)-13 occur as an earlier event. This study aims to investigate incidence and occurrence of del(13q)-13 and chromosome 1p32/1q21, to determine if chromosome 1 should be included into the current routine MM FISH panel.

**Methods:**

Twenty-four newly diagnosed MM patients with normal karyotypes were subjected to interphase FISH using chromosome 1 and 13 probes with 200 nuclei scored.

**Results:**

Out of the 24 samples, 15 (62.5%) were abnormal. From these 15 abnormal cases, 4 (26.7%) had only chromosome 13 abnormality, 2 (13.3%) had only chromosome 1p/1q abnormality and 9 (60%) had both 1 and 13 abnormalities. 1q21 gains were observed in 10 cases and 1p32 deletion was observed in 1 case. Our results showed 2/24 (8.3%) were actually missed by routine FISH screen.

**Discussion & Conclusion:**

Only 2 samples would have been missed by the routine FISH panel. Based on disease stages, chromosome 13 does seem to be an early event. 1p/1q, seems to appear later in the disease and shows a poorer prognosis. Hence, if routine FISH screen is normal, 1p/1q can be added on later which would be more economical for patients.

**BP-AH-02**

**Transferrin Variants in Singapore**

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**Background & Hypothesis:**

Genetic variants of transferrin causing split B-1 bands are a problem when interpreting serum protein electrophoreses (SPE), especially in the presence of elevated IgA concentrations. This study describes the prevalence of split B-1 patterns in Singapore.

**Methods:**

Anonymised details of SPEs performed over 18 months were extracted from the laboratory database for review. SPE is performed by high resolution agarose electrophoresis (Hydragel 15 HR, acid violet dye, Sebia Hydrasys 2). All samples with a split B-1 band present underwent serum immunofixation for G, A and M heavy chains, and kappa and lambda light chains to exclude the presence of paraprotein.

**Results:**

A total of 128/6310 samples had a split B-1 band present, all of which were subsequently negative for paraprotein presence by immunofixation. In all cases, the additional B-1 band ran in an identical position cathodal to the normal B-1 band. The overall split B-1 prevalence was 2.0% with a statistically significant ( $P < 0.05$ ) lower prevalence for Indians of 0.7% (0-1.4) compared to Malays of 3.1% (2.0-4.2) and Chinese of 2.0% (1.6-2.4).

**Discussion & Conclusion:**

Co-dominant expression of genetic polymorphisms of transferrin variants in heterozygotes results in split B-1 bands. The TF\*DChi allele is seen in East Asian and some Indian populations with prevalences up to 8%. The additional cathodal B-1 band described here probably represents this allele. Routine inclusion of a known split B-1 control sample on every gel, rerunning of split B-1 samples alongside such a control or specific transferrin immunofixation are amongst the approaches laboratories could introduce to minimise this problem.

**BP-AH-03**

**Occupational Therapy Department's Fall Prevention Initiatives to Reduce Patient Fall Incidents**

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**Background & Hypothesis:**

Patient fall preventions include staff education, establishment of committees, leadership support, audit and adherence to care process. Failure to do so may lead to unsuccessful fall prevention programme. Patient fall incidents reported increased from 3 in 2010 to 9 in 2012 from Occupational Therapy Department (OTD). Thus, there is an urgent need to introduce and implement fall prevention strategies.

**Methods:**

The Allied Health Services Fall Prevention Committee, consisting of department managers, quality review officers and fall champions met quarterly to discuss falls data and actions. In OTD, e-learning materials on patient safety were developed for all staff. The Safe Manual Handling Team, consisting of senior occupational therapists, trained and assessed new staff on safe and proper manual handling skills. Simulated environments, based on commonly reported fall incidents, were used as case studies. An inaugural department fall prevention event was conducted for all staff to refresh their knowledge and practical skills in fall prevention. Sessions included sharing on past fall incidents, learning points, simulation of handling patients with different conditions, risk assessment and prevention.

**Results:**

Total number of patient falls reported decreased from 9 in 2012 to 2 in 2013; falls during ambulation reduced from 3 in 2012 to 1 in 2013; falls during transfer decreased from 2 in 2012 to 0 in 2013; however falls during standing activities remained at 1 for both years.

**Discussion & Conclusion:**

Staff-targeted fall prevention programme seems to be effective in reducing number of falls in OTD. Due to lack of validated assessment tools, this result cannot be generalised. Future study should include having utilised validated assessment tools.

**BP-AH-04**

**Efficacy of Achieving Target Enteral Feed Volumes for Patients in an Acute Hospital**

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**Background & Hypothesis:**

Enteral feeding is a common form of nutrition support. Currently, there is a lack of data and clinical practice guidelines on the expected rate of achieving target enteral feed volume. The rate of achieving target enteral feeds impacts on patients' nutritional adequacy. This pilot study aims to investigate the average duration to achieve target enteral feeds for patients in an acute hospital.

**Methods:**

This is a retrospective study that evaluates the efficiency rate in achieving target enteral feeds of patients admitted to 4 general wards in an acute hospital over a month in January 2013.

**Results:**

Thirty-six patients with mean age  $83.9 \pm 9.2$  years, and median length of stay of 10 days, were included. A total of 26 patients achieved target enteral feeds in  $6.4 \pm 3.7$  days, of which 21 patients (81%) took more than 3 days since feeds initiation. These 21 patients were kept 'nil by mouth' (NBM) for  $2.4 \pm 1.2$  days versus  $1.2 \pm 1.3$  days for patients ( $n = 5$ ) who took  $\leq 3$  days, ( $P = 0.06$ ). A total of 30 participants (83%) were seen by dietitians. Comparing the group that achieved target enteral feeds ( $n = 22$ ) versus the group that did not ( $n = 8$ ), they were seen by dietitians  $3.5 \pm 3.0$  days versus  $3.9 \pm 3.1$  days ( $P = 0.74$ ) postenteral feeding initiation, and met  $64.6 \pm 42.5\%$  versus  $38.0 \pm 17.5\%$  of estimated energy requirements ( $P = 0.12$ ), respectively.

**Discussion & Conclusion:**

A longer NBM duration appeared to correlate with a delayed rate of attaining target enteral feeds. This and a less timely dietetics intervention could potentially compromise patients' nutritional adequacy during hospitalisation. Further studies to evaluate strategies in improving feeding efficacy will be helpful.

**BP-AH-05**

**Relationships Between Parental and Child Aggression in Children with Disruptive Behaviour Disorders**

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**Background & Hypothesis:**

Prior research has shown that parental harsh discipline and/or violence against children are associated with child aggression and disruptive behaviours. Specifically, psychological maltreatment, corporal punishment and physical abuse are found to increase child aggression at a later age. Nevertheless, there are limited studies conducted on Asian families where parenting styles are believed to be slightly different from the Western counterparts. This study aims to examine the effect of parental aggression on child aggression in the Singapore context. It is hypothesised that parental psychological and physical assault will significantly predict child aggression.

**Methods:**

A total of 211 participants aged 7 to 16 years (M = 10.49, SD = 1.82) who attended a local outpatient psychiatric clinic and fulfilled DSM-IV-TR criteria for attention deficit hyperactivity disorder (ADHD), oppositional defiant disorder (ODD) and/or conduct disorder (CD) were recruited. Participants completed Parent-Child Conflict Tactics Scale (subscales: parental psychological aggression, minor and severe physical assault) and Aggression Questionnaire (subscales: anger, hostility, physical and verbal aggression).

**Results:**

Multiple regression analysis indicated that, after controlling for the effects of age and gender, parental psychological aggression towards child significantly predicted child's physical aggression, anger and hostility. Contrary to the expectation, parental physical assault (both minor and severe) did not significantly predict aggression and its subscales.

**Discussion & Conclusion:**

Findings support that parental psychological aggression was a significant predictor of child aggression. However, this relationship did not hold for parental physical maltreatment, which may be due to differential perception of parenting styles in Asian cultures. Implications and limitations of the study will be discussed.

**BP-AH-06**

**A 43% Reduction of Scatter Radiation to Scrub Nurses During Invasive Coronary Angiography With the Use of a Lead-free Radiation Shield, Radpad®**

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**Background & Hypothesis:**

With the ever increasing complexity of invasive cardiac procedures, occupational radiation exposure has increased significantly and is potentially detrimental to the health of medical staff. Radpad® scatter protection is a sterile, disposable bismuth-barium radiation shield drape that aims to decrease the dose of operator radiation during coronary angiograms. However, such radiation shields have not been tested on scrub nurses before. The aim of this study was to determine whether the use of Radpad® would decrease scatter radiation exposure to our nurses.

**Methods:**

A total of 4 patients undergoing coronary angiography were recruited. The same scrub nurse was asked to assist in all 4 procedures. Radpad® was placed around the area of arterial sheath insertion site and extended medially to the patient's trunk. Radiation exposure during each procedure was measured using thermo luminescence dosimeters positioned next to the scrub nurse. Radiation dosages were recorded in 4 different angiographic views of each patient for 3 seconds during cine acquisition and background dosages were recorded for 20 seconds during fluoroscopic screening, with and without the use of Radpad®. Two angiograms were done via radial approach and the other 2 via femoral approach.

**Results:**

Radiation dosage was lower when Radpad® was used. Background radiation was also reduced. Overall, there was 43.2% decrease in radiation exposure to the scrub nurses after the use of Radpad®.

**Discussion & Conclusion:**

By using Radpad®, which is relatively inexpensive and extremely simple to use, radiation exposure can be dramatically reduced. This will be of great benefit to the health of our nurses, who are mostly below 30 years of age.

**BP-BSTR-01**

**Binding Mechanism and DNA Interaction Studies on Novel Fishgill Peptides**

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**Background & Hypothesis:**

The growing problem of resistance to conventional antibiotics is a global public health problem. The urgent need for new antibiotics has stimulated interest in the development of antimicrobial peptides (AMPs) as human therapeutics. AMPs are found among all classes of life as a first line defence system against deadly pathogens. AMPs demonstrate high potential as novel therapeutic agents, as most of AMPs kill both gram-positive and gram-negative bacteria, while a significant number of these bactericidal peptides have been shown to have antiviral and anticancer activities.

**Methods:**

To understand the mechanism of action of AMPs, the project studies the interaction of AMPs with cell membrane models and DNA using techniques such as multidimensional NMR, fluorescence spectroscopy, circular dichroism (CD) spectroscopic methods, gel retardation assay and biophysical binding studies.

**Results:**

The interactions were studied using fluorescence and CD spectroscopy. Fluorescence experiments revealed that the N-terminal tryptophan residue of the peptides interacts with the hydrophobic core of the membrane mimicking micelles. The CD results suggest that interactions with membrane mimetic micelles induce an  $\alpha$ -helix conformation in peptides. The structural comparison of peptides in the presence of SDS and DPC micelles showed significant conformational changes. The ability of peptides to bind DNA was elucidated by gel retardation and fluorescence.

**Discussion & Conclusion:**

The structural differences of peptides in zwitterionic versus anionic membrane mimics and the DNA binding ability of peptides, collectively contributes to the general understanding of the pharmacological specificity of this peptide towards prokaryotic and eukaryotic membranes and provides insights in its overall antimicrobial mechanism.

**BP-BSTR-02**

**A New Role for Rab5a GTPase Protein in the Regulation of T-Lymphocyte Migration**

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**Background & Hypothesis:**

Rab5a is a member of Rab GTPase family protein and plays an important role in receptor-mediated endocytosis through the spatial regulation of signalling molecules, intracellular transport and the cytoskeleton. Here we hypothesised Rab5a involvement in T-lymphocyte migration, a key element of an adaptive immune response.

**Methods:**

Primary human T-cells and the T-cell line Hut78 were stimulated to migrate by incubating on immobilised anti-LFA-1 or rICAM-1. Standard molecular, biochemical and imaging assays including in vitro kinase assay, co-immunoprecipitation, RNA interference, Western-immunoblotting, confocal microscopy, live cell imaging and high content analysis were utilised.

**Results:**

We detected that Rab5a co-localises and directly associates with protein kinase CE (PKCE) in migrating T-cells. The interaction between Rab5a and PKCE mainly occurs in the centrosomal region of migrating T-cells in a dynamic fashion. Most importantly, utilising specific inhibitors and RNA interference-mediated knockdown approach, we identified that Rab5a undergoes PKCE-dependent phosphorylation at a novel N-terminal Thr7 site. Moreover, using our affinity-purified antiphosphoThr7-Rab5a antibody we noticed that PKCE-mediated Thr7 phosphorylation regulates Rab5a trafficking to the leading edge during T-cell migration. Site-specific mutation analysis further confirmed that Rab5a Thr7 phosphorylation is functionally necessary for Rac1 activation, actin rearrangement and T-cell motility.

**Discussion & Conclusion:**

Our study represents a previously uncharacterised role for Rab5a in the regulation of T-lymphocyte migration. We present a novel mechanism by which PKC $\hat{\mu}$ -mediated Rab5a Thr7 phosphorylation controls cytoskeletal remodeling and T-cell motility. Our data significantly advances the knowledge of T-cell signalling pathway and has relevance to the understanding of local immune responses in both normal and pathological conditions.

**BP-BSTR-03**

**Association Between Visceral Adiposity, Inflammation (C-reactive protein), Microvascular Endothelial Dysfunction and Nephropathy in Multiethnic Asians With Type 2 Diabetes (SMART2D Cohort)**

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**Background & Hypothesis:**

Excessive adiposity (especially visceral) is associated with low-grade systemic inflammation, which drives microvascular dysfunction leading to end-organ injury e.g. diabetic nephropathy (DN). We hypothesise that visceral fat area (VFA) is associated with high-sensitivity C-reactive protein (hsCRP), endothelial dysfunction and albuminuria in multiethnic Asians with type 2 diabetes (T2DM).

**Methods:**

Cross-sectional study involving 1564 T2DM individuals (mean age, 58 ± 11years; male, 54.7%; Chinese 57.3%, Malay 21.5%, Indian 21.2%). Visceral fat area (VFA) was determined by multifrequency bioimpedence method. Plasma hsCRP was measured using enzyme-linked immunosorbent assay. Microvascular reactivity was measured by 2-dimensional Laser Doppler flowmetry coupled with iontophoresis of acetylcholine (ACh) (endothelial-dependant) or sodium nitroprusside (NaNP) (endothelial-independent). Albuminuria was estimated using spot albumin:creatinine ratio (ACR).

**Results:**

Univariate analysis revealed significant correlation of ACR with VFA ( $r = 0.121$ ,  $P < 0.001$ ), hsCRP ( $r = 0.115$ ,  $P < 0.001$ ) and ACh ( $r = -0.055$ ,  $P = 0.030$ ), but not NaNP ( $r = -0.047$ ,  $P = 0.064$ ). Linear regression showed that VFA ( $B = 0.002$ ,  $P = 0.015$ ) and ACh ( $B = -0.002$ ,  $P = 0.034$ ) independently predicted ACR after adjustment for ethnicity, gender, age, HbA1c, blood pressure and triglycerides. Association of ACR with VFA ( $B = 0.001$ ,  $P = 0.081$ ) and ACh ( $B = -0.001$ ,  $P = 0.057$ ) was appreciably attenuated after additional adjustment for hsCRP, which emerged as a significant independent predictor of ACR ( $B = 0.184$ ,  $P < 0.001$ ).

**Discussion & Conclusion:**

Our data is consistent with visceral adiposity driving inflammation leading to endothelial dysfunction and DN. The association between visceral adiposity (VFA), microvascular injury and renal function is mediated, at least in part, by inflammation (hsCRP). Therefore, ameliorating inflammation may retard kidney disease progression in Asians with T2DM.

**BP-CR-01**

**Using Termination of Resuscitation Rules to Predict Neurological Outcomes in Out-of-hospital Cardiac Arrest Patients: A Retrospective Asian Study**

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**Background & Hypothesis:**

Futile resuscitation can lead to unnecessary transports for out-of-hospital cardiac arrest (OHCA). The basic life support (BLS) and advanced life support (ALS) termination of resuscitation (TOR) guidelines have been validated with good results in North America. This study aims to evaluate the performance of these 2 rules in predicting neurological outcomes of OHCA patients in Singapore.

**Methods:**

A retrospective cohort study was carried out on Singapore OHCA data collected from April 2010 to May 2012 for the Pan-Asian Resuscitation Outcomes Study (PAROS). Test outcomes were compared to the patients' actual neurological outcomes. The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and predicted transport rates of each test were evaluated.

**Results:**

A total of 2193 patients had a cardiac arrest presumed to be of cardiac aetiology. TOR was recommended for 1411 patients using the BLS-TOR rule, of which none had good neurological outcomes. This resulted in a specificity of 100% (91.88, 100) and PPV of 100% (99.74, 100) for predicting poor neurological outcomes, with a transportation rate of 35.6%. Using the ALS-TOR rule, TOR was recommended for 587 patients, and none had good neurological outcomes. The ALS-TOR rule had a specificity of 100% (91.88, 100.00) and PPV of 100% (99.37, 100.00) for predicting poor neurological outcomes, with a transportation rate of 73.2%.

**Discussion & Conclusion:**

Both the BLS and ALS-TOR rules were found to have high specificity and PPV in predicting poor neurological outcomes in OHCA patients in Singapore. The BLS-TOR rule has a lower predicted transport rate, which could improve system efficiency.

**BP-CR-02**

**Prevalence of Lymphoma in the Singapore Sjogren's Syndrome Study**

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**Background & Hypothesis:**

Primary Sjogren's Syndrome (SS) is associated with a high risk of extranodal non-Hodgkin lymphoma in Western cohorts. The prevalence of lymphoma among patients with SS in Singapore is unknown.

**Methods:**

Computerised physician order entry records of patients with physician-diagnosed SS between 1993 and 2013 were retrospectively analysed for those who developed lymphoma.

**Results:**

Among 355 SS patients, 4 (1.1%) developed B-cell non-Hodgkin lymphoma (BCNHL) 9.1 ± 4.4 years after the diagnosis of SS. Two had extranodal marginal zone lymphoma, and 2 diffuse large B-cell lymphoma. All were female, 3 Chinese, mean age, 39.6 ± 2.5 years. One had primary-SS, while the other 3 had secondary-SS with systemic lupus erythematosus (SLE), rheumatoid arthritis (RA), and SLE/RA/scleroderma (SSc) respectively. Clinical features included parotid enlargement (4), submandibular gland enlargement (2), lymphadenopathy (2), hypergammaglobulinaemia (3), and paraproteinemia (3). None had major organ involvement from SS. Disease-modifying antirheumatic drugs prior to diagnosis of NHL comprised hydroxychloroquine (HCQ, 2), HCQ + azathioprine (1), HCQ + methotrexate (2) and oral cyclophosphamide (1). NHBCL remitted after 6 cycles of r-CHOP (rituximab-cyclophosphamide, adriamycin, vincristine, prednisolone) in all patients. BCNHL relapsed in the SLE/SSc/RA patient, requiring chlorambucil/ prednisolone and rituximab every 3-monthly for 2 years. The patient with primary-SS had concomitant amyloid in the parotid glands.

**Discussion & Conclusion:**

Prevalence of BCNHL in SS was low (1.1%). It occurred in women in their 40s, up to 10 years after diagnosis of SS, involving extranodal and nodal sites. Secondary-SS with salivary gland enlargement, lymphadenopathy, hypergammaglobulinaemia, paraproteinemia, and preceding immunosuppressive drugs appeared to be important risk factors.

**BP-CR-03**

**A Singaporean Kindred with Mitochondria A3243A>G Maternally Inherited Diabetes and Deafness (MIDD)**

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**Background & Hypothesis:**

Patients with familial non-insulin dependent diabetes diagnosed before age 25 years, lean and without evidence of insulin resistance should be screened for monogenic diabetes. We report for the first time a Singaporean kindred with mitochondria A3243A>G mutation, the most common form of MIDD.

**Methods:**

The proband, a 23-year-old Chinese male, BMI 22.5 kg/m<sup>2</sup>, presented with right shin cellulitis, weight loss and newly diagnosed diabetes (HbA1c 13.7%). His maternal great grandmother, grandmother, mother (at age 30 years) and sister (at age 18 years) had diabetes. Insulin replacement was converted to oral glipizide in <6 months. His sister, BMI 18.9 kg/m<sup>2</sup>, had residual  $\beta$ cell function 8 years after diagnosis (basal-glucagon stimulated C-peptide 161-239 pM). Their mother had chronic severe bilateral sensori-neural hearing loss (SNHL) demonstrated on audiogram. None had a history of diabetic ketoacidosis. Islet-specific auto-antibodies were negative in the family. TaqMan® Real-Time PCR endpoint allele-discrimination for mitochondria-DNA (A3243A>G) mutation hotspot was performed for the sib-pair with follow-up confirmation by Sanger's terminating-dye nucleotide sequencing.

**Results:**

An A to G mutation at position 3243 of the mitochondrial DNA was detected in each of the siblings by TaqMan® Real-Time PCR and confirmed using Sanger bi-directional sequencing.

**Discussion & Conclusion:**

Patients with young onset atypical diabetes, maternal transmission pattern in the pedigree and other related features (e.g. SNHL) should be considered for MIDD genetic testing. Genetic confirmation of this diagnosis mandates surveillance for other comorbidities (e.g. macular retinal dystrophy and proteinuric nephropathy) amenable to early detection and intervention i.e. personalised medicine.

**BP-CR-04**

**The 2-minute-walk Test (2MWT) is Equally Effective in Assessing Functional Capacity as the 6-minute-walk Test (6MWT) in Advanced COPD**

**HY NEO<sup>1</sup>, HY XU<sup>1</sup>, HY WU<sup>1</sup>, A HUM<sup>1</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

COPD specialist outpatient clinics (SOC) routinely use the BODE index as it predicts survival and hospitalisations better than spirometry alone. Performing the 6MWT as part of BODE is challenging in advanced disease, owing to severe airflow limitation. We hypothesise that the 2MWT is equally effective in measuring functional capacity as the 6MWT, in advanced COPD.

**Methods:**

Outpatient stage III and IV subjects were prospectively recruited. The 6MWT was conducted with pulse-oximetry monitoring at 0, 2 and 6 minutes. Subjects could discontinue if they experienced excessive fatigue or desaturated below 90%.

**Results:**

Of 71 patients recruited, 48 (68%) had stage III and 23 (32%) had stage IV disease. A total of 46.5% of subjects couldn't complete the 6MWT compared to 5.6% for the 2MWT, due to steep decline in SpO<sub>2</sub>. Desaturation below 90% was demonstrated in 23.9% of subjects by the end of 2 minutes. The 2MWT has a stronger association with the Modified Barthel Index (MBI) than the 6MWT ( $r = 0.640$ ,  $P < 0.001$ ). It strongly correlates with a heightened perception of dyspnea and poorer BODE prognostic scores. It moderately correlates with quality of life and the FEV<sub>1</sub> (all  $P < 0.01$ ). The strength of these associations are comparable to the 6MWT. Multivariate analysis identified the 2MWT to be an independent predictor of MBI, after controlling for variables identified a-priori.

**Discussion & Conclusion:**

The 2MWT is a safe and effective measure of functional capacity. It can potentially be used in a busy clinic, to screen for frailer patients requiring early palliative intervention. A prospective study is underway, examining its predictive value for survival and exacerbation frequencies.

**BP-CR-05**

**Vitamin D Deficiency and Osteoporosis in Asian Patients With Inflammatory Bowel Disease**

**WK NG<sup>1</sup>, WC LIM<sup>1</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Hypovitaminosis D and low BMD is common amongst IBD patients. Our aim is to evaluate the prevalence of vitamin D deficiency in IBD patients in multiracial Singapore and evaluate its association with BMD.

**Methods:**

Patient records were retrospectively reviewed. Hypovitaminosis D were defined based on local laboratory reference range. BMD is measured using DEXA, with osteopenia and osteoporosis defined by WHO criteria. Data was analysed using Fisher-exact and chi-square test.

**Results:**

Fifty-two percent (47/90) UC patients and 63% (34/54) CD patients had vitamin D levels measured (55 Chinese, 18 Indians, 8 Malays). A total of 83% (39/47) UC patients had hypovitaminosis D, compared to 73.5% (25/34) CD patients ( $P = 0.41$ ). Hypovitaminosis D was found in 71% Chinese, 94% Indian and 100% Malay IBD patients ( $P = 0.03$ ); 59% (53/90) UC and 59% (32/54) CD patients had BMD measured. A total of 59% (85/144) IBD patients had low BMD; 53% (28/53) UC patients had low BMD compared to 69% (22/32) CD patients ( $P = 0.18$ ). Of the 71 IBD patients who had BMD and vitamin D status measured, 81.7% (58/71) had hypovitaminosis D, of which 59% (34/58) had concomitant low BMD, comparing to 54% (7/13) IBD patients with normal vitamin D having low BMD ( $P = 0.77$ )

**Discussion & Conclusion:**

There is a high prevalence of low vitamin D and BMD among Asian patients with difference between vitamin D levels between UC and CD patients. Higher proportion of Indian and Malay patients had hypovitaminosis D compared to Chinese patients. There is a trend towards low BMD in CD patients, compared to UC patients. There is no association between vitamin D status and BMD, suggesting other risk factors for low BMD in IBD patients.

**BP-CR-06**

**How Common are Metachronous Breast Cancers?**

**YP TAN<sup>1</sup>, P CHAN<sup>1</sup>, EY TAN<sup>1</sup>**

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**Background & Hypothesis:**

It is not uncommon for women with unilateral breast cancer to consider a prophylactic contralateral mastectomy for fear of developing a metachronous cancer. In the US, there has been a more than 2-fold increase rate of contralateral prophylactic mastectomies. Thus, we evaluate the incidence of metachronous cancers, defined as cancers developing in the contralateral breast more than 6 months after the initial surgery, and to identify its predictive factors.

**Methods:**

A retrospective review of patients treated for breast cancer at our institute between 1 January 2002 to 31 December 2009 with at least 3 years of follow-up.

**Results:**

Out of 1380 patients, 45 (3.3%) of them developed metachronous contralateral breast cancers. The median interval to the diagnosis was 50 months after first diagnosis of breast cancer (ranging from 10-114 months). A total number of 65% of metachronous cancers were found in the first 5 years and near 80% developed in patients with an initial diagnosis of invasive cancer. Majority of metachronous cancers (78%) were of similar or lower stage than the first cancer. We found no significant factor predictive for metachronous cancers. However, among those with invasive cancers, younger age, Her2Neu over-expression and nodal involvement ( $P < 0.05$ ) were positively correlated with metachronous cancer.

**Discussion & Conclusion:**

Metachronous contralateral breast cancers occurred in 3% of patients. The majority arose within the first 5 years and was of a similar or lower stage than the initial cancer, implying that these cancers were unlikely to worsen the outcome. Young patients with invasive tumours, Her2Neu positive and nodal involvement were more likely to develop metachronous cancers.

**BP-HPE-01**

**Simulated Patients in the Teaching of Mental State Examination: Factors Influencing Learning Among Junior Medical Students**

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**Background & Hypothesis:**

Teaching medical students core geriatrics skills traditionally depended on didactic lectures and patient contact. We study the factors which enhance learning when simulated patients (SPs) are used to teach mental state examination (MSE) and the dementia-delirium-depression (3D) syndrome.

**Methods:**

We studied 259 second-year medical students in a Clinical Foundation Course. Using case scenarios involving SPs, the students learned skills, like the Abbreviated Mental Test, Confusion Assessment Method, DSM-IV criteria for dementia diagnosis and the 15-item Geriatric Depression Scale. Questionnaire was administered after the session. Univariate analysis and hierarchy multiple regression were used for quantitative analysis. Thematic analysis was used for qualitative analysis.

**Results:**

SPs helped students learn the geriatric assessment skills more effectively (97.7%) and prepared them for real patient encounters (96.5%). In unadjusted analysis, poorer attitude towards elderly was associated with less effective learning ( $P = 0.038$ , R-square, 1.7%). After adjusting for covariate of useful feedback by SPs, poorer attitude became insignificant ( $P = 0.317$ , R-square, 29%). Not performing the geriatric assessment was associated with perception of decreased usefulness of the session ( $P = 0.016$ , R-square, 1.8%). After adjusting for SP feedback, it became insignificant ( $P = 0.164$ , R-square, 21%). Adjusting for facilitator effectiveness explained an additional 10% of variance in outcome variables. Four themes facilitated learning: “Authenticity and relevance of scenarios”, “Bridging of theory-practice divide”, “Useful feedback from SP”, and “Enhanced learning experience”.

**Discussion & Conclusion:**

SP scenarios can overcome poor attitude and perception of decreased usefulness in teaching the MSE. Enhancing SP feedback and facilitator effectiveness can optimise the learning environment, and should be incorporated into the design of future SP sessions.

**BP-HPE-02**

**Integrating Ultrasound Into the Medical Undergraduate Anatomy Curriculum**

**GJS TAN**<sup>1</sup>

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

The teaching of anatomy in medical school has changed little since the days of cadaveric dissection and anatomical pots. Clinical medicine, on the other hand, has rapidly evolved to use advanced imaging techniques such as ultrasound. Nonetheless, ultrasound training remains haphazard or even non-existent outside radiology, particularly at the medical school level.

**Methods:**

We reviewed the established curriculum, and identified key areas where ultrasound would add value to traditional teaching methods. We scheduled 8 practical sessions over the 2 preclinical years. This consisted of an Introduction to Ultrasound, followed by 7 clinical sessions titled Cardiac, Bladder, Shoulder, Hepatobiliary, Renal, Neck and Pelvic Ultrasound. A combination of ultrasound phantoms and standardised volunteers was used. Each session lasted 4 hours, with 6 students per machine, to allow for maximum hands-on experience.

**Results:**

In order to assess knowledge retention, sonographic images were included in the anatomy practical assessments. Student scores for these questions showed good reliability compared to the rest of the examination. We also conducted an anonymous course evaluation. The results were overwhelmingly positive, with mean scores of 4.45 to 4.86 on a 5-point Likert scale, and more than 88% of respondents answering “Agree” or “Strongly Agree” to all questions.

**Discussion & Conclusion:**

First-year medical students were able to use ultrasound to appreciate living anatomy and real-time physiology, thus increasing the clinical relevance of the basic sciences and improving knowledge retention. The sessions also served as an early introduction to radiology and provided them with foundational skills in ultrasound.

**BP-HPE-03**

**Preliminary Evaluation of a Pilot Structured Interprofessional Training Programme for Emerging Clinical Educators in Allied Health Services (Occupational Therapy, Physiotherapy, Podiatry)**

**YC TAY<sup>1</sup>, S SALIM<sup>1</sup>, A TEO<sup>1</sup>, T CHEW<sup>1</sup>, A LUM<sup>1</sup>, UP SELVAM<sup>1</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Clinical education involves a more experienced allied health profession (AHP) facilitating a junior AHP in clinical reasoning, teaching clinical skills and providing constructive feedback, guiding the latter to develop clinical competency. Currently, there is no structured training for clinical educators in Tan Tock Seng Hospital (TTSH) Allied Health Services (AHS). With the increase in number of AHPs and introduction of Allied Health Professions Act, developing a structured training programme for the provision of clinical education is crucial.

**Methods:**

Needs analysis survey of 37 junior AHPs and 30 clinical educators from occupational therapy, physiotherapy and podiatry departments were conducted. Workshop was developed and conducted to 5 emerging clinical educators. Pre and postworkshop assessments included Self-rating Questionnaire (self-confidence as an educator) and Clinical Teaching Observation Checklist (teaching skills and strategies). Content-based Postworkshop Multiple Choice Quiz and Feedback Survey were also administered.

**Results:**

There was an overall improvement in the pre- and post-self-rating Questionnaire (Likert scale). Average score of Clinical Teaching Observation Checklist increased from 64.7% to 89.2%. Average score of Postworkshop Quiz was 9 out of 10 and average overall rating from Participant Feedback Survey was 4.65 out of 5.

**Discussion & Conclusion:**

The AHS Clinical Educators Workshop has potential to equip emerging clinical educators with skills and knowledge, to provide standardised quality of teaching to junior AHPs. Due to the small sample size, this result cannot be generalised. Further developments include enhancing the rigour of the assessment plan, extending the training to other AHS departments and further programme evaluation.

**BP-HSR-01**

**Understanding Healthcare Workers' Attitudes, Beliefs and Motivations Towards Hand Hygiene Compliance: A Qualitative Approach**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Healthcare workers are aware of the importance of good hand hygiene in preventing transmission of hospital-acquired infections. Despite this awareness, compliance to hand hygiene in hospitals remains suboptimal. The objective of this qualitative study is to understand reasons behind this low compliance in order to tailor future interventions in the hospital.

**Methods:**

Seven focus group discussions involving 10 doctors, 31 nurses and 6 allied health professionals were conducted using a semi-structured interview guide. All focus group discussions were recorded and transcribed verbatim. Data was analysed using the framework approach. Emerging themes and concepts were categorised according to personal and systemic facilitators and barriers to hand hygiene.

**Results:**

Participants reiterated a heavy workload and time constraints posed as a barrier for hand hygiene. This was also cited in other studies as the most common reason given by healthcare workers for not performing hand hygiene. Participants believed their seniors should be a role model in advocating good hand hygiene. In addition, nurses and allied health professionals wanted doctors to be role models in the hospital. Participants also felt positive reminders from peers, colleagues, and superiors from their own team would reinforce the need for hand hygiene. Interestingly, allied health professionals highlighted receiving no proper feedback, conflicting instructions on infection control, and the sense that no one watches them do their hand hygiene.

**Discussion & Conclusion:**

The results indicate the need for more positive reminders and role modelling to increase hand hygiene compliance amongst hospital staff. In addition, more specific interventions should be developed for allied health professionals.

**BP-HSR-02**

**Pharmacist-run Medication Management Service to Reduce Inappropriate Benzodiazepine and Anticholinergic Medication Usage over 6 Months and 1 Year**

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<sup>1</sup>*Institute of Mental Health, Singapore*

**Background & Hypothesis:**

The usages of benzodiazepines and anticholinergics have been on the rise over the years. This study aims to evaluate the impact of pharmacist-run medication management services in reducing the inappropriate usages of benzodiazepines and anticholinergics in psychiatric outpatients.

**Methods:**

Benzodiazepines and anticholinergic users from a pool of 140 stable psychiatric outpatients were assessed by clinical pharmacists using a medication appropriateness index checklist to be using these medications inappropriately. These subjects underwent structured medication counselling sessions to reduce their usage of these 2 medications. The patients were followed up and monitored for anxiety, sleep, EPSE, psychiatric relapses at every clinic visit at 6 and 12 months. Differences in medication usages across time i.e. from baseline to follow-up assessments were compared using paired t-tests.

**Results:**

Benzodiazepine usage showed significant reduction from baseline to sixth-month (baseline, M = 3.7, SD = 5.8; sixth-month, M = 2.1, SD = 3.1),  $t(59) = 2.8, P < .01$ , twelfth-month (M = 2.2, SD = 3.3),  $t(54) = 2.1, P < .05$ . Anticholinergic usages also showed significant reduction from baseline to sixth-month (baseline, M = 2.46, SD = 2.0; sixth-month, M = 1.7, SD = 1.9),  $t(76) = 5.2, P < .001$ , twelfth-month (M = 1.3, SD = 1.6),  $t(76), P < .001$ .

**Discussion & Conclusion:**

The results of this study show a significant impact by pharmacist-run medication management services in reducing psychiatric patients' inappropriate usage of benzodiazepines and anticholinergics. This preliminary evidence illustrates the greater roles that pharmacists can play in optimising usages of medications in the psychiatric community.

**BP-HSR-03**

**Stigma and Its Sociodemographic Correlates: Results From a Community Survey**

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<sup>1</sup>*Institute of Mental Health, Singapore*

**Background & Hypothesis:**

Stigma is a sign of disgrace, which sets a person apart from others. Stigmatising attitudes towards people with mental illness are widespread and can affect the social, occupational and emotional well-being of the mentally ill. We examined the sociodemographic correlates of stigma towards the mentally ill among the Singapore population.

**Methods:**

Data was derived from the pilot phase (n = 123) of the nationwide Mental Health Literacy Study. As part of the survey, 8 stigma statements were included and rated on a 5-point Likert scale (1 = strongly agree, 5 = strongly disagree). Respondents (18-65 years) were recruited through convenient sampling. Chi-square test was used to analyse the association of stigma with age, gender, ethnicity and education.

**Results:**

Females (68.2% vs. 44.6% males;  $P = 0.03$ ), older age (50-65years) (75.9% vs. 42.0% younger age (18-34 years);  $P = 0.047$ ), Malays (65.7%) and Indians (67.7%) (vs. 47.9% Chinese;  $P = 0.04$ ) and respondents with primary education (88.24% vs. 69.7% secondary education, 41.03% (diploma and A-level) and 48.5% university education;  $P = 0.001$ ) were significantly more likely to agree with the statement “mental illness is a sign of personal weakness”. Those with university education (51.52%) were significantly more likely to agree with the statement “they would not employ anyone with mental illness” as compared to those with 25.6% (diploma and A-level education), 36.4% secondary and 47.1% primary education ( $P = 0.045$ ).

**Discussion & Conclusion:**

Our study showed that patterns of agreement with the statement “mental illness is a sign of personal weakness” differed significantly according to sociodemographic characteristics. There were no significant differences found in other statements pertaining to stigma. Our results indicate that there is a need to educate the community on the causes of mental illness.

**BP-HSR-04**

**Integrated Home Hospice Care – Impact on Family Caregiver Satisfaction**

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**Background & Hypothesis:**

Gaps in transition of care result in unnecessary resource utilisation. Dover Park Hospice (DPH) piloted an integrated palliative home care programme within the central region of Singapore. New elements included active case management, direct-admit rights to hospice and hospital and advance care planning. Impact on caregiver satisfaction and acute care utilisation were evaluated.

**Methods:**

Telephonic interviews of patients' caregivers 1 to 3 months after the patient's demise using a modified "After-Death Family Member Interview" tool were conducted. Intervention group comprised caregivers of DPH pilot patients while the comparator group comprised caregivers who were discharged to other hospice providers.

**Results:**

A total of 76 (72%) DPH and 51 (59%) non-DPH caregivers responded. Against the comparator group, more DPH caregivers received information on what to expect (88% vs. 68%,  $P = 0.049$ ) and were informed of what to do (89% vs. 76%,  $P = 0.015$ ) at the time of the patient's death. A total of 70% of them reported they were always informed of the patient's condition (vs. 49%,  $P = 0.019$ ). Caregivers of DPH patients were also more confident about what to do at the time of death (51% vs. 41%,  $P = 0.031$ ). In the last week of life, a smaller share of DPH pilot patients was admitted to the hospital (13% vs. 43%,  $P < 0.001$ ) or attended the emergency department (12% vs. 39%,  $P < 0.001$ ).

**Discussion & Conclusion:**

The pilot achieved higher satisfaction with shared decision-making and caregiver empowerment. Reflecting greater home care support from DPH, fewer patients accessed acute care services in the last week of life. This model may serve as a guide for future development of hospice services locally.

**BP-HSR-05**

**A Tertiary Hospital Special Care Unit for Dementia is Cost-effective and Improves Outcomes**

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<sup>1</sup>*Khoo Teck Puat Hospital, Singapore*

**Background & Hypothesis:**

Patients with Dementia (PtWD) are often subjected to enforced dependency and experience functional decline and emotional distress during hospital stay. Enhanced care with individualised psychosocial interventions, minimally obtrusive medical care and a physical restraints-free practice holds promise to improve patient outcomes. We evaluate the effectiveness of a special care unit (SCU) that adopts such an enhanced care protocol.

**Methods:**

Prospective naturalistic cohort study whereby PtWD in SCU (n = 172) were compared with control group in usual care wards (n = 60) over 6 months. Assessments included patient demographics, dementia type and stage, comorbidities (Charlson Index) and acute illness severity. PtWD's well-being (Well Being Index), functional status (Modified Barthel Index-MBI) and quality of life (EQ5D) were assessed on admission and upon discharge. Univariate analysis assessed differences between groups on baseline and outcome variables, with multilinear regression adjustments for baseline differences between groups.

**Results:**

Forty-four percent of PtWD in usual care and none in SCU were restrained. SCU patients showed greater gains in function by MBI ( $\Delta = 9.1$ ,  $P < 0.0001$ ), well-being ( $\Delta = 2.3$ ,  $P < 0.0001$ ) and had a shorter length of stay (LOS) ( $14 \pm 13$  days vs.  $17 \pm 13$  days,  $P < 0.03$ ). SCU was associated with greater improvement in EQ5D index score ( $\Delta = 0.19$ ,  $P < 0.001$ ) after adjusting for baseline differences which translated to a QALY gain of 0.0475, assuming stability over 3 months. Estimating added cost of SCU stay over usual care at \$1400 for average LOS of 14 days per patient, incremental cost-effectiveness ratio fell within threshold for cost-effectiveness at \$28,000.

**Discussion & Conclusion:**

SCU for PtWD in acute hospitals improves clinical outcomes, reduces LOS and is cost-effective. It should be adopted on a wider scale for better care of PtWD.

**BP-HSR-06**

**Gender Differences in Singapore Pathological Gamblers**

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**Background and Hypothesis:**

Gender difference among pathological gamblers is a topic of interest for policymakers and treatment providers worldwide, but little research has been conducted in Singapore. Our study explores differences in demographic profile and clinical presentation between male and female gamblers.

**Methods:**

Participants comprised 977 outpatients (866 males, 111 females) fulfilling DSM-IV criteria for pathological gambling-seeking treatment at the National Addictions Management Service (NAMS) between July 2009 to March 2013. Baseline interviews included demographic and clinical information collected from medical records, Gambling Symptom Assessment Scale (G-SAS), Personal-Well-being Index (PWI), and other gambling severity measures.

**Results:**

Female gamblers were more likely to partake in non-strategic gambling (38.7% vs. 14.8%). Females preferred gambling on casino games, jackpot and lotteries. Males preferred gambling on soccer and horses. Females were less likely to engage in illegal (30.6% vs. 50.9%) and online (10.8% vs. 33.4%) gambling. Female gamblers had a longer latency between initial exposure to gambling and development of gambling problems (13.8 years vs. 11.5 years). Female gamblers who sought treatment at NAMS were older (47.7 years vs. 38.9 years), started gambling at a later age (28.3 years vs. 21.2 years), and were less likely to be employed (67.6% vs. 82%) or have tertiary level of education (28.2% vs. 50.1%).

**Discussion & Conclusion:**

Our findings echo studies regarding gender differences in gambling. Prevention and intervention should be targeted towards different genders. Future studies could explore differences in mental and physical health between genders, and how different cultural factors like gambling reasons could affect gambling patterns across genders.

**BP-NA-01**

**Assessment of Newly Referred Patients with Low Back Pain: A Nurse Clinician's Triage Experience**

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**Background & Hypothesis:**

The Brief Pain Inventory (BPI), Oswestry Disability Index (ODI) and the mental subscale of the Short form-36 Health Survey (SF-36) were used to measure baseline and improvement pain intensity, pain interference, disability from back pain and mental status respectively. To examine the clinical outcomes of pain, disability and mental health status of newly referred patients with low back pain (LBP) to the pain management clinic at Tan Tock Seng Hospital (PMC@TTSH).

**Methods:**

A retrospective cohort study of 282 patients was seen at PMC@TTSH from January 2011 to December 2011. The referral sources, baseline measures of BPI, ODI and SF-36 were administered during triaging. Independent t-test and Spearman correlation was used to analyse between-group differences and correlation between measures.

**Results:**

Out of 138 polyclinic referrals: 55.1% male, 49.9% female, mean age 43 years. A total of 72% of them reported mild pain, 28% reported moderate pain, with no report of severe pain; 64.4% reported pain interference in daily activities score >5, and experienced moderate-severe disability 52.9%. Out of 144 other source referrals: 50.1% male, 49.3% female, mean age 50.1 years. A total of 58% of them reported mild pain, 42% reported moderate-severe pain with 53% having pain interference in daily activities; 71.5% experienced moderate-severe disability. There were no significant differences between groups on all measures. Moderate to strong correlations were found between pain intensity, pain interference, disability and mental status for both groups ( $P < 0.01$ ).

**Discussion & Conclusion:**

In view of a higher percentage of patients reporting high pain interference and moderate-severe disability, focusing on patients' levels of pain intensity, pain interference and disability during the nursing triage will be more effective pain management at any pain clinic.

BP-NA-02

## Creative Music Therapy Improves Mood and Engagement in an Acute Tertiary Hospital for Older Patients With Delirium and Dementia

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<sup>1</sup>*Khoo Teck Puat Hospital, Singapore*

### Background & Hypothesis:

The hospital ward can be unfamiliar and stressful for older patients with impaired cognition, rendering them prone to agitation and resistive to care. Extant literature shows music therapy can enhance engagement and mood, thereby ameliorating agitated behaviours. This study evaluates the impact of creative music therapy (CMT) on mood and engagement in patients with delirium and/or dementia (PtDD) in an acute care setting. We hypothesise that CMT increases constructive engagement and pleasure, and reduces negative affect and negative engagement.

### Methods:

Twenty-five PtDD (age = 86.5+ years, MMSE 6/3 + 5.4 SD) were observed for 90 minutes (30 minutes before, 30 minutes during and 30 minutes after music therapy) on 3 consecutive days; day 1 (control condition without music) and days 2 and 3 (during CMT). Music interventions included: 1) clinical music improvisation e.g. spontaneous music making with musical instruments with therapist on the keyboard/guitar, and 2) playing familiar songs of patient's choice. Main outcome measures were mood and engagement (ME) assessed through Menorah Park Engagement Scale (MPES) and Observed Emotion Rating Scale (OERS).

### Results:

Wilcoxon signed-rank test showed a statistically significant positive change in Constructive and Passive Engagement ( $Z = 3.383$ ,  $P = 0.01$ ) in MEPS, and Pleasure & General Alertness ( $Z = 3.188$ ,  $P = 0.01$ ) in OERS, during CMT. The average Pleasure ratings of days 2 and 3 was higher than day 1 ( $Z = 2.466$ ,  $P = 0.014$ ). Negative engagement ( $Z = 2.582$ ,  $P = 0.01$ ) and affect ( $Z = 2.004$ ,  $P = 0.045$ ) were both lower during CMT compared to no music.

### Discussion & Conclusion:

These results suggest CMT holds much promise to improve mood and engagement of PtDD in an acute hospital setting. It was also observed that CMT transcended cultures and languages, making it useful to facilitate care in other areas such as physical rehabilitation and medical therapy.

**BP-NA-03**

**Factors Affecting Sedation Practices Amongst Nurses Caring for Mechanically Ventilated Patients**

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**Background & Hypothesis:**

Sedative therapy is widely utilised in intensive care unit (ICU) to suppress mechanically ventilated patients' awareness and to facilitate their tolerance toward critical care activities. While achieving the intended benefits of sedation is of paramount importance, the effort to minimise the side effects related to sedation remains a challenge because both under and over sedation have detrimental effects on patient's clinical outcomes. Sedation guidelines and protocols are developed to promote safe and consistent sedation practices. However, inconsistent practices were observed in overseas studies suggesting nursing behaviours potentially affecting sedation practices and patient's clinical outcome. Little is known in the local settings. This study aims to identify factors affecting sedation practices amongst nurses.

**Methods:**

The study was a cross-sectional survey using the Nurse Sedation Practices Scale. All registered nurses working in ICUs of an acute hospital were recruited via convenience sampling from 3 October 2013 to 23 October 2013.

**Results:**

A total of 102 (83.6%) questionnaires were returned; 75.5% of nurses have bachelor degree and 47 (46.5%) have more than 5 years of ICU experiences. Nurses' attitude were positively correlated to sedation practice ( $r = 0.56, P < 0.01$ ) and intention to sedate a patient ( $r = 0.49, P < 0.01$ ). None of the nurses' demographic data were found to affect sedation practices.

**Discussion & Conclusion:**

The study suggested that personal attitude has moderate significant impact on nurses' sedation practice and intention to sedate a patient. Education programme on sedation knowledge may improve sedation management and practice consistency.

## SGPCR-P-01

### Limited Health Literacy – How Do Healthcare Professionals Perceive the Problem?

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#### Background & Hypothesis:

Limited health literacy (LHL) is associated with poorer health outcomes. Studies have reported that the elderly, low-income and less-educated are more likely to have LHL and healthcare professionals (HCPs) commonly overestimate patients' literacy levels. The World Health Organisation (WHO) has advocated making health literacy sensitivity a healthcare management quality criterion. We investigated the perception of healthcare professionals (HCP) towards LHL and the differences between 2 groups of HCPs: (Group A) who reported seeing fewer LHL patients and (Group B) who reported seeing more LHL patients, towards patients with LHL.

#### Methods:

HCPs from 9 primary care centres participated in an anonymous, self-administered questionnaire which covered their views on frequency of seeing LHL patients, their perceptions on likelihood of LHL in different categories of patients, and the impact of LHL on patient healthcare choices.

#### Results:

The questionnaire response rate was 91%; 269 (56.5%) HCPs reported seeing fewer LHL patients (Group A) compared to 207 (43.5%) who reported seeing more LHL patients (Group B). Group B was more aware of the likelihood of LHL in different categories of patients e.g. elderly ( $P < 0.001$ ), less educated ( $P = 0.014$ ), low-income ( $P < 0.001$ ). Group B was also more likely to report that LHL would impact the patients' overall physical health (OR = 1.80, 95% CI, 1.22-2.66) and mental health (OR = 1.54, 95% CI, 1.03-2.30), their decision to use healthcare services (OR = 1.50, 95% CI, 1.00-2.25) and their likelihood of admission to hospital (OR = 1.58, 95% CI, 1.07-2.35).

#### Discussion & Conclusion:

HCPs' perception of LHL differ markedly. HCPs who perceived seeing fewer LHL patients were significantly less aware of the populations at high risk of LHL and the impact of LHL on patient care. Awareness of LHL amongst HCPs can be improved.

**SGPCR-P-02**

**Introduction of Liquid Meal Replacement in a Staff Weight Management Programme Yields Improved Weight Loss Results**

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**Background & Hypothesis:**

As a health-promoting institution, National Healthcare Group Polyclinics has in place a Workplace-Health Promotion (WHP) initiative. In order to combat rising overweight and obesity rates among staff, which average about 1% every year, a weight management programme was implemented from June 2012 to March 2014 across all 9 clinics. This study aimed to test the efficacy of incorporating liquid meal-replacement into the programme.

**Methods:**

The annual WHP health screening exercise collected number of employees having body mass index of more than 25 kg/m<sup>2</sup> and invited them to participate in this programme. Out of 257 staff, 64 enrolled after passing the Physical-Activity-Readiness Questionnaire. The 3-month weight management intervention was run in batches of 3 clinic clusters at different starting points. The first cluster was the control group. The second and third clusters were provided with 2 to 4 weeks supply of free Optifast and Glucerna meal-replacement sachets. Participants were advised to replace 1 meal daily. The duration of meal-replacement consumption, baseline and 3-month point measurements were documented.

**Results:**

A total of 60 staff completed the programme. The second and third clusters (n = 41) who were given meal-replacement demonstrated greater weight loss (-3.05% and -3.96% respectively) compared to the control group (n = 19), (-1.67%). There was a positive correlation between weight loss and meal replacement consumption for the combined cluster 2 and 3 ( $\rho = 0.1092$ ,  $P = 0.497$ ).

**Discussion & Conclusion:**

Staff consuming liquid meal-replacement had more significant weight loss than those who did not. In addition, staff consuming a longer duration of liquid meal-replacement also had more significant weight loss.

SGPCR-P-03

**Primary Care Surveillance for Prolonged Neonatal Jaundice Using Transcutaneous Bilirubinometry**

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**Background & Hypothesis:**

Neonatal jaundice surveillance in primary care in Singapore currently involves measuring serum bilirubin (SB). We studied 1) the use of noninvasive transcutaneous bilirubin (TcB) measured from the sternum using Draegar JM103 bilirubinometer and SB measured using standard laboratory methods, in neonates aged >13 days on surveillance for prolonged jaundice in a polyclinic, and 2) association of prolonged jaundice (SB  $\geq$ 150 Mmol/L at day 14) with gestational age, birth and current weights, type of feeding and ethnicity.

**Methods:**

Paired SB and TcB with information on gestational age, birth and current weights, type of feeding and ethnicity were obtained from jaundiced neonates aged days 13 to 16 followed up at a polyclinic. TcB measurements were correlated with SB measurements.

**Results:**

Paired SB and TcB values were performed on 154 babies. Prevalence of prolonged jaundice was 36% (n = 56). TcB correlated well with SB values. A cut-off TcB value of  $\geq$ 140 Mmol/L identified neonates with SB  $\geq$ 150 Mmol/L with a sensitivity of 100% (95% CI, 93-100), specificity 71% (95% CI, 61-79), positive predictive value 65% (95% CI, 53-75), negative predictive value 100% (95% CI, 94-100%), and positive likelihood ratio 3.44 and negative likelihood ratio 0.00. Using a TcB cut-off value of 140  $\mu$ mol/L, almost half (46%) of the neonates could avoid unnecessary invasive SB measurements. Prolonged jaundice was significantly associated with total breast feeding ( $P < 0.001$ ) but neither with prematurity, Chinese race nor current weight <98% birth weight ( $P > 0.05$ ).

**Discussion & Conclusion:**

TcB is a useful screening tool for prolonged neonatal jaundice. Using TcB in the surveillance for prolonged jaundice in primary care may halve the number of invasive SB measurements required.

**OP-AH-01**

**Strength-based Model of a Caregiver Support Group: Preliminary Results**

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**Background & Hypothesis:**

As the hospital shifts its focus to a more integrated community care concept, its strongest partners will be families and caregivers of our patients. Thus it is important that they receive attention for their varied unmet needs, namely, financial, physical, emotional and social. We therefore initiated caregiver support groups based on strength-based model concept.

**Methods:**

Provide support and education to caregivers through group work sessions at the outpatient clinic. Sixteen caregivers attended 3 sessions. Topics discussed included personal sharing by caregivers, knowledge of self-care and effective and constructive communication tips, available community resources.

**Results:**

Preliminary survey on caregivers revealed that 33.4% felt poor support from their roles as caregivers; 27% felt they were coping poorly with their loved ones and 27% also felt their communication and relationship with their loved ones was poor; 46% reported having poor knowledge about the mental illness and medication of their loved ones; 73% reported poor awareness of the community service available; 66% felt they have 1 or 2 friends whom they can confide in as their role as a caregiver.

**Discussion & Conclusion:**

The survey showed that there is a need to educate and support the caregivers. Therefore a strength-based model for caregiver support groups is an important component to include when we care for our patients with chronic illnesses. We will continue to monitor the outcomes of this initiative.

**OP-AH-02**

**A Study on Prevalence of Mouthwash Usage and Preferences Among 17 to 20-year-old Nanyang Polytechnic Teenagers**

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**Background & Hypothesis:**

The benefits and uses of mouthwashes have been well established and they are known to be an important adjunct in oral care. This study aimed to find out the prevalence of mouthwash usage and preferences among 17 to 20 year-old Nanyang Polytechnic (NYP) teenagers.

**Methods:**

A survey was conducted on 438 Nanyang Polytechnic teenagers aged 17-20 years. Participants received a questionnaire consisting of questions on the prevalence of mouthwash usage, knowledge on mouthwash and their mouthwash preferences.

**Results:**

The results showed that less than 50% of these teenagers use a mouthwash and for those who do, less than half of them use it on a daily basis. These teenagers prefer 500 ml-sized mouthwash bottles, and the majority chose blue and mint as their preferred colour and flavour of the mouthwash solution, respectively.

**Discussion & Conclusion:**

There should be more public education so as to increase the awareness and usage of mouthwash as an adjunct for better oral health. Dental professionals and manufacturers play an important role in encouraging and reinforcing positive oral hygiene habits among the teenage population, which is still an untapped market.

**OP-AH-03**

**Occupational Therapy Low Vision Rehabilitation: Programme Development and Evaluation**

**D BOEY**<sup>1</sup>

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Low vision has an increasing prevalence among older adults and creates difficulties in daily activities. Occupational therapists specialising in low vision rehabilitation are adept in assisting patients with low vision to engage fully in life. However, there was no occupational therapy low vision rehabilitation programme in Tan Tock Seng Hospital and these patients may not receive the help needed for daily activities. This project aimed to develop and evaluate a specialised occupational therapy low vision rehabilitation programme. The desired short-term outcomes were an increase in referrals and patients to demonstrate improvements in function.

**Methods:**

The author completed a certificate in low vision rehabilitation and used field notes taken during an attachment to a visual rehabilitation centre in the United States to develop the programme. Information about the referrals was monitored and a self-report assessment of performance in daily activities was done pre and postintervention.

**Results:**

Referrals increased from 1.83 per month in the first 6 months, to 5.5 per month in the next 6 months. Twenty four preintervention assessments and 5 postintervention assessments were done.

**Discussion & Conclusion:**

The first outcome for increase in referrals was met for the first year. The second outcome for patient care could not be ascertained due to limitations in the outcome measurement tool. The next step is to develop the programme with multidisciplinary collaborations and enhance the outcome measurement system. This programme can be used as a model for occupational therapists developing low vision rehabilitation programmes in Singapore.

**OP-AH-04**

**Impact of Patient Counselling by Coordinators on Tertiary Prevention of Diabetic Kidney Disease in Primary Care**

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**Background and Hypothesis:**

The Nephrology Evaluation, Management and Optimisation (NEMO) programme was implemented in all 9 National Healthcare Group Polyclinics to augment the management of diabetic kidney disease (DKD). The essence of NEMO is the utilisation of coordinators in each polyclinic to counsel and monitor DKD patients through the optimisation of angiotensin-converting enzyme inhibitor (ACEI)/angiotensin receptor blocker (ARB) therapy.

**Methods:**

A total of 2671 patients had been counselled on DKD, lifestyle interventions and their ACEI/ARB therapy. Information cards with serial albuminuria results cards were used to empower patients in self-monitoring. Survey was conducted by the coordinators pre and postcounselling to determine the awareness on DKD, ACEI/ARB therapy and the benefit of counselling.

**Results:**

Fifty-five percent of the 2671 respondents did not know they had DKD and 53.8% were not aware of the indication of ACEI/ARB therapy precounselling; 96.3% agreed to have ACEI/ARB initiated or increased and 97.6% agreed to attend their regular follow-ups for DKD. Overall, 97.9% were more aware of their conditions and felt that the session was beneficial.

**Discussion & Conclusion:**

This study demonstrated that individualised counselling session increases patients' awareness of DKD and the importance of ACEI/ARB optimisation. Coordinators play a critical role in addressing the knowledge gap in DKD and self-management. Increased awareness is a critical step in any optimisation of care to empower patients to manage their conditions and compliance to treatment.

**OP-AH-05**

**A Combined Orthopaedic and Physiotherapy Service for Patients With Spinal Disorders: A Patient Satisfaction Index Outcome**

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**Background and Hypothesis:**

The setting for treating spinal disorders traditionally starts with orthopaedic specialist consult followed by physiotherapy consult. However, no previous study has looked at the satisfaction levels of patients by combined orthopaedic and physiotherapy consultation service. This study was done to determine whether a combined orthopaedic and physiotherapy consultation service can improve satisfaction levels in patients with spinal disorders.

**Methods:**

The study was done retrospectively over an 8-month period. One group saw the spine consultant and the physiotherapist together. The other group was seen by the spine consultant alone. Satisfaction survey forms were given to the patients as a routine process postconsultation. Questions regarding advice and understanding condition, time factor, results, ethics and professionalism were rated from 1 to 5. Independent t-tests were used to analyse the differences between 2 groups.

**Results:**

A total of 200 people, aged 18 to 80 years, completed the survey; 80 patients went through the combined consultation and 120 for orthopaedic consultation alone. The combined service achieved greater satisfaction than the orthopaedic consultation alone (mean difference 2 [95% CI, 1.6 to 2.7],  $P < 0.001$ ). Advice and understanding the condition showed the strongest correlation to the satisfaction score in combined group ( $r = 0.82$ ,  $P < 0.0001$ ).

**Discussion & Conclusion:**

A combined orthopaedic and physiotherapy service has provided significantly greater satisfaction compared with orthopaedic specialist alone. Better understanding of the condition and management through combined service may have contributed to the overall satisfaction of the service.

**OP-AH-06**

**Redesign and Restructure of ECG Leads Placement in Invasive Cardiac Laboratory Procedure Rooms With the Application of MyCare Principles**

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**Background & Hypothesis:**

Electrocardiogram (ECG) plays an important role to determine any abnormalities during angioplasty. Our main target is to cut down the time of applying ECG leads without inaccuracy, to avoid unstable ECG tracings and to prevent damaging of the leads, thus saving costs on damaged equipments.

**Methods:**

All leads were labeled and colour-coded according to the ECG placement diagram available on the ECG hub. Leads required for the procedure (RA & LA, V2 & V5 and LL & RL) were paired up and isolated from those that were not required. Leads were relocated and arranged according to the patient's body alignment to the X-ray table.

**Results:**

Stable ECG tracing. Shorter time for preprocedure preparation, from 45 seconds to less than 25 seconds. Cost-effective as lesser leads were damaged. Easier application under stressful circumstances. Tidier working environment.

**Discussion & Conclusion:**

MyCare principles were attained by: 1) Safety: ensure correct placement of the leads to prevent misinterpretations; 2) Sort: the commonly used leads are separated; 3) Straighten: the leads are kept according to the 12-lead ECG connection on patient's body; 4) Shine: the labels are enforced with a layer of scotch tape to maintain hygiene and patient safety; 5) Standardise: all 3 rooms are under same settings; and 6) Sustain: daily routine check is enforced by nurses and technicians.

OP-AH-07

## Evaluating a Case Management Service in a Tertiary Psychiatric Hospital in Singapore

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### **Background & Hypothesis:**

Case management (CM) for general, forensic, community and psychogeriatric patients commenced in 2003. Its objective was to coordinate care through the promotion of seamless care transitions thus reducing care fragmentation. CMs are guided in their clinical role by their ward psychiatrist. They adopt the “Brokerage” model of case management and follow specific CM clinical protocols and risk assessment framework. They telephone patients within 48 hours of their discharge and continue to support them in their physical and psychological healthcare needs. This paper will highlight the outcomes of their service.

### **Methods:**

Data mining of patients on CM in 2012 and 2013 was done and the results analysed with Microsoft Excel spreadsheet.

### **Results:**

The total number of patients on CM in 2011 was 5286. The mean average for patients who defaulted treatment was 11% for schizophrenia and delusional disorders, the major psychiatric diagnosis, and 14% for other diagnoses. Mean readmission rate within 30 days was 18.3% in 2012, 6776 on CM. Default treatment mean average 7.9% for schizophrenia and delusional disorders and 13.6% for other diagnoses. Mean readmission rate within 30 days: 16.1%. In 2013, 5320 patients on CM. Treatment default rate of 7.6% for schizophrenia and delusional disorders and 11.5% for other diagnoses. The mean readmission rate was 14.7%.

### **Discussion & Conclusion:**

The rapid changes in healthcare technology and services pose severe navigating issues to patients. CM will be one service that can assist their navigation. CM will help reduce health cost as only essential resources are recommended and utilised.

**OP-AH-08**

**Next-generation-sequencing of Whole Mitochondrial DNA Uncovers Previously Undetected Rare Pathogenic Mutations in Patients With Leber's Hereditary Optic Neuropathy**

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**Background & Hypothesis:**

Molecular diagnosis of Leber's hereditary optic neuropathy (LHON) is crucial to exclude other causes of vision loss prior to treatment. LHON is caused by point mutations in mitochondrial DNA (mtDNA). Current methods target common mutations and rare variants are missed, leaving patients without a diagnosis. We aim to develop a next-generation-sequencing (NGS) test to detect all LHON mutations including rare variants.

**Methods:**

Two overlapping regions covering the entire mtDNA sequence were PCR-amplified in 10 mtDNA samples with known common LHON mutations that were previously detected by targeted-Sanger sequencing. The overlapping amplicons were enzymatically fragmented, tagged with unique adapter/index sequences and pooled for paired-end sequencing on Illumina MiSeq sequencer. Sequence alignment and variant-calling were performed by Avadis-NGS software using the complete mitochondrion reference sequence (GenBank\_NC\_012920). Variants with strand bias of  $\leq 1\%$  and  $\geq 95\%$  supporting reads were selected for further confirmation using targeted-Sanger sequencing.

**Results:**

Known common LHON mutations were detected by NGS in all samples (*G3460A* (n = 1), *G11778A* (n = 6), *T14484C* (n = 3)). In addition, 6 homoplasmic variants in 6 samples were detected by NGS and confirmed by targeted-Sanger sequencing. Of these, 2 are rare LHON variants (*T12811C*, *G9804A*) found in 2 separate samples with *G11778A*. Sequencing coverage was 100% with minimum read depth of 200x in all samples.

**Discussion & Conclusion:**

We developed a whole mtDNA-NGS test and found 2 secondary-LHON variants that were missed by targeted-Sanger sequencing. *T12811C* with *G11778A*, was predicted to increase penetrance and expressivity, while *G9804A* was associated with encephalomyopathies. This information which was previously missed, can affect clinical management and improve treatment outcome.

**OP-AH-09**

**Regular Phone Contact Aids the Sustenance of Patient's Community Care Under the MH-GPPP**

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**Background & Hypothesis:**

The Mental Health-General Practitioner Partnership Programme (MH-GPPP) was introduced by IMH in 2005 to reduce stigma and it seeks to promote convenient, conducive and sustainable community care for stabilised patients with mental health issues. Patients often default treatment due to the stigma of mental illness. Although the programme did benefit some patients, a significant number of patients dropped out of the programme due to various reasons. Therefore, a strategy implemented was for the case manager to contact these patients regularly.

**Methods:**

Year-on-year statistics for FY11, FY12 and FY13 were collected for the total number of referrals, in-care patients, and out-of-programme patients. The case manager would also contact the patients after the first 3 appointments, and subsequently at 6 monthly intervals. A verbal consent was taken during the first phone call to the patient after referral. The results were tabulated using the Microsoft Excel.

**Results:**

At the end of FY 13, there was a total of 745 patients in the programme. Between FY11 and FY13, a total of 548 patients were referred to the programme, and the dropout rates between FY 11, FY12 and FY13 are 18.45%, 17% and 12.15% respectively. It was also noted that 97.4% of the patients responded positively to receiving follow-up calls from the case manager.

**Discussion & Conclusion:**

It could be seen from the results that with regular communication with patients, it can help to reduce patient out-of-care rates as patients were able to receive psychoeducation and reassurance over the phone with the case manager of the programme.

**OP-AH-10**

**Early Mobilisation in Surgical Intensive Care Unit – A Quality Improvement Project**

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**Background & Hypothesis:**

Early mobilisation of patients in ICU has shown to minimise ICU acquired weakness, reduce hospital length of stay and result in better functional outcomes. However, locally there is no documented practice of early mobilisation in ICU. Objective: To know the current level of mobilisation in surgical intensive care unit (SICU), and to embark on a quality improvement project to improve mobilisation practice.

**Methods:**

Design: A retrospective and prospective clinical practice improvement project (CPIP) on early mobilisation of patients in SICU setting: 16-bed SICU in acute care restructured hospital. Participants: 64 eligible patients warded in SICU for the study period of 6 months intervention: 1) Early mobilisation eligibility criteria guidelines; 2) Revised work process; 3) Interdisciplinary communication board.

**Results:**

Primary outcome: At the end of CPIP, 84.99% of all eligible patients were mobilised within 3 days of SICU stay, compared to only 27.87% of eligible patients before CPIP implementation. Secondary outcomes: Average length of stay in ICU and hospital is reduced by 2.11 and 4.5 days respectively; Percentage of patients discharged to their own home and rehabilitation services had increased by 4.44% and 6.67% respectively; Percentage of patients discharged to nursing homes decreased by 7.78%; Able to successfully sustain the improvement of ICU mobilisation, even after completion of CPIP.

**Discussion & Conclusion:**

With this improvement project, the percentage of patients mobilised was greatly increased and also impacted the patients functional and hospital outcomes. Hence, this model should be applied in all ICUs to promote early mobilisation with the ICU specific eligibility criteria guidelines for better patient care.

**OP-AH-11**

**Enhancing Psychogeriatric Care With the Case Management Process**

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**Background & Hypothesis:**

The first 2 weeks after discharge is extremely crucial for patients as inappropriate discharge planning and inadequate postdischarge support can result in patients relapsing, being readmitted and reducing their quality of life. Therefore, this paper aims to highlight the importance of a case manager's role in providing adequate patient resources to aid patients' stability in the community upon discharge.

**Methods:**

Microsoft Excel was used for datamining of patients accepted in the psychogeriatric programme between January 2012 and December 2013 and the results analysed.

**Results:**

A total of 397 patients (M = 380, F = 17) were accepted for case management. All patients were above 65 years, majority of them are Chinese (n = 327), and 42.3% of them diagnosed with dementia; 1238 sessions of patient and family psychoeducation and counselling were conducted in the past 2 years; 1021 linkages and referrals to essential services, within and outside the hospital, were made. These linkages included 130 referrals to nursing homes and 47 referrals to day care centres; 809 postdischarge calls were also made. It was noted that of the 397 patients, 4.5% of the patients were readmitted within 28 days of discharge, and 8.6% of the patients were readmitted more than 28 days after discharge. There were no suicides or crisis intervention or police assistance needed for readmission purposes.

**Discussion & Conclusion:**

Psychogeriatric care is a multidisciplinary approach which includes case management. Ensuring appropriate resource provision often leads to positive postdischarge outcomes and adequate support to continue living in the community or in structured care settings.

**OP-AH-12**

**Persistence of Neurocognitive Impairments in Adult Patients With Schizophrenia: A Longitudinal Perspective**

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**Background & Hypothesis:**

Neurocognitive impairments (including working memory, attention, executive functioning) have been found in patients with schizophrenia (SCZ), and they are associated with poorer psychosocial functioning. Scarcity in longitudinal studies urged us to investigate the progression of these neurocognitive impairments alongside clinical features prospectively. In light of extant data, we hypothesised that neurocognitive impairments remained stable in the context of improved symptomatology and psychosocial functioning over time.

**Methods:**

At Time 1, 130 SCZ and 68 age- and gender-matched healthy controls (HC) were assessed on neurocognition, psychopathology and psychosocial functioning using Brief Assessment of Cognition in Schizophrenia (BACS), PANSS and GAF respectively. At Time 2 (mean years difference between Time 2 minus Time 1 = 3.83, SD = 0.906), 51 subjects (24 SCZ, 27 HC) were reassessed with the same scales.

**Results:**

At both time points, HC performed significantly better in most neurocognitive domains (verbal memory, working memory, motor speed, attention, speed of processing, and verbal fluency) compared to SCZ (all  $P < 0.05$ ). Compared to Time 1, HC (but not SCZ) showed significant improvements in verbal and working memory, executive functioning and overall BACS scores at Time 2 (all  $P < .05$ ). No improvement in neurocognitive performance was observed in SCZ despite improvement in psychosocial functioning and stable psychopathology and treatment dose over time.

**Discussion & Conclusion:**

Our study highlighted that neurocognitive impairments persevered over time despite improvement in psychosocial functioning in schizophrenia. This behoves further work to examine better cognitive rehabilitation strategies to improve such enduring neurocognitive deficits.

**OP-AH-13**

**An Initiatory Outlook of a Structured Programme of Motivational Support for Outpatients With Frequent Admissions To Be Compliant With Treatment in a Tertiary Psychiatric Hospital**

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**Background & Hypothesis:**

A recent survey on 67 inpatients on 16 October 2013 revealed that patients do not come for their clinic appointments because of: 1) financial and social problems, 2) lack of insight towards their illness, 3) fearful of being readmitted, and 4) medication was not effective. Therefore funding for a pilot programme which aims at reducing readmission rates in patients who suffer relapses of their illness when they default treatment was sought after.

**Methods:**

Patients who are admitted more than 3 times a year are recruited in the programme and will undergo 12 follow-up sessions at the outpatient clinic. Individualised personalised psychoeducation and counselling sessions are provided together with incentives to motivate them. Patient's biosocial and psychological needs, medication compliance, functional improvement (CGI and GAF) and risk assessment will also be measured.

**Results:**

Presently, 38 patients have been recruited with 19 patients who claimed to be strongly motivated to return for their TCU while 20 patients felt the programme will be beneficial. Five have completed the first TCU, 8 have completed the second TCU, 4 have completed the third TCU, 11 have completed the fourth TCU and 6 are waiting for their first TCU. Four have dropped out of the programme since the programme commencement in February 2014. Overall, 90% of patients are showing potential to remain compliant to treatment.

**Discussion & Conclusion:**

With medication compliance, the incidences of illness relapse and hospital readmission will be reduced, thus the importance of this programme.

**OP-AH-14**

**Taste Change in an Asian Cohort After Sleeve Gastrectomy**

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**Background & Hypothesis:**

Studies have shown that there is taste alteration following bariatric surgery in Caucasians. This study examines if altered taste perception influences eating behaviour and weight loss outcomes after laparoscopic sleeve gastrectomy (LSG) in Asians.

**Methods:**

This DSRB approved prospective study recruited 120 patients undergoing LSG at NUH between 2012 to 2014. Questionnaires were administered 3 months post-LSG. Taste sensitivity for sweet, sour and salty foods and their influence on weight loss were evaluated. Independent samples t-test were carried out to evaluate the effect of taste change on weight loss.

**Results:**

There were 68 women and 52 men with mean age of  $36.6 \pm 12.8$  years. The mean BMI was  $42.3 \pm 7.2$  kg/m<sup>2</sup> and ethnicity comprised of 40.8% Malays, 34.2% Chinese, 21.7% Indians and 3.3% of other Asians. Sensory change in taste was reported by 33 (27.5%) patients. There was no significant difference in postoperative weight loss between those who experienced taste changes versus those who did not ( $18.9 \pm 7.2$  kg vs.  $19.5 \pm 8.0$  kg,  $P = 0.70$ ). Changes in taste perception for sweet, salty and sour foods were 90.9% (n = 30), 57.6% (n = 19) and 21.2% (n = 7) respectively. Most subjects experienced a heightened sensitivity to the respective tastes: 28 (93.3%), 19 (100%) and 6 (85.7%). The taste dysfunction compelled 28 (100%), 16 (84.2%) and 5 (83.3%) number of subjects consuming sweet, salty and sour foods to reduce their intake.

**Discussion & Conclusion:**

Taste change was evident in over a quarter of the post-LSG patients with majority of them experiencing increased sensitivity to taste. However, this did not translate into better weight loss for those patients with taste change.

**OP-AH-15**

**Reducing Inpatient Supply and Pharmacy Dispensing Errors**

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**Background & Hypothesis:**

Medication error is a significant problem in hospitals. In 1999, the Institute of Medicine (IOM) released a report called 'To Err is Human: Building a Safer Health System'. The committee believed that the safety of care, defined as "freedom from accidental injury", is a property of a system of care. It is in this spirit that the pharmacy department embarked on this project to reduce medication errors in an inpatient pharmacy setting.

**Methods:**

A Failure Mode and Effects Analysis was conducted for the inpatient pharmacy. The supply process was systematically looked into and vulnerable areas or processes were identified. After identification, improvement methodology such as the Plan-Do-Study-Act (PDSA) was adopted to reduce the risk of these processes.

**Results:**

Three cycles of PDSA were carried out over a period of 2 years. These cycles include strategies such as 1) implementation of bin codes in inpatient dispensary, 2) education of doctors on correct item strength prescribing, and 3) tallman lettering and standardised coloured strengths to differentiate look-alike sound-alike (LASA) drugs. An indicator of number of near misses or errors was chosen to track the effectiveness. The denominator for the indicator was per 1000 supply and prescriptions. After implementation of the initiatives, the mean error rate decreased from 2.62 to 0.90.

**Discussion & Conclusion:**

It was observed that the error rate decreased after implementation of the various strategies, giving testimony to their effectiveness. Moving forward, with new drugs being added to the hospital's drug formulary, the LASA list has to be reviewed regularly to reduce preventable medication error.

**OP-AH-16**

**Gender Differences in First Episode Psychosis**

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**Background & Hypothesis:**

Gender differences have been reported in first episode psychosis (FEP) patients across the world, but have not been explored in a Singaporean sample. This research study aims to identify the gender differences among multiethnic, Asian patients attending the Early Psychosis Intervention Programme (EPIP) in Singapore.

**Methods:**

Data for this study was derived from 533 patients in the EPIP database. Sociodemographic data, Positive and Negative Syndrome Scale (PANSS) and Global Assessment of Functioning (GAF) scores at baseline, 3-months, 6-months and 1-year was obtained from 2007 to 2011. T-tests were used to analyse the sociodemographic data, PANSS and GAF scores.

**Results:**

Significant gender differences were identified in terms of age, marital status, referral sources and PANSS and GAF scores over 1 year in the cohort. More women were older, married or divorced ( $P < 0.0001$ ) and referred from GP/Polyclinics and relatives ( $P < 0.0001$ ). They showed better improvement over 1 year in PANSS positive, PANSS total and GAF disability scores ( $P < 0.0001$ ). Men were more likely to be single/unmarried and referred from other sources ( $P < 0.0001$ ).

**Discussion & Conclusion:**

Overall, women show better improvement than men. Our findings that women were older, had better social functioning (e.g. being married) and showed better course of illness is in line with previous research. Previous studies argue that FEP programmes should be tailored for gender differences. In this sample, men could benefit from a more intensive programme to aid their recovery.

**OP-AH-17**

**Novel and Efficient Single-Tube PCR-Only Molecular Diagnostic Test for Comprehensive Assessment of *FMRI* CGG Repeat Size, AGG Interruption Pattern and Methylation Status in Fragile X Syndrome and *FMRI*-Related Disorders**

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**Background & Hypothesis:**

Hyperexpansion of a CGG repeat within the *FMRI* gene and its consequent methylation-mediated silencing leads to fragile X syndrome (FXS). Accurate characterisation of expanded *FMRI* alleles in affected individuals demands comprehensive assessment of CGG repeat size, AGG interruption pattern and methylation status. There is currently no single test that provides such comprehensive information. We describe a novel single tube PCR-only assay for comprehensive and accurate molecular diagnosis of FXS and other *FMRI*-related disorders.

**Methods:**

Differentially-labeled primers specific to methylated and unmethylated *FMRI* alleles were used for simultaneous amplification from bisulfite-modified DNA in a methylation-specific triplet-primed PCR (msTP-PCR) reaction, and products were resolved by capillary electrophoresis. Twenty-four genotype-known reference DNAs, and 107 patient samples previously characterised by PCR and/or Southern blot analysis, encompassing normal to fully expanded *FMRI* genotypes, were used to evaluate assay sensitivity and specificity.

**Results:**

Repeat size, AGG interruption pattern and methylation state were correctly identified in all tested samples, which together represent the complete spectrum of *FMRI* allele sizes. The assay also detected skewed X chromosome inactivation when present in females, and somatic mosaicism of *FMRI* alleles in fragile X males.

**Discussion & Conclusion:**

This novel single tube molecular diagnostic assay follows a simple analysis workflow and provides comprehensive information necessary for accurate diagnosis and prognosis of *FMRI* related-disorders, virtually eliminating the need to reflex any patient samples for Southern blot analysis.

**OP-AH-18**

**Positive Mental Health Among Patients With Schizophrenia-spectrum Disorders**

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**Background & Hypothesis:**

The Positive Mental Health (PMH) instrument is a validated self-report measure which has previously been used to establish PMH levels in a large general population sample in Singapore. It generates the total PMH and subscale scores for General Coping (GC), Emotional Support (ES), Spirituality, Interpersonal Skills (IS), Personal Growth and Autonomy (PGA) and Global Affect (GA) with scores ranging from 1 to 6. We measured PMH levels among people with schizophrenia-spectrum disorders and compared them with the general population.

**Methods:**

Participants (n = 100) were outpatients, aged 21 to 65 years with schizophrenia-spectrum disorders. Sociodemographic information was obtained and all participants completed the PMH instrument. Instrument reliability was established and descriptive analyses were used to measure total PMH and subscale scores among participants, which were then compared with the general population.

**Results:**

The PMH instrument had high reliability (Cronbach's alpha = 0.96). The mean total PMH score was 4.21. Older participants (40-65 years) had significantly higher scores for total PMH, PGA and GC as compared to those aged 21 to 39 years old. Women had a significantly higher ES ( $P = 0.002$ ) and GA ( $P = 0.026$ ) scores as compared to men. Mean total PMH score ( $4.21 \pm 0.83$ ) among participants was significantly lower when compared to that of the general population ( $4.53 \pm 0.74$ ), as were all subscales scores, except for Spirituality.

**Discussion & Conclusion:**

Findings suggest that PMH is significantly lower among people with schizophrenia-spectrum disorders when compared to the general population and differs by patients' sociodemographic characteristics. This highlights the need for improving mental health by implementing well-being interventions targeting this group.

**OP-AH-19**

**Sleep Problems Among People With Major Depressive Disorders (MDD) in Singapore**

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**Background & Hypothesis:**

This study aimed to establish the prevalence of sleep problems among Singaporeans with major depressive disorder (MDD), as well as its sociodemographic and clinical correlates.

**Methods:**

Data was collected from the Singapore Mental Health Study, a cross-sectional epidemiological survey of the local residential population aged >18 years. Using the Composite International Diagnostic Interview version 3.0, 417 among 6616 respondents were identified with lifetime prevalence of MDD and included in the analysis. Sleep problem was defined as “having a lot more trouble than usual either falling asleep, staying asleep, or waking too early nearly every night during that period of being (sad/empty/depressed) lasting several days/two weeks or longer”.

**Results:**

The prevalence of any sleep problem among those with MDD was 90.9%. Multiple logistic regression analyses revealed ethnicity ( $P < .01$ ) and education ( $P < .05$ ) to be significantly associated with sleep problem(s). Malays were less likely to have sleep problem(s) than the Chinese. Those with secondary education and below were more likely to have sleep problem(s) compared to those with university education. Those with MDD and sleep problems were found to have higher odds of comorbid diabetes (12.6) and hypertension (6.1) than those with MDD only. However, only 28.6% among those with MDD and sleep problems sought help and 6% were prescribed benzodiazepine.

**Discussion & Conclusion:**

The proportion of Singaporeans with MDD who have sleep problems is high, along with their risk for the above major chronic medical conditions. Given this high prevalence, patients with MDD must be screened and treated for sleep problems.

**OP-AH-20**

**Prevalence of Major Depressive Disorder in Diabetics and its Associated Risk Factors**

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**Background & Hypothesis:**

Depression has been associated with decreased adherence to medications and self-care regimens, leading to worse medical outcomes in diabetics. Studies have also shown that treatment of depression improves glycaemic control in diabetic patients. This paper aims to study the prevalence of major depressive disorder (MDD) and its associated sociodemographic and behavioural risk factors in a multiethnic Asian population.

**Methods:**

Data was collected as part of the Singapore Mental Health Study: a population-based, cross-sectional, epidemiological study of 6616 Singapore residents, aged 18 years and above. The study was conducted to establish lifetime and 12-month prevalence of mental disorders using the Composite International Diagnostic Interview (CIDI), through face-to-face interviews. Data on diabetes was collected using a self-report measure.

**Results:**

A total of 653 respondents (9.9%) indicated that a doctor had ever diagnosed them with diabetes. Among them 47.5% were females (n = 310) and mean age of those with diabetes was 60 years. The lifetime and 12-month weighted prevalence of MDD among those with diabetes was 4.5% and 2%, respectively. After adjusting for sociodemographic factors, smoking and overweight status, it was found that among those with diabetes, the unemployed (vs. employed) (OR: 10.14), preuniversity educated (vs. university) (OR: 8.32) and those aged 18 to 34 years (vs. 65 + years) (OR: 8.81) were more likely to be depressed.

**Discussion & Conclusion:**

Diabetic patients should be screened for depression, in particular patients who are younger, unemployed and with preuniversity education. This is to ensure early diagnosis and treatment of depression thus preventing poor health outcomes in this population.

**OP-AH-21**

**Prevalence of Polypharmacy in the Transition of Care from Tertiary Hospitals to a Community Hospital**

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**Background & Hypothesis:**

Polypharmacy, defined as taking 5 or more types of medications, is prevalent in the patients admitted and discharged from community hospitals. Understanding the extent of the polypharmacy in the transition of care will provide information to devise a more comprehensive discharge plan to enable patients and caregivers to safely manage polypharmacy postdischarge. There was no similar study available.

**Methods:**

The list of medications upon admission and discharge for patients discharged on a particular month were compared and analysed. Non-medicated moisturisers/cleansing soaps were excluded.

**Results:**

Ninety-eight percent of the patients were above 55 years old, with 20% above 85 years old. Upon admission, they had an average of 11 types of medications in 20 daily doses. Ninety-five percent had more than 5 types of medications with 56% having more than 10. Seventy-seven percent of the patients had analgesic and 79% had laxatives. After an average stay of 31 days in the community hospital, they were discharged with an average 10 types of medication in 15 daily doses. Eighty-five percent had more than 5 types of medications with 40% more than 10. While the prevalence of analgesic reduced to 67%, laxative usage increased to 84%.

**Discussion & Conclusion:**

The study showed that many patients were admitted and discharged from the community hospital with more than 10 types of medications. Management of polypharmacy requires good cognitive and organisation skill. This study highlighted the need and provided information for the development of postdischarge medication management like early identification of at-risk patients and providing them with adequate postdischarge support.

**OP-AH-22**

**Improving Adherence to Treatment in High-risk Patients With Mental Health Issues**

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**Background & Hypothesis:**

Literature does support that intensive case management for high-risk patients assist them to cope more effectively in the community. In IMH, patients identified with high-risk tendencies, namely violence and aggression, are provided with intensive case management which entails comprehensive active care in the community (regular telephonic case management calls, letter reminders for their appointments and meeting them for their appointments at the outpatient clinics). This intensive care commences even at the inpatient setting where patients and their caregivers are psychoeducated on their illness and multidisciplinary team discharge plans are discussed. This paper will describe the various strategies utilised to promote treatment compliance.

**Methods:**

All patients with high-risk tendencies, case managed from January to December 2013 were identified and enlisted. Analysis was done using Microsoft Excel.

**Results:**

A total of 119 patients were identified to be placed on intensive case management care, 166 telephonic calls and psychoeducation were provided. The case manager rang all patients within 2 days of discharge and 3 days before their clinic appointments. Reminder letters were also sent if they missed on their appointments; 85% came for their follow-up, 12% defaulted; 3% were readmitted to hospital before their first appointment date. These rates are lower than the hospital rates of 14%.

**Discussion & Conclusion:**

It is encouraging that with intensive case management, our patients are able to cope more effectively in the community with lowered risk of violence and aggression and minimal readmissions. This in turn, benefits them as well as the community and our organisation.

**OP-AH-23**

**Optimising Safe Use of Agomelatine – Improving Compliance to Monitoring Guidelines**

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**Background & Hypothesis:**

Agomelatine, a drug indicated for the treatment of major depressive episodes, has been associated with several serious cases of hepatotoxicity including hepatic failure. To support its safe use in the hospital, the Pharmacy and Therapeutics Committee has instituted a set of monitoring guidelines, which includes recommendations to perform liver function tests (LFTs) at treatment initiation, dose increment, and maintenance therapy. However, the presence of the guidelines did not suffice in safeguarding the appropriate use of agomelatine. This study aims to evaluate the effectiveness of a systemic intervention in promoting the required monitoring of LFTs.

**Methods:**

A retrospective audit was conducted on all patients who were prescribed agomelatine pre and post intervention. In total, 58 patients were reviewed (31 pre and 27 postintervention). Medications prescribed, laboratory measurements and case notes were analysed. The intervention consisted of an iPharm alert where prescribers receive automatic prompts whenever agomelatine was ordered and LFT monitoring was due. The alert was also customised to match the timeframe of monitoring required and linked to the laboratory order screen for convenient ordering.

**Results:**

At baseline, it was observed that only a mere 12.9% of patients on agomelatine had their LFTs monitored appropriately. Postintervention, compliance to monitoring guidelines showed a marked improvement to 48.1%.

**Discussion & Conclusion:**

Systemic measures are vital to ensure appropriate drug use especially when additional, out-of-norm monitoring parameters are required. The encouraging statistics from this study highlights the effectiveness of implementing systemic changes that would positively impact medication safety.

**OP-AH-24**

**To Promote Interprofessional Learning and Standardised Training for Tracheostomy Management**

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**Background & Hypothesis:**

In TTSH, tracheostomy trainings are conducted for different professions by their respective department. A lack of standardised training and practice may contribute to reduced efficiency and poor tracheostomy care. This study aims to identify participants' knowledge and guide us in learning needs analysis and development of a training curriculum.

**Methods:**

Doctors and nurses from 2 general wards, 4 ICUs and 3 allied health departments were surveyed using convenience sampling. Participants completed a 22-question precourse survey including demography, confidence level and related knowledge: A) indication, B) parts of tracheostomy tubes, C) cleansing, D) emergency care, E) speech and swallowing, F) humidification, G) weaning, and H) monitoring.

**Results:**

A total of 143 participants participated in the survey: doctors 20% (n = 28), nurses 44% (n = 63), speech therapists (ST) 3% (n = 5), physiotherapists (PT) 20% (n = 28) and respiratory therapists (RT) 13% (n = 19). Knowledge related to: A) doctors and RT achieved average score of >90%; others scored <90%. B) nurses, RT and ST scored >80%; doctors and PT scored <70%. C) ST scored the lowest at 60%; others scored >80%. D) nurses and PT scored >85%; doctors scored 67.48%. E) ST scored 86.67%; others scored <60%. F) RT and nurses scored >75%; others scored ≤60%. G) PT and ST scored >80%; nurses and RT scored <70%; doctors scored 57.47%. H) RT scored 73.68%; others scored ≤40%. Lastly, 17% rated their knowledge as good, 52% rated as average and 29% as poor.

**Discussion & Conclusion:**

Nurses scored averagely for all aspects of tracheostomy care which is expected of their job scopes. Most of the allied health professionals scored higher in their specialties. Doctors scored relatively lower in 4 areas including emergency care likely because of their limited exposure to tracheostomy caseloads (most of them have 1-2 year experience in medical field). These findings have highlighted that there are knowledge gaps among the healthcare professionals and developing a standardised interprofessional tracheostomy training is essential to improve patient care outcome.

**OP-AH-25**

**Clinical Profiles of Patients and their Compliance With Oral Naltrexone for Alcohol, Opioid and Gambling Addiction in the National Addictions Management Service at the Institute of Mental Health (IMH), Singapore**

**ZA TOH<sup>1</sup>, PR WIJESINGHE<sup>1</sup>**

<sup>1</sup>*Institute of Mental Health/Woodbridge Hospital, Singapore*

**Background & Hypothesis:**

Despite being used as an adjunct to substance abuse programmes, concerns have been raised of patients who are started on oral naltrexone failing to continue treatment, and those who comply, achieving no benefit. We examined prescriptions for oral naltrexone in IMH to identify patient characteristics, compliance and the likelihood of beneficial outcomes.

**Methods:**

Naltrexone prescriptions dispensed for a period of 1 year were analysed for patient characteristics, compliance (defined as treatment visits for a continuous supply of naltrexone for up to 3 months), and patient reported outcome of treatment.

**Results:**

Of 52 patients (42 male, 10 female), 44% (n = 23) were compliant to naltrexone. Among those, only 44% (n = 10) were continuously obtaining naltrexone supply for 6 months or more. Eighty-one percent (n = 42) were using naltrexone for alcohol addiction, 13% (n = 7) for problem gambling and 6% (n = 3) for opioid dependence. Of those, 65% (n = 34) experienced a reduction in addiction craving (alcohol, heroin or gambling). Fifty-six percent (n = 29) were non-compliant and among those, 59% (n = 17) defaulted follow-up with reason unknown, 10% (n = 3) discontinued due to side effects, 17% (n = 5) felt naltrexone was ineffective, 7% (n = 2) switched to acupuncture and there were no records for 7% (n = 2).

**Discussion & Conclusion:**

These data suggest that despite experiencing a reduction in addiction craving, more than half of community setting patients failed to continue treatment with majority defaulting visits. On the other hand, naltrexone use is gaining ground for gambling addiction in Singapore. The effect of naltrexone on alcohol, opioid and gambling dependence should be studied further, and the reason for failure to continue treatment also needs additional investigation.

**OP-AH-26**

**Evaluation of Medication Supply Verification Process at Clinics**

**HL WEE<sup>1</sup>, WC LIM<sup>1</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

A pilot on pharmacy receiving process moved upstream to outpatient clinics as a postconsultation process was shown to be successful in reducing waiting time and rework rates. With this success, this process was rolled out to all outpatient clinics and subsequently termed as Medication Supply Verification (MSV). MSV pharmacy technicians (PT) are stationed at clinics to verify prescriptions and order medications prior to medication collection at pharmacy. The objectives of this project were to determine MSV captured rates, analyse reasons for low captured rates and to determine rework rates.

**Methods:**

Captured rates were calculated based on MSV workload against number of prescriptions dispensed. These data was extracted from Online Analytical Processing (OLAP) report. A survey involving the MSV PT was conducted to analyse the reasons for low captured rates. Reworks were gathered by inputs from dispensers using rework rate slips.

**Results:**

Captured rates ranged from 18.8% to 66.9%. The main reason for the low captured rate was lack of referral from patients service associates (PSA). Other factors included influx of patients and uneven load distribution amongst MSV counters. In addition, as only 9 out of 17 MSV counters were rolled out during the time of the project, the captured rates were not optimised. Rework rate at Basement 2 Pharmacy had reduced from 23% (Year 2011) to 1.6% (Year 2013).

**Discussion & Conclusion:**

In view that captured rates were still low, the potential benefit in reducing waiting time was not clearly seen yet. Nonetheless, MSV process had shown to be effective in reducing pharmacy rework rates.

OP-AH-27

## **Implementation of International Dietetics and Nutrition Terminology in a Malnutrition Population: Characterising the Nutrition Care Process**

**SL WONG<sup>1</sup>, YP LIM<sup>1</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

### **Background & Hypothesis:**

Dietitians from Tan Tock Seng Hospital, Singapore (TTSH) utilised International Dietetics and Nutrition Terminology (IDNT) within nutrition care process (NCP) in electronic records. Malnutrition is prevalent in acute hospitals and its associated adverse outcomes are well documented. Appropriate nutrition care is warranted. This study aims to utilise IDNT to characterise the nutrition care provided to the malnourished population in an adult acute hospital setting.

### **Methods:**

Patients identified as at-risk of malnutrition upon admission were assessed by dietitians to determine their nutritional status using Subjective Global Assessment. Malnourished patients (656 out of 2737) seen between 1 October 2013 and 31 December 2013 were included in this study. Data on nutrition diagnoses, interventions and monitoring and evaluation indicators for malnourished patients were collected from electronic documentation of NCP incorporating IDNT.

### **Results:**

Twenty-four percent of patients seen were malnourished. The most common nutrition diagnoses were malnutrition (70.4%), followed by inadequate oral intake (28.8%). Nutrition interventions targeted collaboration with other providers (90.1%), commercial beverage (52.4%), protein-modified diet (35.4%), enteral nutrition (24.5%) and texture-modified diet (24.4%). Common nutrition monitoring and evaluation criteria identified included energy intake (90.9%), protein intake (90.4%) and weight (18.4%).

### **Discussion & Conclusion:**

Implementation of IDNT allowed characterisation of nutrition care provided for the malnourished population. Results showed that documented care aligned with evidence-based practice guidelines. Nutrition intervention particularly highlighted the value of interprofessional collaboration in carrying out the nutrition recommendations. Documenting nutrition care with IDNT can further allow comparison of practices across sites and support development of a standardised approach to nutrition care for this population.

**OP-AH-28**

**A Clinical Practice Improvement Programme (CPIP) on Successful Right-siting of Patients from Asthma Specialist Outpatient Clinic to the Primary Care Team Within Six Months**

**YP WONG<sup>1</sup>, JA ABISHEGANADEN<sup>1</sup>, L PRABHAKARAN<sup>1</sup>, LP NEO<sup>1</sup>, LM THAM<sup>1</sup>, SS FATIMAH<sup>1</sup>, ALBERT YH LIM<sup>1</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

The objective of the study is to determine the feasibility, efficacy and safety of a right siting protocol for discharging asthma patients to the primary care team within 6 months.

**Methods:**

Clinical practice improvement methodology was applied to determine the root causes of low referral rates to primary care. The efficacy of the right-siting protocol was determined by event rate of readmissions to hospital and ED attendance. The safety outcome is defined as the rate of near fatal asthma and the mortality that was related to asthma during the 6-month period after discharge.

**Results:**

A total of 145 patients (79 female) with mean (SD) age 41 (21) years were studied. Of these, 81 (56%) patients were successfully right-sited to the primary care team. The median (IQR) ACT score during right-siting was 22 (19-24). The rate of successful right-siting was significantly improved during the study period ( $R^2 = 0.7$ ,  $P = 0.005$ ). The rate of successful right-siting was significantly higher during the period with CPIP and right-siting protocol than without (56% vs. 14%,  $P < 0.0001$ ). During the 6 months after discharge, 4 patients (5%) were reattended ED once with asthma exacerbation. There were no episodes of near-fatal asthma and mortality.

**Discussion & Conclusion:**

A clinical practice improvement programme (CPIP) with a right-siting protocol for discharging patients from the asthma specialist outpatient clinic to the primary care team is feasible, effective and safe, provided that the asthma is stable, patients have good knowledge of their condition, comply with asthma management/care and are proficient on self-management.

**OP-AH-29**

**Profile of Elderly With Stroke and Visual Acuity Impairment in Singapore's Population – Well-being of the Singapore Elderly Study (WiSE)**

**YJ ZHANG<sup>1</sup>, SP LEE<sup>1</sup>, M SUBRAMANIAM<sup>1</sup>, JA VAINGANKAR<sup>1</sup>, SA CHONG<sup>1</sup>**

<sup>1</sup>*Institute of Mental Health/Woodbridge Hospital, Singapore*

**Background & Hypothesis:**

Visual problems often occur in stroke patients which could be associated with low levels of optimism. This study was aimed at exploring the profile of respondents with stroke who had visual problems and its association with optimism among older adults in Singapore.

**Methods:**

A population based study of 2565 older adults (aged 60 and above) in Singapore was conducted using a Background Questionnaire and physical and neurological examination to collect information on stroke diagnosis and visual problems (impaired vertical gaze and visual field defects). Respondents were also asked to rate from 0 to 3 on their overall level of optimism with 0 being “very happy” and 3 being “not very happy at all”. Logistic regression was performed for data analysis.

**Results:**

The prevalence of self-reported stroke in the population was 7.6% (n = 199), comprising 46.2% males. Among these respondents, 28.9% had visual problems. Those aged 85 years and older (OR: 8;  $P = 0.01$ ) as compared to those aged 60 to 74 and 75 to 84 years were more likely to have visual problems. In response to “In general, how happy would you say you are?”, respondents who had stroke and visual problems (6.98%) had a higher prevalence of reporting “not very happy “ as compared to respondents who only had stroke (5.32%). In addition, among the respondents with visual problems, males (OR: 9.2;  $P = 0.03$ ) and those aged above 85 years (OR: 20.9;  $P = 0.04$ ) were more likely to report “not very happy” on the optimism scale.

**Discussion & Conclusion:**

Visual problem are more likely to occur in those with stroke aged 85 years and above; these respondents are also likely to report low levels of optimism.

**OP-BSTR-01**

**Rare Cases of Bacteraemia With Spiral Gram-negative Rods *Anaerobiospirillum Succiniciproducens* and *Helicobacter Cinaedi***

**PP DE<sup>1</sup>, P RAO<sup>1</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

This report describes 2 cases, believed to be the first reported in Singapore, with bacteraemia caused by uncommon spiral shaped Gram-negative bacilli. *Anaerobiospirillum succiniciproducens* was isolated from a patient with ovarian carcinoma, while *Helicobacter cinaedi* was isolated from a patient with human immunodeficiency virus infection.

**Methods:**

Identifying these organisms presented diagnostic challenges due to delayed growth on routine laboratory culture media, resulting in prolonged time-to-diagnosis. Molecular and MALDI-TOF methods were employed for identification.

**Results:**

There is a potential risk of suboptimal antibiotic therapy in these infections due to a lack of appropriate testing methods and validated susceptibility breakpoints, as well as variable resistances to antibiotics commonly used in the treatment of infections caused by Gram-negative bacilli, anaerobes, and *Campylobacter spp.*

**Discussion & Conclusion:**

Clinicians should be aware of the differential diagnoses when a spiral shaped Gram-negative bacillus is isolated from a patient's clinical samples, as well as the potential pitfalls in diagnosing and treating these patients.

**OP-BSTR-02**

**Using Gold Nanorods as Photothermal Agents and Autofluorescence Enhancer to Track Kidney Cancer Cell Death During Plasmonic Photothermal Therapy**

**KT CHONG<sup>1</sup>, RK KANNADORAI<sup>2</sup>, Q LIU<sup>2</sup>**

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**Background & Hypothesis:**

Focal ablative therapy in small kidney cancer lesions aims to maximise cancer killing efficiency while reducing collateral damage to surrounding healthy parenchyma. However, intratumoural temperature monitoring alone is inadequate for predicting cancer cell death. Our study aims to improve cellular apoptosis by using gold nanorods (GNRs) to conduct plasmonic photothermal therapy (PPTT), in which real-time live measurements of enhanced cellular autofluorescence are conducted simultaneously to track the ongoing process of kidney cancer cell death.

**Methods:**

Human renal cell carcinoma (RCC) cells were incubated for 24 hours with PEGylated gold nanorods (GNRs) for endocytosis. A fiber coupled with 785-nm laser with 500 mW was used for therapy. The RCC cells were treated for different time durations and its autofluorescence was measured before and after PPTT. Cell viability test for cellular death was carried out at various exposure timings.

**Results:**

PEGylated gold nanorods that entered the kidney cancer cells by endocytosis increased the enhanced absorption, scattering properties and autofluorescence emission intensity from the cell. During laser therapy when the cells were illuminated for 4 minutes, the nanorods-incubated RCC cells reached appropriate hyperthermia for cellular apoptosis. Cell viability tests and autofluorescence intensity curves were able to track similar outcome that indicated progressive cell death.

**Discussion & Conclusion:**

GNRs enhanced cell autofluorescence to indicate cell viability, which can be measured continuously to track ongoing RCC cell death. This would provide instant feedback to clinicians in real time for fine adjustment of laser therapy in PPTT to improve treatment outcome for small kidney cancers.

**OP-BSTR-03**

**Phosphorodiamidate Morpholino Oligomers As Potent Antiviral Against Chikungunya Virus Infection**

**JJH CHU<sup>1</sup>, S LAM<sup>1</sup>, HX CHEN<sup>1</sup>**

<sup>1</sup>*National University of Singapore, Singapore*

**Background & Hypothesis:**

Chikungunya virus (CHIKV) infection in humans has re-emerged as a significant infectious disease due to various recent outbreaks in geographical regions worldwide. As an arbovirus, CHIKV is transmitted to the human host by Aedes mosquito. Following infection, CHIKV induces chikungunya fever associated with debilitating and persistent arthralgia and arthritis. Currently, there is no specific vaccine or effective antiviral available.

**Methods:**

Anti-CHIKV phosphorodiamidate morpholino oligomers (CPMO) was evaluated for its antiviral efficacy in both human cell line and murine model. The CPMOs were designed to block translation initiation of viral genomic RNA. Antiviral efficacy was assessed by viral plaque assay, Western blotting, transmission electron microscopy (TEM), murine survival analysis and viremia.

**Results:**

CPMOs displayed no cellular and in vivo toxicity at various concentrations tested. Pretreatment of HeLa cells with 10MM of CPMO1 achieved significant decrease in CHIKV titre. Consistently, there was substantial decrease in CHIKV structural protein and absence of CHIKV-induced cytopathic effect in infected cells. Furthermore, CPMO1-mediated inhibition were CHIKV-specific due to the lack of cross-reactivity against SINV or DENV replication. When administered prophylactically at 151 g/g, CPMO1 potently protected mice against onset of CHIKV disease by reducing viremia and viral load in several organs, as well as enhancing the mice survival relative to the scrambled CPMO or non-treated control groups.

**Discussion & Conclusion:**

In light of these findings, we have shown CPMO1 as a potent antiviral against CHIKV infection. This is a novel study highlighting the promising efficacy of CPMO1 which can be further developed as translational therapeutic for CHIKV disease.

**OP-BSTR-04**

**Automate Prominent Nucleoli Detection**

**HK LEE**<sup>1</sup>, **KT CHONG**<sup>2</sup>, **E KALAW**<sup>2</sup>, **GD**<sup>2</sup>, **CH HUANG**<sup>1</sup>, **YN LAW**<sup>1</sup>, **L CHENG**<sup>1</sup>, **M SINGH**<sup>1</sup>,  
**CK YAP**<sup>1</sup>

<sup>1</sup>*Bioinformatics Institute, Singapore*, <sup>2</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Prostate cancer has risen to become the third most common male cancer in Singapore. One key step is to identify potentially dangerous premalignant prostate lesions like atypical small acinar proliferations (ASAP) or high-grade prostatic intraepithelial neoplasia (HG-PIN) that may become higher risk cancers when they become malignant. We develop computational pathology methods that recognise and differentiate benign, premalignant lesions (e.g. ASAP or high-grade PIN) and prostate cancer (organ confined or invasive).

**Methods:**

Prostate biopsy slides are first scanned into digital images using a high power microscope. These images are fed into computer visions and machine learning algorithms. Pathologists manually annotate benign, premalignant and cancerous prostate lesions on the digital images. These exemplars are given to the computer vision algorithm.

**Results:**

Our algorithm classifies patterns of prominent nucleoli up to 95% accuracy.

**Discussion & Conclusion:**

Computing and machine learning methods can be very effective in helping pathologist to screen large whole slides images.

**OP-BSTR-05**

**Manual Adjustment of Segmentation Lines to Achieve Comparability Between Time-Domain and Spectral-Domain Optical Coherence Tomography**

**ZH LI<sup>1</sup>, CS TAN<sup>2</sup>, TH LIM<sup>2</sup>**

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**Background & Hypothesis:**

Retinal thickness measurement on optical coherence tomography (OCT) is important in the assessment of retinal diseases. Different OCT machines generate different retinal thickness due to their individual segmentation algorithms. We aim to achieve comparability of retinal thickness between Spectral-Domain (SD) and Time-Domain (TD) OCTs by the adjustment of segmentation lines.

**Methods:**

SD-OCT (Spectralis) and TD-OCTs (Stratus) were performed on 200 eyes of 100 healthy volunteers. Central retinal thickness (CRT), central point thickness (CPT) and 1 mm volume of the Early Treatment Diabetic Retinopathy Study (ETDRS) grid were compared between the 2 machines. Subsequently, a trained operator manually adjusted the segmentation lines on the TD-OCT and the parameters were compared again. The segmentation lines were also edited separately by other trained operators and the inter and intraoperator repeatability were assessed.

**Results:**

The mean CRTs of Spectralis and Stratus OCTs were significantly different (268.2 Mm vs. 193.9 Mm,  $P < 0.001$ ). After segmentation line adjustments, the adjusted Spectralis CRT was 197.3 Mm. The difference between SD-OCT and TD-OCT measurements decreased from 74.3 Mm to 3.4 Mm ( $P < 0.001$ ). Similar trends were observed for CPT and central 1 mm volumes. Inter and intraoperator repeatability were good with an intraclass correlation of 0.99 for both.

**Discussion & Conclusion:**

Manual adjustment of segmentation lines reliably achieves comparability between TD-OCT and SD-OCT. This simple and effective method is useful in multicentred clinical trials where retinal measurements may be obtained using different machines.

**OP-BSTR-06**

**A Comparison of Various Equations in the Prediction of Retinal Thickness on Optical Coherence Tomography**

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**Background & Hypothesis:**

Retinal thickness measurement on optical coherence tomography (OCT) is important in the assessment of retinal diseases. Different OCT machines generate different retinal thicknesses due to their individual algorithms. We aim to compare the accuracy of different equations in predicting central retinal thickness values using corresponding values from other OCT machines.

**Methods:**

SD-OCT (Spectralis) and TD-OCTs (Stratus) were performed on 200 eyes of 100 healthy volunteers. A group of 60 eyes was used to generate the conversion equations, which were tested on the remaining 140 eyes. Four equations were used: 1) Mean difference between SD-OCT and TD-OCT; 2) Multiplying a ratio by the original retinal thickness; 3) Linear regression analysis using retinal thickness; and 4) Regression analysis using retinal thickness and spherical equivalent. All 4 methods were used to calculate predicted SD-OCT values from TD-OCT measurements, and vice versa.

**Results:**

For all 4 equations, the predicted SD-OCT central retinal thickness values were similar to the actual SD-OCT, with mean difference ranging from 0.78Mm to 1.01Mm, and intraclass correlation coefficients >0.88. Regression equations and mean difference showed greater accuracy, with variation between calculated and actual retinal thickness values ≤5Mm in 60% of eyes. In contrast, the ratio method was less accurate, with 15.8% of eyes showing differences >15Mm. Similar results were found for predicted TD-OCT values.

**Discussion & Conclusion:**

These methods can be used to converted central retinal thickness values from SD-OCT to predicted TD-OT values, or vice versa, with high degrees of accuracy and reliability.

**OP-BSTR-07**

**It's Time for Clarity: Antegrade, Retrograde or DJ Stent for Delivering Topical Therapy to the Upper Urinary Tract?**

**ZB LIU<sup>1</sup>, JX NG<sup>1</sup>, YK TAN<sup>1</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Topical therapy is often delivered to the upper urinary tract (UUT) as adjuvant therapy following nephron-sparing surgery for UUT transitional cell carcinoma. There are currently 3 methods – antegrade instillation via a nephrostomy tube, retrograde instillation with an open ended ureteral catheter and reflux from the bladder via DJ stent. However, there are no studies looking at which is the best method. It is time for greater clarity and this study aims to do so.

**Methods:**

En bloc porcine urinary tracts were used to create an ex-vivo model of the kidney, ureter and bladder. A fluorescence dye which stains the urinary tract, indigo carmine solution, was administered to the porcine model according to the 3 methods as described in the literature. Following a fixed 2-hour dwell time, the intensity of urothelium staining was measured at 3 predefined points by measuring the amount of fluorescence of the tissues (all cut to same size).

**Results:**

Two porcine models were used for each method and 3 tissues samples at each predefined point (Point 1 = renal pelvis, Point 2 = mid ureter, Point 3 = distal ureter) were studied. Retrograde method resulted in a significantly increased intensity of staining at all 3 points compared to the others except for Point 1 between retrograde and DJ stent. Retrograde with antegrade *P* values 0.037, 0.007, 0.044; retrograde with DJ stent *P* values 0.888, 0.066, 0.021 for Point 1,2,3 respectively.

**Discussion & Conclusion:**

Our study suggests that retrograde method results in consistently better staining of the UUT.

**OP-BSTR-08**

**A Polymorphism of Dipeptidylpeptidase 4 (rs12617656) is Associated With Susceptibility to Rheumatoid Arthritis**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Rheumatoid arthritis (RA) is one of the most common autoimmune inflammatory arthritides, where CD4<sup>+</sup> T cells are the major drivers of disease initiation and perpetuation of the damaging inflammatory process. It has been previously shown that dipeptidylpeptidase 4 (DPP4) is up-regulated in active RA. DPP4 is a multifunctional enzyme known to be vital in T cell costimulation. The present study was undertaken to investigate the association of single nucleotide polymorphism (SNP) rs12617656, located in the intronic region of DPP4, with RA susceptibility.

**Methods:**

DPP4 rs12617656 was genotyped in 107 Singapore Chinese RA patients using TaqMan SNP Assays. The frequencies of genotypes and alleles were examined and the results compared with 137 unaffected controls from the Han Chinese population (International HapMap Project).

**Results**

Analysis indicated a higher frequency of T allele in RA cases ( $P = 0.043$ ). Comparison of genotype revealed higher frequencies of TT genotypes in case group but statistically the difference was not significant.

**Discussion & Conclusion:**

The DPP4 polymorphism rs12617656 was associated with RA risk in Singapore Chinese population and may be used as a biomarker in the early diagnosis of RA in moving towards personalised medicine.

**OP-BSTR-09**

**Biopsychosocial Factors Associated With Prurigo Nodularis in Endogenous Eczema**

**CC OH<sup>1</sup>, HL TEY<sup>1</sup>, HH LI<sup>1</sup>, ZD LEE<sup>1</sup>**

<sup>1</sup>*National Skin Centre, Singapore*

**Background & Hypothesis:**

Prurigo nodularis is a dermatological manifestation secondary to chronic scratching or picking on focal areas of the skin. Its pathogenesis remains poorly understood, and limited data has indicated its association with psychological factors. Aim: To determine the biological, psychological and social factors associated with the occurrence of prurigo nodularis in patients with underlying endogenous eczema.

**Methods:**

A prospective case control questionnaire-based study on patients with endogenous eczema, with and without prurigo nodules, was performed. The 'Impact of Skin Disease on Daily Life' questionnaire was used to assess dimensions of physical functioning, including extent and severity of skin disease, itch, pain, fatigue and scratching, as well as dimensions of psychological and social functioning, including mood, illness cognition, disease-related impact, stigmatisation and social support.

**Results:**

Thirty-six cases and 47 controls were recruited. Patients with endogenous eczema and prurigo nodules indicated a higher itch score on the visual analog scale over the previous 4 weeks compared to those without prurigo nodules ( $P = 0.0292$ ). There were no significant differences between the 2 groups in the scores reflecting the other parameters of physical, psychological and social functioning.

**Discussion & Conclusion:**

In patients with endogenous eczema, those with prurigo nodules experience a greater itch intensity compared to those without prurigo nodules. There were no other physical, psychological and social factors that were found to be associated with the occurrence of prurigo nodules in endogenous eczema.

## OP-BSTR-10

### miR-100 is Differentially Expressed in Visceral Adipose Tissues of Patients with Type 2 Diabetes and is Reduced in Adipogenesis

SLT PEK<sup>1</sup>, SLT PEK<sup>1</sup>, AKS CHENG<sup>1</sup>, SC LIM<sup>1</sup>, CF SUM<sup>1</sup>, S TAVINTHARAN<sup>1</sup>

<sup>1</sup>Khoo Teck Puat Hospital, Singapore

#### Background & Hypothesis:

Obesity confers substantial risk for Type 2 diabetes (T2D) and understanding their molecular basis is critical. MicroRNAs are small non-coding RNAs that bind to regulatory sites of target mRNA, usually resulting in decreased protein production. We previously reported that blood miR-100 was lower in obese T2D versus non-T2D patients. We aim to assess adipose levels of miR-100, with hypothesis that adipose miR-100 will be differentially expressed in obese T2D versus non-T2D patients.

#### Methods:

Obese patients referred to bariatric surgeons for weight management at Khoo Teck Puat Hospital were recruited. Patient demographics, anthropometric data, fasting blood, paired visceral and subcutaneous adipose samples were collected. miR-100 expression was assessed by realtime-PCR. Adipogenesis was induced in adipose primary cultures from patients (n = 3) and 3T3-L1 mouse preadipocytes. 3T3-L1 was transfected with miR-100 and gene expression analysed by mRNA array. Student's t-test was used to assess differences in molecular expression. *P* value <0.05 was considered statistically significant.

#### Results:

Age, BMI, triglycerides, cholesterol and blood pressures were not significantly different in T2D (n = 26) versus non-T2D (n = 57) patients. miR-100 was significantly lower in visceral tissues in T2D versus non-T2D patients, *P* = 0.018. Visceral adipose miR-100 was negatively and significantly associated with fasting glucose (rho:-0.286, *P* = 0.018). In-vitro studies showed reduction in miR-100 upon adipogenesis in primary cultures (visceral and subcutaneous) and 3T3-L1 adipocytes (*P* <0.05). mRNA array analyses revealed pathway enrichment of lipid catabolic processes in adipocytes over-expressing miR-100.

#### Discussion & Conclusion:

Correlation of circulating and tissue miR-100 suggest circulating miR-100 could be a biomarker of adipose tissue dysfunction associated with T2D. In-vitro work further suggests miR-100 deregulation is related to adipogenesis and lipid metabolism.

## OP-BSTR-11

### Multiple Novel Mutations Discovered by Next Generation Sequencing in Asians with Maturity Onset Diabetes of the Young (MODY)

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#### Background & Hypothesis:

Diabetes is a polygenic disease. However, a subset of individuals (~5% among young-onset diabetes i.e. age <45) harbour Mendelian mutations in specific genes involved in glucose metabolism. This is known as monogenic diabetes or MODY, which is an attractive model for the study of pharmacogenetics or personalised medicine. An accurate diagnosis of MODY may inform specific choice of antihyperglycaemic therapy resulting in better clinical outcome and has been found to be cost-effective.

#### Methods:

Genetic testing was performed for 67 diabetic probands with onset <45 years, BMI <31.2 kg/m<sup>2</sup> and negative GAD autoantibody. High-throughput next generation sequencing (Ion Torrent, Life Technologies), targeting all the exons and promoter regions of 16 known MODY-candidate genes (including major MODY genes *GCK*, *HNF1A*± and *HNF4A*±) was performed.

#### Results:

Deleterious non-synonymous mutations in *HNF1A*± (A98V, H126D and R272C) and *GCK* (S441W) were detected in 5 of 67 probands. Another 4 probands were found to harbour novel missense mutations (I131T in *KCNJ11*, L47R and R1493G in *ABCC8* and R52C in *PAX4*) and were predicted to be deleterious by several bio-informatic programmes: SIFT, Polyphen2 and Mutation Taster. Therefore, 9/67 (13.4%) were classified as MODY based on genetic testing. In contrast, the MODY probability calculator (<http://www.diabetesgenes.org/content/mody-probability-calculator>) estimated a positive post-test probability >75% in 22/67 probands (~30%).

#### Discussion & Conclusion:

MODY, a clinically actionable diagnosis, is not rare among Asians with young-onset atypical diabetes. Our preliminary data suggested the need for greater awareness and nationwide effort to better understand the epidemiology of MODY in Singapore.

**OP-BSTR-12**

**Targeting Myristoylation of Enterovirus VP4 as a Potential Antiviral Strategy for Hand, Foot and Mouth Disease**

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**Background & Hypothesis:**

As an emerging public health threat, outbreaks of hand, foot and mouth disease (HFMD) has had an apparent increase in both frequency and severity in the recent years, particularly in Asia. The disease can result from infections by a plethora of enteroviruses, with type A enterovirus human enterovirus 71 (*HEV71*) being one of the most common aetiologic agents isolated during HFMD outbreaks. The N-terminal myristoylation signal (MGXXXS) of viral capsid protein VP4, 1 of the 4 viral structural proteins, is an extremely well conserved feature of enteroviruses, highlighting the integral role this cotranslational modification plays in enterovirus replication and an antiviral target worthy of further research.

**Methods:**

Reverse genetics was used to illustrate the effect of mutations in the VP4 myristoylation signal. Small interfering RNA to human N-myristoyltransferases was used to confirm the importance of myristoylation in the replication of *HEV71*. Two myristic analogues, 2-hydroxymyristic acid (2OHM) and 4-oxatetradecanoic acid (4O), were used to inhibit myristoylation in infected rhabdomyosarcoma (RD) cells.

**Results:**

We have confirmed myristoylation of VP4 is essential for *HEV71* replication. Infected RD cells treated with 2OHM displayed a deficiency in VP0 cleavage into mature proteins VP4 and VP2 while those treated with 4O were found to have reduced viral replication in general.

**Discussion & Conclusion:**

Myristoylation of VP4 is essential to ensure progeny virus viability and the differential effects displayed by 4O and 2OHM highlights the possibility of further development of myristic acid analogues similar to 2OHM which exhibit lower cellular toxicity while retaining the ability to disrupt viral assembly.

**OP-CR-01**

**Pandemic 2009 Influenza A (H1N1) in Five Long-term Care Facilities: Insights from a Multilevel Random-intercept Logistic Regression Model**

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**Background & Hypothesis:**

We analysed individual and facility level determinants of 2009 influenza A (H1N1) seroconversion between 15 July 2009 to 30 October 2009 in 5 long-term care facilities (LTCFs) in Singapore.

**Methods:**

Consenting participants contributed epidemiological data and paired venous samples. Seroconversion ( $\geq 4$  fold change in titer) between paired samples on haemagglutination inhibition assays to A/California/7/2009 A(H1N1)pdm09 was used as an indicator of incident infection. The multilevel random-intercept logistic regression model included gender, age, staff or resident of the LTCF, previous flu vaccination and baseline titre as individual (level 1) predictors, and the proportions of each facility which had of these characteristics (e.g. % aged above 75 years) as facility (level 2) predictors.

**Results:**

Of 569 individuals enrolled, 442 (77.7%) completed follow-up. Antibodies to A(H1N1)pdm09 at titres  $\geq 1:40$  was observed in 13 participants (2.3%), with those  $\geq 75$  years having significantly higher titres. Across the 5 facilities, 5.2% seroconverted (ranging from 0% to 17.9% across the 5 facilities). None of the individual (level 1) variables was associated with seroconversion in the multilevel model. However, incidence of seroconversion was positively correlated with the proportion which are male, had seasonal influenza vaccination and baseline titres  $\geq 10$ , and negatively correlated with the proportion aged  $\geq 75$  years; on multivariate analysis, significant results were that proportion aged  $\geq 75$  was negatively, and proportion vaccinated was positively associated with seroconversion.

**Discussion & Conclusion:**

Lower risk of seroconversion in facilities with higher proportions of older individuals may reflect effects of herd-immunity from exposure to past influenza strains closely related to A(H1N1)pdm09.

**OP-CR-02**

**Quantitative Sensory Testing in Primary Localised Cutaneous Amyloidosis: Functionality of Itch-Transmitting Cutaneous C-nerve Fibres**

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**Background & Hypothesis:**

Primary localised cutaneous amyloidosis (PLCA) is a chronic pruritic dermatological disease with poorly understood pathogenesis. Itch present in 60% to 90% of cases causes significant morbidity. Small cutaneous unmyelinated C-nerve fibres transmit itch, warm and pain sensations. We aim to investigate if warm detection threshold (WDT) and heat pain threshold (HPT) in PLCA patients are abnormal.

**Methods:**

Quantitative sensory testing of 19 clinically- and histologically-diagnosed PLCA patients (10 females) and 19 age-, ethnic- and sex-matched controls was performed bilaterally at the upper back, lateral forearms and shins. Warm stimuli, which the patient was blinded to, were increased by 1°C every 4 seconds from a baseline temperature of 30°C until WDT and HPT were reached. Baseline itch intensity experienced by the PLCA patients was determined using a combined numerical and visual analogue scale. Data were analysed using Wilcoxon Rank-sum test and Spearman rank correlation.

**Results:**

The median WDT was higher in PLCA patients compared to controls at all sites: upper backs (39.5°C vs. 36.5°C;  $P < 0.05$ ), lateral forearms (39.0°C vs. 35.5°C;  $P < 0.05$ ) and shins (42.5°C vs. 40.5°C;  $P = 0.06$ ). WDT in PLCA patients correlated with itch intensity experienced ( $r = 0.59$ ;  $P < 0.01$ ). The median HPT was higher at all sites in PLCA patients compared to controls but was not statistically significant.

**Discussion & Conclusion:**

Heat/pain signalling in neurons inhibits itch transmission. Increased WDT indicate reduced heat/pain signalling and itch transmission may correspondingly increase. In our PLCA patients, WDT was increased and it correlated with itch intensity experienced. These indicate that cutaneous C-nerve fibres were dysfunctional in PLCA and relate to the pathogenesis of itch in PLCA.

**OP-CR-03**

**Simplified Preimplantation Genetic Diagnosis of Alpha-thalassemia Using a One-tube Combined Mutation and Linkage Marker Panel Assay**

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**Background & Hypothesis:**

Alpha-thalassemia is the most prevalent single-gene disorder in Southeast Asia, and the lethal Hb Bart's hydrops fetalis syndrome and severe HbH disease forms account for >90% of all cases. Affected pregnancies can be avoided through preimplantation genetic diagnosis (PGD), which currently involves gap-PCR and other genotyping methods for detecting deletions and point mutations, respectively, as well as additional linked markers to increase diagnostic accuracy. Currently, each PGD test requires customisation according to the deletion(s) and/or point mutation(s) carried by the at-risk couple, while the paucity of available linked polymorphic markers limits their use in linkage-based PGD.

**Methods:**

We performed in silico mining to identify novel microsatellites within 1 Mb flanking the alpha-globin gene cluster, and optimised a single-tube assay combining detection of single- and/or double-gene deletions with multimarker linkage analysis. We performed validation on 100 single cells prior to clinical PGD application.

**Results:**

Forty-two microsatellites that were identified in silico were filtered bioinformatically for high informativity and absence of flanking Alu sequences. Of 24 suitable markers, 9 generated high empirical polymorphism values ( $0.68 < PIC < 0.92$ ;  $0.66 < HET < 0.90$ ;  $10 < \text{alleles} < 35$ ) and were validated in a single-tube multiplex-PCR assay for PGD of HbBart's and HbH disease. Clinical application of the assay in PGD for HbBart's (2 cases/cycles) and HbH (1 case/cycle) resulted in ongoing twin and singleton pregnancies.

**Discussion & Conclusion:**

We have successfully developed a highly informative one-tube assay applicable to PGD of potentially any couple at risk of deletional and/or non-deletional forms of severe or lethal  $\alpha$ -thalassemia.

**OP-CR-04**

**Factors Associated With Hepatorenal Syndrome (HRS) in a Local Hospital Setting**

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**Background & Hypothesis:**

Hepatorenal syndrome (HRS) is associated with advanced liver disease and results in significant mortality. It is defined by a 2-fold increase in serum creatinine within 2 weeks, or worsening renal impairment despite albumin administration.

**Methods:**

We performed a retrospective analysis on HRS patients admitted to Tan Tock Seng Hospital between January 2007 and December 2013. Factor association analysis was performed using Chi-square testing and point-biserial correlation.

**Results:**

Forty-two patients were diagnosed with HRS (34 definite criteria, 8 partial criteria). A total of 83% of them (n = 35) had mean MELD score of 28.88; 88% (n = 37) of patients had liver cirrhosis, 7.14% (n = 3) had acute liver failure and 4.76% (n = 2) had alcoholic hepatitis. The most common causes for liver cirrhosis were alcohol (30.95%, n = 13) and viral hepatitis (28.57%, n = 12), which consisted of 5 patients with Hepatitis B and 7 patients with Hepatitis C. Sepsis was present in 80.9%. Mean time to diagnosis of HRS from admission was 7.82 days. Point-biserial test revealed near significant correlation of creatinine acceleration to HRS diagnosis ( $P = 0.076$ ). One month mortality was 78.5%. Two patients survived 1 month and 7 patients survived at least 6 months post-Terlipressin treatment.

**Discussion & Conclusion:**

The majority of our patients with HRS had advanced liver cirrhosis whilst 12% had acute liver disease. Sepsis was the most common aggravating factor. We observed a possible association of the acceleration rate of serum creatinine with HRS development. Risk factor scoring systems could potentially incorporate this for early HRS detection.

**OP-CR-05**

***Escherichia Coli* or *Klebsiella Pneumoniae* Pyogenic Liver Abscess – Does It Matter?**

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**Background & Hypothesis:**

This paper aims to evaluate differences between *Klebsiella pneumoniae* (*K.pneu*) and *Escherichia coli* (*E.coli*) pyogenic liver abscess (PLA).

**Methods:**

A retrospective review of patients admitted to Tan Tock Seng Hospital from January 2003 to December 2011 was performed. Patients with age <18 years, amoebic liver abscess, infected liver cyst, infected hydatid cyst, culture negative abscess or ruptured liver abscess were excluded. Only patients with blood or pus culture confirmation of either *K.pneu* or *E.coli* formed the study cohort. Patient demography, comorbidity, clinical presentation, laboratory, radiographic, microbiology and clinical outcome data were collected and analysed.

**Results:**

*E.coli* PLA affects older patients (68 vs. 62 years,  $P = 0.049$ ). There was a tendency towards female predominance in *E.coli* PLA patients (50% vs. 39%,  $P = 0.31$ ). Ischaemic heart disease was more common in the *E.coli* group (29% vs. 14%,  $P = 0.048$ ) and there was no difference in diabetes status (42% vs. 38%,  $P = 0.74$ ). *K.pneu* PLA are larger in size compared to *E.coli* PLA (6 vs. 4 cm,  $P = 0.006$ ) and require percutaneous drainage more frequently than *E.coli* PLA (64% vs. 42%,  $P = 0.034$ ). *E.coli* PLA is more commonly associated with hyperbilirubinemia (60 vs. 34  $\mu\text{mol/L}$ ,  $P = 0.003$ ), increased gamma-glutamyl transpeptidase (GGT) (236 vs. 16 IU/L,  $P = 0.038$ ) and gallstones (58% vs. 30%,  $P = 0.004$ ). Patients with *E.coli* PLA had a tendency towards prolonged hospital stay (21 days vs. 17 days,  $P = 0.19$ ) and increased mortality (16% vs. 10%,  $P = 0.498$ ).

**Discussion & Conclusion:**

*E. coli* PLA is more commonly associated with old age, ischaemic heart disease, biliary lithiasis and a trend towards prolonged hospital stay and increased mortality.

**OP-CR-06**

**Comparison of the Performance of a Heart Rate Variability Model With Existing Trauma Scores in Predicting Early Mortality in Trauma Patients**

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**Background & Hypothesis:**

To compare the performance of a heart rate variability (HRV) model as a predictor of early mortality in trauma patients against existing scores, namely trauma injury severity score (TRISS), and injury severity score (ISS).

**Methods:**

This is an observational pilot study with retrospective identification of trauma patients admitted to Priority 1 in the emergency department (ED) of Singapore General Hospital, Singapore. All patients above 18 years old in sinus rhythm at presentation were eligible. Five-minutes of ECG signals were downloaded from bedside Lifepak-15 monitors and combined with age and vital signs of each patient to acquire the HRV model. TRISS, RTS and ISS were also computed. Their performance in predicting early mortality was analysed via receiver operating characteristic (ROC) curves.

**Results:**

Sixty patients were enrolled, 6 (10%) died within 72 hours of presentation at ED. Major mechanisms of trauma were falls (n = 20, 33.3%), road traffic accidents (n = 20, 33.3%) and assault (n = 8, 3.3%). No significant difference was found in demographic characteristics and past medical histories of those who died within 72 hours, and those who did not. The HRV model (AUC = 0.90, sensitivity = 83.3%, specificity = 88.9%, PPV = 45.5%, NPV = 98.0%) outperformed ISS (AUC = 0.90, sensitivity = 83.3%, specificity = 77.8%, PPV = 29.4%, NPV = 97.7%). However, TRISS had the best performance (AUC = 0.98, sensitivity = 100%, specificity = 92.6%, PPV = 60.0%, NPV = 100%), although it is not a practical assessment tool for clinical triage in an acute setting.

**Discussion & Conclusion:**

The HRV model demonstrates equivalent performance to TRISS, and has the added advantages of being a rapidly assessed physiologic tool, with applications in both prehospital care and triage at the ED. Further work can be done to incorporate HRV into bedside tools.

**OP-CR-07**

**Real World Experience of Bioresorbable Vascular Scaffold in an Unselected Patient Population**

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**Background & Hypothesis:**

Bioreasorbable vascular scaffold (BVS) has become the latest advancement in percutaneous coronary intervention. The theoretical advantages of BVS have been demonstrated in small trials. We look at our real world experience of BVS usage in a unselected patient population.

**Methods:**

Between May 2012 to October 2013, 79 patients (84.1% male, mean age  $51.8 \pm 22.6$  years) with 82 coronary lesions were treated with a total of 116 BVS in our hospital. The primary endpoint was in-hospital major adverse cardiac events (MACE) including cardiovascular death, target vessel related myocardial infarction (MI), target lesion revascularisation (TLR) and stent thrombosis. Secondary endpoints included MACE components on follow-up.

**Results:**

Half of the patients presented with acute coronary syndrome (48.8%). Transradial approach was done for 97.6% of cases. ACC/AHA Type B lesions made up 51.2% of lesions. Nearly all the target vessels were native vessels, with 1 BVS used on a saphenous vein graft and 1 used on a left internal mammary artery conduit. The average length of BVS was  $21.2 \text{ mm} \pm 5.59 \text{ mm}$ . The average diameter of BVS was  $3.09 \text{ mm} \pm 0.37 \text{ mm}$ . There were no inpatient MACE. During follow-up, there were 2 subacute stent thrombosis, of which one was attributed to premature discontinuation of antiplatelets.

**Discussion & Conclusion:**

ABSORB BVS is an attractive option in percutaneous coronary intervention. The short-term MACE rates in an unselected population are acceptable and comparable to the older generation of stents. More trials will be required to prove their long-term clinical utility in coronary intervention.

**OP-CR-08**

**Complications in Barbiturate Coma Therapy for Refractory Intracranial Hypertension**

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**Background & Hypothesis:**

Barbiturate coma therapy (BCT) though effective for refractory intracranial hypertension, remains as second-tier treatment because of associated adverse effects

**Methods:**

Retrospective study of all patients admitted between 2008 to 2012 for traumatic and non-traumatic brain injuries receiving thiopentone BCT for control of refractory intracranial hypertension in neurosurgical ICU, TTSH.

**Results:**

Seventy-one patients received BCT, of which 2 underwent a second BCT course. Traumatic brain injuries accounted for 52.1% of cases. Mean age was 43.5±13.1, with slight male-gender preponderance (57.5%). Median postresuscitation GCS was 4 (3-7) and median APACHE II score at ICU admission was 25 (23-29). Mean maximum intracranial pressure prior to initiating barbiturate coma was 48.3±22.6mmHg. Median duration of thiopentone infusion was 48.0 (22.6-78.3) hr, the longest BCT duration being 285 hr. Median maximum infusion rate was 300 (250-500) mg/hr, with median total thiopentone infused being 12550 (4600-17021) mg. Noradrenaline infusion (maximum dose 0.30±0.22mcg/kg/min) for systemic hypotension upon starting BCT was required in 64 (87.7%) episodes. Superimposed clinical infection occurred in 30 patients at mean onset of 3.4±2.9 days after BCT induction, with pneumonia (n = 15) and septicaemia (n = 9) accounting for the majority of infections. Hypokalemia occurred in 50 BCT episodes (76.9%), time to nadir of potassium levels (lowest mean K<sup>+</sup> 2.62±0.90mmol/L) was at 24 hr after institution of BCT and this was associated with ventricular ectopics/arrhythmias in 38 (76.0%) of these cases; 12 (16.9%) patients had rebound hyperkalaemia (6.3(5.8-6.4)mmol/L) on BCT cessation. Hypernatraemia (peak mean Na 155.3±13.3mmol/L) occurred in 47 BCT episodes (64.4%). Intolerance to enteral nutrition occurred in 35.6% of patients.

**Discussion & Conclusion:**

BCT should be employed with caution because of serious infective, hemodynamic and electrolyte perturbations.

**OP-CR-09**

**Predictors of Patients' Receipt of Antibiotic Recommendations by a Computerised Decision Support System: A Cohort Study**

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**Background & Hypothesis:**

Antibiotic computerised decision support systems (CDSS) were developed to guide antibiotic decisions, yet prescriptions of CDSS-recommended antibiotics have remained low. Our aim was to identify predictors of patients' receipt of antibiotic CDSS intervention.

**Methods:**

We conducted a prospective cohort study in 1500-bed Tan Tock Seng Hospital in Singapore. We included all patients admitted from 1 October 2011 through 30 September 2012, who were prescribed piperacillin-tazobactam or carbapenem for empiric therapy and autotriggered to receive antibiotic recommendations by the inhouse antibiotic CDSS, "ARUSC". Relevant data on the patient, prescribing and attending physicians were collected via electronic linkages of medical records and administrative databases. To account for clustering, we used multilevel logistic regression models to explore factors associated with receipt of CDSS intervention.

**Results:**

One-quarter of the 1886 patients received CDSS-recommended antibiotics. More patients treated for pneumonia (33.2%) than sepsis (12.1%) and urinary tract infection (7.1%) received CDSS intervention. The prescribing physician—but not the attending physician or clinical specialty—accounted for some (13.3%) of the variation. Prior hospitalisation (OR: 1.32, 95% CI, 1.01-1.71), presumed pneumonia (OR: 6.77, 95% CI, 3.28-13.99), intensive care unit (ICU) admission (OR: 0.38, 95% CI, 0.21-0.66), and renal impairment (OR: 0.70, 95% CI, 0.52-0.93) were factors associated with patients' receipt of CDSS intervention.

**Discussion & Conclusion:**

We observed that ICU admission and renal impairment were negative predictors of patients' receipt of CDSS intervention. Patients admitted to ICU and those with renal impairment might have more complex clinical conditions and antibiotic needs that require a physician's assessment in addition to CDSS recommendations.

**OP-CR-10**

**Why Don't Doctors Accept Recommendations by Antibiotic Computerised Decision Support Systems?: A Mixed Methods Study**

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**Background & Hypothesis:**

Antibiotic computerised decision support systems (CDSS) were developed to facilitate optimal prescribing, but acceptance of their recommendations has remained low. This study aimed to evaluate doctors' perceptions and attitudes toward antibiotic CDSS, and to determine psychosocial factors associated with acceptance of CDSS recommendations for empiric therapy.

**Methods:**

We conducted a mixed methods study in Tan Tock Seng Hospital, with its in-house antibiotic CDSS, Antimicrobial Resistance Utilisation and Surveillance Control (ARUSC), that integrates antimicrobial stewardship with electronic prescribing. Focus group discussions were conducted among purposively sampled doctors and data analysed using the framework approach. Emerging themes were included in the questionnaire with newly developed scales for the subsequent cross-sectional survey involving all doctors. Principal components analysis was performed to derive the latent factor structure that was later applied in multivariable analyses.

**Results:**

Doctors expressed confidence in the credibility of CDSS recommendations. Junior doctors accepted CDSS recommendations most of the time, while senior doctors acknowledged overriding recommendations in complex patients with multiple infections or allergies. Willingness to consult CDSS for common and complex infections (OR: 1.68; 95% CI, 1.16-2.44) and preference for personal or team decision (OR: 0.61; 95% CI, 0.43-0.85) were associated with acceptance of CDSS recommendations. Cronbach's alpha for scales measuring doctors' attitudes and perceptions toward acceptance of CDSS recommendations ranged from 0.64 to 0.88.

**Discussion & Conclusion:**

Doctors' willingness to consult an antibiotic CDSS determined the acceptance of its recommendations. Doctors would choose to exercise their own or clinical team's decision over CDSS recommendations in complex patient situations when the antibiotic prescribing needs were not met.

**OP-CR-11**

**Administrative Data as Good as Medical Chart Review for Comorbidity Ascertainment in Patients With Infections**

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**Background & Hypothesis:**

The Charlson comorbidity index (CCI) is widely used for control of potential confounding from comorbidities in clinical studies. The International Classification of Diseases (ICD)-coded diagnoses from administrative databases is an efficient way of deriving CCI. However, studies evaluating its validity are limited. Our study aims to compare CCI derived from administrative data with CCI traditionally obtained from medical record review, in patients with infections.

**Methods:**

A cross-sectional study on a random sample of 199 inpatients was conducted. Correlation analyses were used to compare comorbidity scores derived from ICD-coded administrative database with those from medical record review. Multivariable regression models were constructed and compared for discriminating power for 30-day inhospital mortality.

**Results:**

The overall agreement between data sources was fair (weighted kappa 0.33, 95% CI, 0.23, 0.43). Spearman correlation was 0.38 ( $P < 0.0001$ ). Connective tissue disease (kappa 0.85, 95% CI, 0.57, 1.00), peripheral vascular disease (0.65, 95% CI, 0.40, 0.91), leukaemia (0.66, 95% CI, 0.05, 1.00), and lymphoma (0.66, 95% CI, 0.22, 1.00) had good agreement. CCI derived from administrative data was predictive of CCI  $>5$  from medical record review, after controlling for patient demographics, illness severity, and infection source ( $C = 0.773$ ). Using the multivariable model comprising age, gender, resident status, ward class, clinical specialty, illness severity, and infection source to predict 30-day inhospital mortality, CCI derived from administrative data provided a similar C-statistic as CCI computed from medical record review ( $C = 0.729$  and  $C = 0.717$ ,  $P = 0.8548$ ).

**Discussion & Conclusion:**

Administrative data-derived CCI performed as well as CCI computed from medical record review. The index can be used for assessing comorbidities and confounding control in infectious disease clinical and epidemiologic research.

## OP-CR-12

### Local Experience and Validation of Managing

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#### **Background & Hypothesis:**

Emergency surgery for perforated peptic ulcer (PPU) is associated with significant morbidity and mortality. Accurate and early risk stratification is important. The primary aim of our study is to audit our experience of managing PPU and the secondary aim is to validate the various existing mortality risk prediction models (MRPMs).

#### **Methods:**

A total of 332 patients who underwent emergency surgery for PPU at a single institution from January 2008 to December 2012 were studied. Clinical and operative details such as patient demography, type of operation and postoperative complications were collected. Four MRPMs: American Society of Anesthesiology (ASA) score, Boey's score, Manheim peritonitis index (MPI) and Peptic ulcer perforation (PULP) score were validated.

#### **Results:**

Median age of our patients was 54.7 years (range, 17-109 years) with male predominance (82.5%). A total of 61.7% of patients presented to the hospital within 24 hours of onset of abdominal pain; 16.2% of patients had at least 1 comorbidity. Pneumoperitoneum was diagnosed by plain erect chest X-ray in 59.8% (184/308). Median size of ulcer was 5 mm (range, 1-50mm) and majorities were in duodenum or juxta-pyloric (77%). Median length of stay was 7 days (range, 2-137 days). Leakage, reoperation and 30-day mortality rates were 2.1%, 1.2% and 7.2%, respectively. Validation of MRPMs revealed similar accuracy with Manheim's Peritonitis Index (MPI) showing highest area under curve (AUC) of 77.2%.

#### **Discussion & Conclusion:**

Emergency surgery for PPU has low morbidity and mortality in our experience. MRPMs had a similar accuracy to predict mortality. A local MRPM needs to be developed and it could be more accurate.

**OP-CR-13**

**An In-vivo Evaluation of the Changes in the Facial Skin Properties and Constituents After Smoking Cessation With Raman Spectrometry**

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**Background & Hypothesis:**

Many studies have identified the changes in the skin. Recent studies have also looked at changes in the appearance of the skin following smoking cessation. There are no studies which looked into changes in the skin properties and constituents after smoking cessation. This might be able to elicit the mechanism by which improvements in the appearance of the skin is produced.

**Methods:**

Sixteen Chinese female subjects of 5 to 10 pack years were recruited from the smoking cessation clinic. In-vivo Raman spectra of the skin from the perioral-right lateral region of between 25 to 30 were obtained at the start of the study (T0), 30 days (T30) and 60 days (T60) of continuous smoking cessation. Multivariate statistical analysis of principal components analysis (PCA) and linear discriminant analysis were performed on all Raman spectra.

**Results:**

Smoking cessation for 60 days increased the intensity of the Raman bands for collagen, amide III (1250 to 1350 cm<sup>-1</sup>) for proteins, and the water (OH) stretching mode at 3250 cm<sup>-1</sup>, suggesting that the treatment was effective. The changes observed at T30 were sustained at the same intensity for 60 days.

**Discussion & Conclusion:**

Exposure to cigarette smoke causes significant deficiencies in the epidermal layer and facial skin temperature. Smoking cessation could allow the epidermal layer to regenerate to reduce evaporation. The evaporation is further decreased by the decrease in facial temperature. This results in the increase in the water stretching mode. The increase in the amide and collagen in the skin can be linked to the changes in the tissue oxygen and microvasculature.

**OP-CR-14**

**An Evaluation of the Effects of Facial Cosmetics on the Cross-gender Perception of Facial Attractiveness With Eye Tracking**

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**Background & Hypothesis:**

Facial attractiveness is often evaluated subjectively. This can also be evaluated objectively through the use of eye tracking technology. The exact time and position an subject spends on a certain region of a image is recorded. A t-test was used to compare the amount of time spend the images in the 2 groups. ANOVA was used to compare the time spend between each area of interest.

**Methods:**

Fifty Chinese males, aged 21 to 32 years looked at the facial pictures of 16 females in the same age group and racial origin. Subjects assessed facial beauty by looking at the pictures, while the eyetracker recorded their eye movements and reported the fixation length corresponding to each area of interest within each image: face, eyes, nose, and mouth.

**Results:**

Faces with facial cosmetics attracted 40% longer attention time span ( $P < 0.05$ ). Of the facial features, the eyes attracted the most attention. The eyes with makeup had 35% ( $P < 0.05$ ) longer attention time than the eyes without makeup. The nose and mouth showed an increase of 18% and 27% after makeup application. The study revealed that roughness in faces without makeup diverted attention away from the eyes. When makeup was applied to the entire face, concealing the facial unevenness, the attention to the eyes was increased by up to 65 % ( $P < 0.05$ ).

**Discussion & Conclusion:**

Objective evaluation of facial attractiveness can be done by eyetracking. The eyes were the focal point of interest when assessing facial attractiveness. Usage of cosmetics face resulted in increased attention time, indicating increased attractiveness.

**OP-CR-15**

**The Role of Axial Length/Corneal Radius of Curvature Measurements in Determining Refraction in 3-year-old Children**

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**Background & Hypothesis:**

To determine the distribution of axial length (AL) to corneal radius of curvature (CRC) ratio and to evaluate its association with refractive errors in 3-year-old Asian children.

**Methods:**

A total of 631 three-year-old Asian children were followed since birth from June 2009 to September 2010 from The Growing up in Singapore Towards Healthy Outcomes (GUSTO) birth cohort and the In Vitro Fertilization (IVF) cohort study. Individuals with a history of ocular disease were excluded. Subjects underwent AL measurements with IOL Master (Carl Zeiss), CRC measurements and cycloplegic refraction via an autorefractor (model RK-F1; Canon, Tokyo, Japan). Spherical equivalent refraction (SER) for each eye was calculated as sphere power plus half cylinder power. Hyperopia was defined as SER of at least +0.50 dioptres (D), low myopia as SER of between -0.50D to -3.00D, and moderate myopia as SER of greater or equal to -3.00D.

**Results:**

Three-hundred-and-fifty children (55.5%) had available eye measurements; 193 (55.1%) were Chinese, 91 (26.0%) were Malay and 66 (18.9%) were Indian; 176 (50.3%) were male; 19 (5.44%) had myopia. Mean AL/CRC was  $2.81 \pm 0.73$  mm, mean SER was  $0.88 \pm 0.93$ , mean AL was  $21.73 \pm 0.66$  mm, and mean CRC was  $7.75 \pm 0.12$  mm. The correlation between the mean SER and AL/CRC was -0.58 ( $P = 0.00$ ) whereas the correlation between SER and AL was -0.42 ( $P = 0.00$ ).

**Discussion & Conclusion:**

AL/CRC has a stronger correlation with SER, in comparison to that of AL with SER. AL/CRC could serve as a better clinical surrogate for refractive errors than AL.

**OP-CR-16**

**A Validation Study of a Portable Device (Watch-Pat 200) for the Diagnosis of Obstructive Sleep Apnoea**

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**Background & Hypothesis:**

This study was designed to assess the accuracy and clinical efficacy of a wrist-worn portable device (Watch-Pat 200) to diagnose obstructive sleep apnoea (OSA).

**Methods:**

Twenty participants with suspected OSA were recruited and had simultaneous polysomnography (PSG) and Watch-PAT assessments within the hospital's sleep laboratory settings. The study population consisted of 18 males and 2 females with mean age of 39 years. Mean body mass index was 27.2, mean Epworth sleepiness score was 8.55. All PSG were scored according to the scoring manual of the American Academy of Sleep Medicine (2007) and the Watch-Pat data were analysed by the automatic algorithm.

**Results:**

The Wilcoxon signed rank test was applied, following that the correlation between the AHI was assessed using Spearman's correlation coefficient and Bland-Altman plots to test for agreement. The difference between the means for AHI for the PSG and the Watch-Pat was significant ( $P = 0.0094$ ). However, Spearman's coefficient was 0.94, which suggests a very strong correlation between the AHI recorded by the Watch-Pat and the PSG. Bland Altman plot showed a good agreement with the AHI mean difference of about 4.23 with a slight tendency to underscore the AHI at the mild range of OSA and overscore the range at the severe end of OSA.

**Discussion & Conclusion:**

In a population of patients with suspected OSA, the Watch-Pat 200 can quantify a AHI that compares favourably with the gold standard PSG for the diagnosis of OSA. It also has a high specificity for moderate to severe OSA with a high sensitivity for mild OSA.

**OP-CR-17**

**A Case Series: Psychosis Due To Neuropsychiatric Systemic Lupus Erythematosus**

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**Background & Hypothesis:**

Systemic lupus erythematosus (SLE) is a multiorgan autoimmune disease with numerous clinical manifestations. Neuropsychiatric manifestations in SLE (NPSLE) include psychosis. The estimated prevalence of psychosis due to NPSLE in SLE patients is 4.6%. Specific studies about psychosis due to NPSLE especially amongst an Asian population are limited.

**Methods:**

Twelve episodes of psychosis due to NPSLE that occurred in 10 patients between January 2004 and October 2009 were identified through the Department of Psychological Medicine Consultation-Liaison register. A retrospective case-notes review was conducted.

**Results:**

Three episodes occurred within the first month of SLE diagnosis and 1 episode at diagnosis. The mean time lapse between SLE diagnosis and first episode of psychosis was 30.6 (range, 0-110) months. The mean SLE Disease Activity Index (SLEDAI) score at time of psychotic episode was 15.1 (range, 8-26). Auditory hallucinations occurred in 10 episodes, visual hallucinations in 6 episodes and persecutory delusions in 5 episodes. Antipsychotics were used in all 12 episodes. Haloperidol was used initially in eleven episodes. In 6 episodes, haloperidol was stopped and atypical antipsychotics were prescribed. At time of data collection, antipsychotics were tailed off in 5 patients over a mean duration of 16.6 (range, 4-39) weeks.

**Discussion & Conclusion:**

Psychosis due to NPSLE is a diagnosis of exclusion with no gold standard diagnostic test. It occurs early in SLE's illness course. Similar to previous studies, common psychotic symptoms included persecutory delusions, auditory and visual hallucinations. SLE patients are prone to extra-pyramidal side effects from antipsychotics, and judicious use is required.

**OP-CR-18**

**Impact of microRNA MIR137 on Fronto-striatal White Matter Connectivity in Adult Patients With Schizophrenia**

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**Background & Hypothesis:**

Genomewide association studies have implicated significant association between microRNA *MIR137* with schizophrenia (SCZ). *MIR137* is important for neuronal maturation, migration and synaptic connectivity in the brain. Though the mechanism on its impact on schizophrenia is unknown, it is highly expressed in the frontal cortex and subcortical regions such as nucleus accumbens, substantia nigra and putamen, which indicates potential impact on neurocognitive deficits and negative symptoms. By using diffusion tensor imaging (DTI), we hypothesised *MIR137* risk allele affects brain fronto-striatal white matter connectivity in schizophrenia.

**Methods:**

A total of 62 patients with schizophrenia and 88 age- and gender-matched healthy controls were genotyped for 2 SNPs (*rs1625579* and *rs1198588*) using blood samples and underwent DTI scans. Two-way ANOVA was employed to examine genotype effects, diagnosis effects and genotype x diagnosis interaction effects on cortical and subcortical brain regions.

**Results:**

For both SNPs, significant genotype x diagnosis interactions were found in right frontal cortex (*rs1625579*:  $F = 5.33$ ,  $P = 0.022$ ; *rs1198588*:  $F = 7.42$ ,  $P = 0.007$ ) and left basal ganglia (*rs1625579*:  $F = 7.95$ ,  $P = 0.006$ ; *rs1198588*:  $F = 9.41$ ,  $P = 0.003$ ). Specifically, lower fractional anisotropy were found in patients with schizophrenia carrying homozygous risk allele (*rs1625579* = AA, *rs1198588* = TT) in the frontal cortex and basal ganglia (all  $P < .05$ ).

**Discussion & Conclusion:**

Our results revealed that *MIR137* is associated with disrupted fronto-striatal white matter connectivity in schizophrenia. Further imaging genetic investigations on the underlying mechanism of *MIR137* in schizophrenia may shed light on the potential impact of *MIR137* in neuronal development and regulations in schizophrenia.

**OP-CR-19**

**Preliminary Investigation of the Wechsler Adult Intelligence Scale-IV (WAIS-IV) and Matrix Consensus Cognitive Battery (MCCB) in Schizophrenia**

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**Background & Hypothesis:**

Cognitive deficits are a central feature of schizophrenia. Neuropsychological batteries are gold standard tools for characterising these deficits; however, majority of previous studies were conducted in Western samples. Preliminary comparisons of associations and agreement analysis of 2 widely utilised batteries in a local schizophrenia sample was conducted.

**Methods:**

Fifty-three schizophrenia subjects were recruited; 67.9% were males, and mean age was 40.76 (SD = 8.84). Association and agreement analysis were conducted on Verbal Comprehension (VC), Perceptual Reasoning (PR), Working Memory (WM), Processing Speed (PS) and Full Scale IQ (FSIQ) on the WAIS-IV; and Speed of Processing (Spd), Non Verbal Working Memory (NVWM), Verbal Learning (VerL), Visual Learning (VisL) and Reasoning/Problem Solving (R/PS) on the MCCB.

**Results:**

Lowest association was at  $r = .393$  between WM (WAIS-IV) and R/PS (MCCB), and highest association was at  $r = .755$  between VC (WAIS-IV) and VerL (MCCB). Bland Altman analysis revealed the following agreements: 1) VC - > VerL; R/PS; 2) PR - > NVWM; 3) WM - > VerL; Spd; 4) FSIQ - > VerL; NVWM; Spd.

**Discussion & Conclusion:**

Cognitive domains from either battery were moderately to strongly correlate between both batteries in schizophrenia samples. However, agreement analysis revealed subtle differences in the neurocognitive architecture indexed by the batteries. While differing cognitive domains could reveal informative feature of cognitive deficits in each battery, general cognition remains a crucial factor to elucidate in schizophrenia cognition.

**OP-CR-20**

**Outcome of Abnormal PSA Levels in Singapore: Increasing Rate of Prostate Cancer Detection**

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**Background & Hypothesis:**

Prostate cancer has become the third most common cancer among Singaporean men. Locally, there have been no studies on the detection rate of prostate cancer using contemporary multicore prostate biopsy. We aim to evaluate the prostate cancer detection rate on prostate biopsies based on levels of serum prostate-specific antigen (PSA) and digital rectal examination (DRE) in Singaporean men.

**Methods:**

We retrospectively evaluated 755 men who underwent first transrectal-ultrasound (TRUS) guided 12-core prostate biopsies from January 2012 to April 2014. Prostate biopsies were performed on men presenting to the urology clinic in a tertiary institution when their PSA levels were more than 4.0 ng/ml and/or when they had suspicious DRE findings.

**Results:**

Overall prostate cancer detection rate was 35.9%. Regardless of DRE findings, patients were divided into 4 subgroups based on their serum PSA levels: 0-3.9 ng/mL, 4.0-9.9 ng/mL, 10.0-19.9 ng/mL and >20.0 ng/mL. The corresponding prostate cancer detection rates were 11.8%, 21.5%, 37.2% and 73.1%, respectively. The detection rate of cancer based on suspicious DRE findings alone was 61.6% compared to 37.0% based on serum PSA cut-off of 4.0 ng/mL alone. The combined detection rate of prostate cancer based on PSA and DRE findings was 70.5%.

**Discussion & Conclusion:**

Local prostate cancer detection rate based on serum PSA and DRE findings has increased over the past decade. Despite advances in biopsy methodology, it is still lower than in Caucasian men. Our results suggest that there remain true ethnic differences but other factors may be resulting in increasing incidence of cancer.

**OP-CR-21**

**Is Obesity an Associated Risk Factor of Prostate Cancer Detection in Singapore?**

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**Background & Hypothesis:**

It is postulated that body mass index (BMI) has a role in prostate cancer. There have been no studies on the risk factors of prostate cancer in Singapore. We aim to evaluate the risk factors of prostate cancer in patients undergoing first transrectal ultrasound (TRUS) guided biopsy.

**Methods:**

We retrospectively examined 755 men who underwent first prostate biopsies from January 2012 to April 2014. Prostate biopsies were performed when prostate-specific antigen (PSA) levels were >4.0 ng/mL or when the men had suspicious digital rectal examination (DRE) findings. Variables included in our analysis were age, serum PSA, BMI (at time of biopsy), DRE findings, prostate volume (PV) and hypoechoic lesion(s) seen on TRUS. Men with BMI >25.0 kg/m<sup>2</sup> were categorised as obese.

**Results:**

Among 548 men with complete datasets, 212/548 (38.7%) were obese and 213/548 (38.9%) had prostate cancer on biopsy. Obese men were younger (68.0 vs. 70.2 years,  $P = 0.04$ ), had larger prostate volumes (46.9 vs. 42.0 mL,  $P = 0.02$ ) and lower PSA levels (8.0 vs. 9.0,  $P = 0.04$ ). On the univariate analysis, obese men were no more likely to have prostate cancer than non-obese men ( $P = 0.92$ ). On the multivariate analysis, obesity was found to be an associated risk factor of prostate cancer on biopsy. (OR: 2.485, 95% CI, 1.598-3.867,  $P < 0.001$ ). Other predictors included age, PV and PSA levels.

**Discussion & Conclusion:**

Obese men have larger prostates that produce lower PSA levels and are at a greater risk of having prostate cancer detected on biopsy.

**OP-CR-22**

**Neuropsychological Impairment Using a Proxy for the Deficit Syndrome**

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**Background & Hypothesis:**

Schizophrenia is a complex and multidimensional disorder with large variabilities in clinical profiles. The deficit syndrome (DS) has been presented as a subtype characterised by primary and enduring negative symptoms in an attempt to reduce heterogeneity. We sought to clarify if such subtyping could be applied to our sample and its relationship to neurocognitive performance.

**Methods:**

The DS was categorised using a previously validated proxy for deficit syndrome (PDS) using the Positive and Negative Syndrome Scale (PANSS). Cognitive scores were calculated based on a previously published cognitive model with 3 domains, namely Speed/Vigilance, Fluency/Memory, Executive Function and g, which was an index of general cognition. Multivariate analyses with age, gender, and duration of illness as covariates were run to examine differences in cognitive performance between the 2 groups (DS and non-DS).

**Results:**

Of 695 participants assessed, 118 (17%) were categorised as DS. There were significant group effects for g, Speed/Vigilance, Fluency/Memory and Executive Function. Posthoc comparisons revealed that the DS group performed significantly poorer than the non-DS group in all domains.

**Discussion & Conclusion:**

Patients with primary negative symptoms seem to be performing poorer cognitively and should be analysed separately. The results support the use of the PDS to subtype schizophrenia in an Asian population. Future research should focus on whether the use of targeted therapy for these subgroups can improve clinical outcomes.

**OP-CR-23**

**Predictive Factors of High-grade Prostate Cancer on Initial Contemporary Multicore Prostate Biopsy**

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**Background & Hypothesis:**

Gleason Score (GS) is an important biopsy parameter in selecting patients for appropriate treatment of prostate cancer. We aim to evaluate the risk factors of high-grade (GS >4+3) prostate cancer in patients undergoing first transrectal ultrasound (TRUS) guided biopsy.

**Methods:**

We retrospectively evaluated 755 men who underwent first TRUS prostate biopsies from January 2012 to April 2014. Biopsies were performed when prostate-specific antigen (PSA) levels were >4.0 ng/mL or when patients had suspicious digital rectal examination (DRE) findings. Variables included in our multivariate logistic regression model were age, serum PSA, BMI, DRE findings, prostate volume (PV) and hypoechoic lesion(s) seen on TRUS. High-grade prostate cancer refers to GS >4+3.

**Results:**

Among 753 men with complete datasets, 269/753 (35.7%) had a positive biopsy, of which 149/269 (55.4%) had high-grade disease. Men with high-grade disease were of similar age ( $P = 0.51$ ) and BMI ( $P = 0.886$ ) compared to those with low-grade disease, but had much higher PSA levels (50.1 vs. 8.82 ng/mL,  $P < 0.001$ ), larger prostates (43.6 vs. 36.4 g,  $P = 0.036$ ) and were more likely to have abnormal DRE findings (66.4% vs. 31.7%,  $P < 0.001$ ) and hypoechoic lesions on TRUS (30.2% vs. 5.8%,  $P < 0.001$ ). On multivariate analysis, serum PSA (OR: 1.004, 95% CI, 1.001-1.006,  $P = 0.009$ ), abnormal DRE (OR: 2.160, 95% CI, 1.174-3.974,  $P = 0.013$ ) and hypoechoic lesions (OR: 3.107, 95% CI, 1.203-8.029,  $P = 0.019$ ) were significant predictors of high-grade disease.

**Discussion & Conclusion:**

Serum PSA, abnormal DRE and hypoechoic lesions seen on TRUS were all significant independent risk factors for high-grade prostate cancer.

**OP-CR-24**

**Factors Affecting Concordance of Gleason Score Between Needle Prostate Biopsy and Radical Prostatectomy**

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**Background & Hypothesis:**

Gleason score (GS) is an important biopsy parameter in selecting patients for appropriate treatment in prostate cancer as well as for cancer prognosis. However, the correlation between the GS on biopsy and radical prostatectomy (RP) is known to be poor. We aim to determine the clinical and pathological variables that can predict differences in GS between needle biopsy and RP specimen.

**Methods:**

We retrospectively evaluated the medical records of 93 men who had undergone RP from December 2008 to April 2014 in TTSH. GS on needle biopsy was compared to that of the RP specimen.

**Results:**

The median age, PSA and prostate volume (n = 93) were 65 years, 8.53 ng/mL and 37.5 mm<sup>3</sup> respectively. Out of the 93 men, 24 (25%) of them had a GS upgrade seen on RP specimen, while 55/93 (60%) and 14/93 (15%) men had concordant GS and GS downgrade respectively. Among the 24 men with GS upgrading, 18/24 (75%), 4/24 (17%) and 2/24 (8%) had GS of  $\leq 6$ , 7 and  $>7$  respectively on prostate biopsy. There were no significant differences in age, PSA, PV, PSAD, number of cores taken, number of positive cores, highest percentage of core affected and clinical stage (DRE findings) between men who had no upgrade (concordant/downgrade) in GS and men who had an upgrade in GS. GS upgrading was not associated with extracapsular tumour extension or positive surgical margins.

**Discussion & Conclusion:**

Up to a quarter of patients had pathological upgrading of GS on RP specimen. No significant risk factors were identified.

**OP-CR-25**

**Sun Protection Counselling Service at a Tertiary Dermatology Centre in Singapore**

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**Background & Hypothesis:**

Exposure to ultraviolet radiation has been linked to various dermatological conditions, including pigmentary disorders, melanoma and non-melanoma skin cancers. There is a considerable degree of interindividual variability with regards to sun protection awareness and attitudes. The objectives of our study were to assess if patients and allied health professionals understood the importance of photoprotection, and to evaluate the effectiveness of a dedicated pharmacist-led counselling service with regards to improving their level of awareness.

**Methods:**

A total of 50 patients who were seen at the National Skin Centre (NSC) in Singapore, as well as 50 NSC allied health staff members, were surveyed with a questionnaire designed to assess sun protection awareness, attitudes and behaviours. Each study subject then underwent a standardised counselling session by a trained pharmacist at our institution. The patients and staff members were subsequently surveyed a second time after the session to assess the efficacy of the intervention.

**Results:**

After the intervention, there was an improvement in sun protection awareness, as evidenced by an increase in the proportions of patients and allied health professionals who gave appropriate responses to each question in the questionnaire.

**Discussion & Conclusion:**

Our preliminary results show that the implementation of a specialised sun protection counselling service is potentially useful in the education of patients, so as to reduce the harmful effects of ultraviolet radiation on the skin. We hope to build on these findings in the future, and use these results to promote the establishment of similar services in other dermatology centres around the world.

**OP-CR-26**

**Activation of Division of Medicine Specialist Review on Patients with Long Bed Waiting Time: Does It Improve Emergency Department Management?**

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**Background & Hypothesis:**

Division of Medicine registrars are activated to review patients admitted to Division of Medicine with bed waiting time more than 8 hours. This study aims to analyse the distribution of admission to different Division of Medicine departments, and review the common changes made to improve management by emergency department physicians.

**Methods:**

This is a retrospective cohort study. Patients admitted to Division of Medicine in August 2013 and December 2013 with bed waiting time more than 8 hours were selected. Inputs by Division of Medicine registrars for activated patients were reviewed.

**Results:**

A total of 1246 patients were selected; 37% admitted to general medicine, followed by neurology (12.6%), geriatric (11.6%), respiratory (11.3%), cardiology (10.7%), and others (16.8%). Out of 1246 patients, 464 (37.2%) of them were activated for registrar review, of which 229 (49.3%) with complete review notes. A total of 55.4% of patients needed additional blood test, 52.4% changed medications, 30.1% changed intravenous fluid regime, 27.5% needed UFEME/ urine cultures, and 24% had initiated or changed antibiotics. Common interventions were chronic medications review, blood sugar monitoring, fluid regime considering cardiac and renal functions, electrolytes replacement, withholding medications and change antibiotics according to renal functions, nebulisation review, and geriatric monitoring.

**Discussion & Conclusion:**

It may be possible to protocolise the common interventions in order to improve emergency department management of patients admitting to Division of Medicine.

OP-CR-27

**The Relationship Between DAS28-CRP, DAS28-ESR, CDAI and SDAI in Rheumatoid Arthritis Patients in Singapore**

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**Background & Hypothesis:**

Composite indices for the assessment of rheumatoid arthritis disease activity, important for clinical trials and clinical practice, have proliferated in number in the last 15 years. They are thought to correlate well with each other. To ascertain this, we studied the relationship of the 4 most commonly used indices: 28-joint count Disease Activity Score computed with erythrocyte sedimentation rate and C-reactive protein (DAS28-ESR and DAS28-CRP respectively), clinical disease activity index (CDAI) and simple disease activity index (SDAI).

**Methods:**

We studied 175 patients in our prospective rheumatoid arthritis registry who had ESR and CRP assayed in the same study visit. We examined the 6 pairs of relationships between the 4 indices. We plotted the scatter plots and calculated Kendall's tau, Spearman's rho, Cohen's kappa and Goodman and Kruskal's gamma. Using the indices to classify patients into the 4 disease states of remission, low, moderate and high activity, we studied the degree of agreement between them.

**Results:**

The indices have monotonic relationships. The relationships between DAS28-ESR and DAS28-CRP, and between SDAI and CDAI, are linear; the others are curvilinear. DAS28-ESR consistently underestimates the activity compared with the DAS28-CRP. SDAI and CDAI tend to agree fairly well. The curvilinear relationships lead to low agreement. Patients are frequently classified into differing disease activity states with any 2 indices, ranging from 9.7% (between CDAI and SDAI) to 40.6% (between DAS28-CRP and CDAI).

**Discussion & Conclusion:**

If we classify DAS28-ESR and DAS28-CRP into one family, and SDAI and CDAI to another, the relationship is linear between family members and curvilinear across.

**OP-CR-28**

**The Use of Growth Mixture Models to Characterise Recovery Trajectories of Patients With Tennis Elbow**

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**Background & Hypothesis:**

Patients undergoing treatment often undergo different trajectories of recovery. Some patients may recover at a slower pace and an alternate treatment protocol may be preferred. It is therefore essential to be able to identify these patients. Our study will illustrate the use of growth mixture models (GMM) to identify unique recovery trajectories of patients undergoing treatment for tennis elbow.

**Methods:**

Thirty-four patients with tennis elbow were recruited from an outpatient occupational therapy clinic. Each patient was assessed using the Disabilities of the Arm, Shoulder and Hand (DASH), visual analogue scale (VAS) and grip strength on week 1 and 5. Analysis was conducted with the outcome measures using GMM to identify groups with distinct trajectories. MANOVA is then used to determine which measures had significant differences between groups.

**Results:**

The GMM results suggest that there are 2 distinct recovery trajectories in the sample. The MANOVA results suggest that there were significant differences between the grip strength of both groups after controlling for gender. Group 1 is characterised by low grip strength at baseline which decreases over time while Group 2 is the direct opposite.

**Discussion & Conclusion:**

Our study highlighted the presence of different trajectories of recovery in patients with tennis elbow. Further work needs to explore the driving factors behind the different recovery trends and be able to pre-emptively identify patients with a downward trend and possibly put them on an alternate treatment protocol. The use of GMM should also extend to investigating trends of recovery in other conditions.

**OP-CR-29**

**Association of Aortic Arch Type and Proximal Landing Zone with Bird-beak Configuration in Thoracic Endovascular Aortic Repair**

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**Background & Hypothesis:**

This study investigates the association of aortic arch type and proximal landing zone with bird-beak configuration in thoracic endovascular aortic repair (TEVAR).

**Methods:**

From August 2006 to May 2014, 29 patients underwent TEVAR which indications included degenerative aneurysm (n = 16), dissection (n = 6), ruptured aneurysm (n = 2), type 1 endoleak after previous TEVAR (n = 2), penetrating aortic ulcer (n = 1), intramural hematoma (n = 1) and mycotic pseudoaneurysm (n = 1). Aortic arch types, proximal landing zones, bird-beak configuration and endoleak formation were determined using fluoroscopic aortogram and postprocedural CT angiography.

**Results:**

Among the 29 patients, type 1 (n = 1), type 2 (n = 4) and type 3 (n = 24) aortic arches were found. The proximal landing of the endograft was situated in zone 0 (n = 2), zone 1 (n = 9), zone 2 (n = 12) and zone 3 (n = 6). The median follow-up duration was 6 months (2.0-13.5). Bird-beak configuration and endoleaks were observed in 11 and 16 patients respectively. For type 1, 2 and 3 aortic arches, the bird-beak configuration rates were 100%, 25% and 37.5% respectively, and for endoleak rates they were 0%, 50% and 58.3% respectively. For zones 0, 1, 2, and 3, the bird-beak configuration rates were 50%, 33.3%, 41.7% and 33.3% respectively, and for endoleak rates they were 100%, 55.6%, 41.7%, and 66.7% respectively. No statistically significant association was found between aortic arch type and bird-beak configuration ( $X(2) = 1.922, P = 0.382$ ), and between proximal landing zone and bird-beak configuration ( $X(3) = 0.330, P = 0.954$ ).

**Discussion & Conclusion:**

The aortic arch type and proximal landing zone are not associated with bird-beak configuration after TEVAR.

**OP-CR-30**

**Critical Life Stressors Among Adolescent Suicide Attempters in Singapore**

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**Background & Hypothesis:**

Suicide is a significant cause of mortality, especially in the young (age, 10-29 years) with a rising suicide trend. This study hypothesises that peer pressure and school factors are the biggest contributors to adolescent suicide and aims to identify significant life stressors associated with adolescent suicide in Singapore.

**Methods:**

Sixty adolescent suicide attempters seen at National University Hospital (NUH), and 58 controls who visited NUH for acute conditions were recruited for a case-control study. Controls were matched to cases in age, gender and ethnicity. Adolescent Stress Questionnaire (ASQ) with 45 questions was administered, investigating domains of adolescent stress across home life, school performance, school attendance, romantic relationships, peer pressure, teacher interaction, future uncertainty, school-leisure conflict, financial pressure and emerging adult responsibility. Raw scores and effect sizes for each domain were compared between cases and controls.

**Results:**

The mean total ASQ score for cases is 145.4 (SD = 39.09) versus controls 108.59 (SD = 30.56) ( $P < 0.001$ ). Peer pressure, romantic relationships and home life registered the largest effect sizes (0.98, 0.97, 0.94 respectively). Comparing the mean scores across domains, future uncertainty (0.715), school performance (0.598), peer pressure (0.571) and home life (0.571) were the highest scoring domains for cases.

**Discussion & Conclusion:**

This study demonstrated a positive correlation between life stressors and adolescent suicide. Results showed peer pressure as the most significant contributor to adolescent suicide in both frequency and effect size. However, home life and romantic relationships are critical contributors to adolescent suicide. Future uncertainty was the commonest source of life stress for both groups. This could help parents, schools counsellors and mental health professionals understand and focus their resources on specific aspects of an adolescent's life.

**OP-CR-31**

**Risk Factors and Outcomes of Gastric Resection in Perforated Peptic Ulcer**

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**Background & Hypothesis:**

Perforated peptic ulcer (PPU) is a common surgical emergency and treatment involves omental patch repair (PR). Gastric resection (GR) is reserved for difficult pathologies. Emergency GR is associated with high morbidity and mortality. The primary aim of this paper is to study factors predicting the need for GR in PPU and the secondary aim is to audit outcomes of GR at our institution.

**Methods:**

This is a single-institution, retrospective study of patients with PPU who underwent surgery from 2004 to 2012. Demographics and clinical presentation were studied to identify factors predicting the need for GR in PPU. An audit of clinical outcomes and 30-day mortality for all patients with GR is reported.

**Results:**

There were 537 (89.6%) patients who underwent PR and 62 (10.4%) patients GR. Old age ( $P < 0.001$ ), female sex ( $P = 0.011$ ), non-steroidal anti-inflammatory drugs usage ( $P < 0.001$ ), previous history of peptic ulcer disease (PUD) ( $P = 0.013$ ), low haemoglobin ( $P < 0.001$ ), low serum albumin ( $P < 0.001$ ), high serum creatinine ( $P = 0.002$ ) and high urea ( $P < 0.001$ ) predict the need for GR. Morbidity and mortality of GR is 27.7% and 24.2% respectively.

**Discussion & Conclusion:**

Traditionally, large and malignant ulcers predict the need for GR in PPU. In this study, other factors such as demographics, drug and medical history, and biochemical markers as above are also found to be significant. These factors may aid in preoperative counselling on increased probability of GR. A multicentre randomised trial comparing simple PR with GR in selected high-risk patients needs to be performed to confirm if PR is safer than GR.

**OP-CR-32**

**The Efficacy and Safety of a Multidisciplinary Care Pathway for Inpatient Treatment of Acute Exacerbation of Bronchiectasis**

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**Background & Hypothesis:**

Hospitalisation with acute exacerbation of bronchiectasis is associated with increased morbidity and mortality (1,2). Evidence based clinical pathway has been shown effective in managing exacerbation of asthma and COPD. However, it is unknown about the safety and efficacy of a multidisciplinary care pathway on management of hospitalised patients with acute exacerbation of bronchiectasis.

**Methods:**

A retrospective study on all patients admitted with acute exacerbation of bronchiectasis between November 2013 and April 2014. Age, sex, length of hospital stay and comorbidities were established. Patients were divided into 2 groups: 1) care pathway group (CP), and 2) non-care pathway group (non-CP). The efficacy is defined as the event rate of recurrent hospitalisation with acute bronchiectasis exacerbation within 30 days postdischarge. The safety outcome is defined as the rate of mortality during the study period

**Results:**

A total of 125 patients were studied; 34 patients were in CP and 91 patients in non-CP group. They were similar in age, gender distribution and comorbidities. The median (IQR) length of hospital stay was significantly lower in the CP than the non-CP 4 ((3-6) vs. 6 (3-10) days;  $P = 0.023$ ). The readmission rate was 9% in the CP and 20% in non-CP ( $P = NS$ ). The mortality was similar in both groups (9% vs. 10%,  $P = NS$ ).

**Discussion & Conclusion:**

This study showed that a multidisciplinary evidence based care pathway for inpatient treatment of bronchiectasis is safe and efficacious. The impact of it will require a prospective study.

**OP-CR-33**

**The Relationship Between Negative Symptom Subdomains and Cognition in Schizophrenia**

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**Background & Hypothesis:**

Negative symptoms and cognitive deficits in schizophrenia are associated with significant psychosocial impairments. However, the nature of the relationship between negative symptoms and cognition remains equivocal. Recent reviews have demonstrated that there are 2 subdomains within negative symptoms: 1) expressive deficits, and 2) avolition. Therefore, we sought to clarify the relationship between the 2 negative symptom subdomains and cognition.

**Methods:**

The negative symptom subdomains consisted of 9 items from the Positive and Negative Syndrome Scale which was previously validated in another study. The 3 cognitive domains, namely 1) executive function, 2) fluency/memory, and 3) vigilance/attention, consists of factor scores derived from our previously published cognitive model. We used confirmatory factor analysis to examine if the previously validated negative symptom subdomains model was relevant to our sample. Subsequently, we examined the effect of negative symptom subdomains on cognition, both individually and combined, using structural equation modelling.

**Results:**

The negative symptom subdomains model fitted our data well. In addition, each negative symptom subdomain was significantly associated with the 3 cognitive domains where the magnitudes of the regression coefficient were in an increasing order from 1) executive function, 2) fluency/memory, and to 3) vigilance/attention. When both subdomains were regressed on the 3 cognitive domains, avolition acted as a suppressor variable, increasing the magnitudes of the regression coefficient between expressive deficits and all 3 cognitive domains.

**Discussion & Conclusion:**

Hence, negative symptoms subdomains and cognition are moderately correlated. Interventions seeking to improve negative symptoms and cognition could benefit from targeting expressive deficits and vigilance/attention-related tasks.

**OP-CR-34**

**Venous Thromboembolism in Asian Patients With Inflammatory Bowel Disease**

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**Background & Hypothesis:**

Patients with inflammatory bowel disease (IBD) appear to have increased risk of venous thromboembolism (VTE) particularly during active disease. Western studies report that prevalence of VTE in IBD ranges from 1.2-6.7%. Antithrombotic prophylaxis has been recommended in all hospitalised IBD patients. Our aim is to evaluate the VTE risk in Asian patients with IBD.

**Methods:**

Medical records of patients with ulcerative colitis (UC) or Crohn's disease (CD) who were treated at our centre from 2002-2013 were reviewed. VTE was diagnosed according to international guidelines. Padua prediction score was used to stratify VTE risk.

**Results:**

There were 152 patients with IBD: 96 had UC, 56 had CD. Males comprised 62% and the median age was 48 (range 17-90). There were 93 (61%) Chinese, 40 (26%) Indians, and 16 (11%) Malays. Disease severity and treatment modality varied widely; 31 (33%) UC patients and 29 (52%) CD patients had 161 (91 CD, 70 UC) hospitalisation episodes for disease flare. None were given antithrombotic prophylaxis. Only 1 CD (Padua score 0: low risk) and 1 UC patient (Padua score 5: high risk) developed pulmonary embolism and bilateral deep vein thrombosis respectively; both VTEs were detected during their first hospitalisation and initial diagnosis of IBD. The period prevalence and incidence rates for all VTE, DVT and PE were 1.31%, 0.65%, 0.65% and 1.20, 0.60 and 0.60 per 1000 patient-years respectively.

**Discussion & Conclusion:**

The prevalence of VTE in Asian IBD patients is lower than in Western populations. Further prospective studies are needed to better assess the risk of VTE and the role of routine antithrombotic prophylaxis in this population.

**OP-CR-35**

**ICU-based Multidisciplinary Infectious Diseases Team: Making an Impact With Antimicrobial Strategies for Severe Pneumonia**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

To optimise infection management within surgical ICUs, an ICU-based multidisciplinary infectious diseases (IMI) programme was commenced since 2009 at Tan Tock Seng Hospital, Singapore. Patients with infectious diseases conditions and their antimicrobial therapy are reviewed twice weekly with the attendings. Hypothesis: IMI has enabled efficient and cost-effective antimicrobial strategies for severe pneumonias. This can lead to improved outcomes.

**Methods:**

A case control study was performed in neurosurgical and surgical ICUs. Chart reviews were undertaken for cases (patients with pneumonia admitted to ICU from January 2009 to December 2012) and controls (ICU patients with pneumonia admitted to ICU prior to IMI commencement). Comparisons between both groups with respect to demographics, comorbidities, severity of pneumonia, broad-spectrum antimicrobial therapy and mortality were made.

**Results:**

Cases had significantly longer duration of ventilatory support (11 days vs. 4 days) and inotrope requirement (6 days vs. 3 days) compared to controls; 39.3% of cases versus 21.7% of controls were on meropenem ( $P = 0.05$ ); 50% of cases versus 58.7% of controls used piperacillin-tazobactam. Median duration of meropenem for cases versus controls (6 vs. 15.5 days,  $P = 0.007$ ). Median duration of piperacillin-tazobactam use for cases versus controls (6 vs. 9,  $P = 0.018$ ). The 30-day mortality, hospital and ICU length of stay was similar between both groups.

**Discussion & Conclusion:**

Severe pneumonia is a leading cause of admission to ICU, associated with significant morbidity and mortality. IMI optimises antimicrobial de-escalation and significantly reduces use of broad spectrums without worsening mortality for patients with significant disease severity.

**OP-CR-36**

**Assessment of Potential Antidiabetic Overtreatment in Patients with Type 2 Diabetes and High Risk of Hypoglycaemia**

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**Background & Hypothesis:**

A growing body of evidences showed that intensive antidiabetic treatment in some subpopulations of patients with type 2 diabetes (T2DM) was associated with more harm than benefit. We aim to assess the rate of potential antidiabetic overtreatment in T2DM patients with high risk of hypoglycaemia.

**Methods:**

In this posthoc analysis of SMART2D study (subjects were recruited from KTPH and Yishun polyclinic), high risk of hypoglycaemia in T2DM were defined as 1) taking sulfonylurea and/or insulin, and 2) meeting any of the 2 criteria: age  $\geq 70$  years, eGFR  $\leq 30$  mL/min/1.73m<sup>2</sup>. HbA1c  $\leq 7\%$ , 6.5% and 6% were taken as indicators of potential antidiabetic overtreatment.

**Results:**

Among 2058 T2DM subjects in SMART2D cohort, 252 were classified as having high risk of hypoglycaemia. The distribution of subjects with HbA1c  $\leq 7\%$ , 6.5% and 6% was 25.0%, 7.8% and 2.8%, respectively, among this high-risk subpopulation. Compared with subjects with HbA1c  $> 7\%$ , those with HbA1c  $\leq 7\%$  had significantly lower fasting plasma glucose (6.9 +/- 1.7 vs. 8.6 +/- 2.7 mM,  $P < 0.001$ ). Logistic regression revealed that taking sulfonylurea was associated with ~2-fold increased odds ratio (95% CI, 1.03-3.80,  $P = 0.041$ ) for being potentially over-treated (HbA1c  $\leq 7\%$ ) compared with those taking insulin alone.

**Discussion & Conclusion:**

In our T2DM patients with high risk of hypoglycaemia, 25% may have been potentially overtreated, especially for those taking sulfonylurea.

**OP-CR-37**

**Thoracic Endovascular Aortic Repair With Supra-aortic Single Branch Chimney Graft: Early Experience from a Single Institution**

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**Background & Hypothesis:**

To present our early experience of thoracic endovascular aortic repair (TEVAR) with single supra-aortic branch chimney graft.

**Methods:**

A retrospective review of 4 male patients with either enlarging or dissecting thoracic aortic aneurysms who underwent TEVAR with a single supra-aortic branch chimney graft.

**Results:**

Mean age was 80 years of age with all patients having multiple comorbidities and preoperative American Society of Anaesthesiologists (ASA) classification of 3. Technical success was achieved in all 4 patients with an average length of hospital stay at 15 days. The cohort average maximal aneurysmal size was 68.3 mm and all patients received Medtronic Valiant thoracic aorta stent grafts with Atrium Advanta V12 chimney grafts. Two patients received left common carotid artery (LCCA) chimney grafts in view of their aortic stents landing proximally at Criado's zone 1 while the other 2 patients received left subclavian artery (LSA) chimney grafts due to intraoperative assessment of poor collateral flow to the subclavian artery. One patient was found to have a small type IIIa endoleak at the 3-month review, which was stable at subsequent 6-month review.

**Discussion & Conclusion:**

From open bypass surgeries to hybrid procedures to the current totally-endovascular TEVAR, advancements in technologies and techniques have allowed us to address TEVAR landing zone limitations imposed by arch vessels. Our early experience suggests that TEVAR with LCCA or LSA chimney grafts may be safe and feasible, especially in those at proximal landing at zone 1 or with poor LSA collaterals. However, the mid- to long-term results remain to be evaluated.

**OP-CR-38**

**Effectiveness of Nintendo Wii Gaming in Facilitating Upper Limb Recovery After Stroke: A Randomised, Controlled Study**

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**Background & Hypothesis:**

To compare the efficacy of upper limb exercises using a computer gaming device (Nintendo Wii) with conventional therapy and customary care in stroke patients receiving stroke rehabilitation.

**Methods:**

Study design: randomised, controlled, single-blinded study. Setting: tertiary rehabilitation centre. Participants: 105 subjects within 6 weeks of first stroke who fulfilled inclusion criteria. A total of 97 subjects completed the study. Interventions: subjects were randomly assigned to 1 of 3 groups of upper limb exercises: 1) Nintendo Wii gaming; 2) conventional therapy; 3) customary care. Nintendo Wii gaming and conventional therapy were provided 4 times a week for 3 weeks. All subjects also received standard care. Main outcome measure(s): main outcome measure was Fugl-Meyer Assessment (FMA) of upper limb function. Secondary outcome measures included Action Research Arm Test, Functional Independence Measure and Stroke Impact Scale. These measures were assessed at baseline, completion of intervention (week 3) and at 4 weeks and 12 weeks after completion of intervention. The primary outcome measure was change in FMA scores at completion of intervention.

**Results:**

The mean age was  $57.5 \pm 9.8$  years, and subjects were enrolled at a mean of  $13.7 \pm 8.9$  days after stroke. The mean baseline FMA score was  $16.4 \pm 14.2$ . There was no difference in FMA scores between all 3 groups at the end of intervention, and at 4 and 8 weeks after completion of intervention. Similar findings noted for the secondary outcome measures.

**Discussion & Conclusion:**

Twelve sessions of augmented upper limb exercises via Nintendo Wii gaming or conventional therapy over a 3-week period was not effective in enhancing upper limb motor recovery.

**OP-CR-39**

**Ethnicity and Gender Affect Long-term Outcomes of Type 2 Diabetes Mellitus**

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**Background & Hypothesis:**

The impact of ethnicity and gender on long-term outcomes of diabetes mellitus (DM) in Singapore is poorly understood.

**Methods:**

This is a retrospective cohort study involving 3006 Type 2 DM patients who attended a DM centre in 2003-2011. Demographics and clinical data were obtained from standardised questionnaire. Outcomes on acute myocardial infarction (AMI), end-stage renal failure (ESRF) and all-cause death were ascertained by data linkage with national registries. From reported onset of DM, time to events was assessed using Kaplan-Meier method. Multivariable cox proportional hazards regression model was used to control for confounding.

**Results:**

There were 44,280, 43,761 and 48,850 person-years of follow-up for AMI, ESRF and death respectively. Malays had poorer event-free survival rates for all outcomes than Chinese and Indians (log-rank test,  $P < 0.001$ ). Males had poorer event-free survival rates for AMI and ESRF than females (log-rank test,  $P < 0.05$ ). After adjusting for age, blood pressure, body mass index, glycosylated haemoglobin, low density lipoprotein-cholesterol, estimated glomerular filtration rate and urinary albumin-to-creatinine ratio (uACR), Malays and Indians remained significantly associated with AMI with HRs 2.81 (95%CI, 1.81-4.37) and 2.03 (95%CI, 1.15-3.59) respectively. The effect of Malays on ESRF and death became attenuated postadjustment. Males had higher risk for death than females (adjusted HR, 1.65; 95%CI, 1.24-2.20). uACR is a significant predictor for all outcomes.

**Discussion & Conclusion:**

There were ethnic and gender disparities in DM-related outcomes. Traditional cardiovascular risk factors may partly explain such findings. The results will inform our planning in care management and prevention strategies, particularly the intensiveness of intervention in high-risk groups.

**OP-CR-40**

**Asthma Severity, Control and Treatment Compliance Before and After Near-fatal Asthma Events**

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**Background & Hypothesis:**

Near-fatal asthma (NFA) is a serious complication in patients with severe asthma and asthma mortality in Singapore is unacceptably high at 2 per million. This may be related to the high proportion of patients who are not receiving inhaled corticosteroids (ICS). It is also uncertain if the asthma severity, patient compliance and treatment behaviour changed after a NFA attack.

**Methods:**

This is a retrospective study comprising of 163 NFA admissions to an academic university hospital over 12 years from 2001 to 2012. We collected data on the profile of patients (classified as untreated, difficult-to-treat or treatment-resistant based on the World Health Organization guidelines), asthma treatment received, and level of control and treatment behaviour before and up to 2 years after an NFA event.

**Results:**

The proportion of untreated, difficult-to-treat and treatment-resistant asthma changed from 34.1%, 58.5%, 1.2% to 0.61%, 66.9%, 1.2% respectively, after a NFA attack. Overall, the prescription of ICS increased from 59.5% to 96.3% and compliance to ICS increased from 23.9% to 54.6%. There were no differences in emergency department visits, hospitalisations and steroid bursts after a NFA event. In the subgroup of patients labelled as “untreated asthma” prior to the NFA: 90.5% of these patients were prescribed ICS after the NFA but 46% were non-compliant.

**Discussion & Conclusion:**

A significant proportion of NFA in Singapore may be prevented by increasing corticosteroids prescription and compliance. Patient's control and compliance to ICS remains suboptimal after a NFA.

**OP-CR-41**

**Incidence of Clinically Symptomatic Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE) in Liver Resection Patients Without Pharmacological Prophylaxis**

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**Background & Hypothesis:**

The perceived risk of bleeding after liver resection has limited the use of medical pharmacologic thromboprophylaxis to prevent deep vein thrombosis (DVT). Recently, it is evident that liver resection can unbalance haemostatic equilibrium towards hypercoagulable state and cirrhotic patient is not protective from thrombotic risk.

**Methods:**

A retrospective review of all patients undergoing liver resection operations in Tan Tock Seng Hospital, Singapore from January 2010 to August 2013 was performed and those developing DVT and PE was highlighted. Patients with pharmacological prophylaxis were excluded from the study.

**Results:**

A total of 88 patients (67 male and 21 female) with a mean age of 62 years underwent liver resection operations either wedge resection, segmentectomy (up to 2 segments) or haemihepatectomy during the study period. A major haemihepatectomy was performed in 35 patients (39.7%); 18 patients had wedge resection (20.5%) and 35 patients had segmentectomy (39.8%). Indication of liver resection are hepatocellular carcinoma (49 patients), colorectal liver metastases (29 patients), Klatskin tumour (2 patients), gallbladder carcinoma (2 patients), gastric carcinoma with liver invasion (1 patient), pancreatic neuroendocrine tumour (1 patient), hepatic haemangioma (3 patients) and focal nodular hyperplasia (1 patient). Thrombotic complications were seen in 2 patients in haemihepatectomy group (5.71%) with radiologically evident. There is no DVT or PE in wedge resection or segmentectomy group (0%). All patients have TED stocking postoperatively.

**Discussion & Conclusion:**

The symptomatic thromboembolic complication rate was higher in haemihepatectomy group compared to wedge resection and segmentectomy groups. Therefore, medical pharmacologic thromboprophylaxis is recommended for haemihepatectomy group as benefits of DVT prophylaxis outweigh risk of bleeding.

**OP-CR-42**

**Methicillin-resistant *Staphylococcus Aureus* Bacteraemia: Elevated MIC and 30-day Mortality**

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**Background & Hypothesis:**

Elevated MIC to vancomycin in methicillin-resistant *Staphylococcus aureus* (MRSA) has been reported to result in excess mortality if treated with vancomycin.

**Methods:**

We retrospectively studied all new unique cases of MRSA bacteraemia in 2006. Identification of MRSA and determination of vancomycin MIC using e-test were performed.

**Results:**

Median age for 88 patients was 71 years (interquartile range, 61-80). Male comprised 66% of the patients. Intensive care admission was needed in 20% of the patients and shock occurred in 8%. Median duration of bacteraemia was 1 day (range, 1-431). Median length of hospitalisation after bacteraemia was 26 days (range, 2-658). Thirty-day mortality was noted in 28%. MIC  $\geq 1.5$  was noted in 62 while MIC  $\geq 2$  in 19. Vancomycin was started within 2 days of bacteraemia in 37%. MRSA bacteraemia with vancomycin MIC  $\geq 1$  versus  $>1$  was similar in 30-day mortality (29% vs. 27%,  $P = 0.84$ ), median hospitalisation postbacteraemia (29 vs. 24 days,  $P = 0.385$ ) and median duration of bacteraemia (1 vs. 1 day,  $P = 0.372$ ). Similarly, MRSA bacteraemia with vancomycin MIC  $\geq 2$  vs  $>2$  was similar in 30-day mortality ( $P = 0.36$ ), hospitalisation postbacteraemia ( $P = 0.855$ ) and duration of bacteraemia ( $P = 0.278$ ). In a multivariable logistic regression model for predictors for 30-day mortality from bacteraemia involving age, comorbidity, acute illness severity, time to vancomycin, vancomycin MIC and source of bacteraemia, the only independent predictor was pneumonia with adjusted odds ratio of 9 (95% CI, 1.64-49.84),  $P = 0.011$ .

**Discussion & Conclusion:**

We did not find vancomycin MIC to be a predictor of 30-day mortality, analysed with two MIC cut-offs of 1.5 and 2. A randomised controlled trial is needed to guide clinical decision-making.

**OP-CR-43**

**Assessing Risk Associated with Methicillin-resistant *Staphylococcus Aureus* Acquisition in a Multidisciplinary Ward at CDC in 2013**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Multiple interventions have been undertaken to prevent MRSA transmission in hospitals. Little is known about the effect of universal octenidine bathing on MRSA acquisition.

**Methods:**

We conducted an analytic cross-sectional study on patients admitted to the infectious disease and dermatological ward at the Communicable Disease Centre. Daily bathing with octenidine was implemented for all patients for second half of the year.

**Results:**

During the period from January 2013 to December 2013, the average MRSA prevalence of 940 screened patients at admission was 7.7% and acquisition was 2.4%. Sixteen case-patients screened negative for MRSA on admission and positive at discharge, and 554 control-patients screened negative for MRSA both on admission and at discharge were compared. Cases tend to have more hospitalisations in the preceding year before admission (odds ratio [OR]: 2.9; 95% confidence interval [CI], 1.00-8.59), more comorbidities with Charlson score >3 (OR: 2.09; 95% CI, 0.71-6.15), and from nursing homes (OR: 9.75; 95% CI, 1.90-50.15) respectively. After adjusting for age, gender, ethnicity, Charlson comorbidity index, hospitalisation in the preceding year, MRSA colonisation pressure in the ward, hand hygiene compliance rate, surgery and antibiotic exposure during the hospital stay, total length of hospital stay, and daily universal octenidine bathing, nursing home residency status is the only factor independently associated with MRSA acquisition in the hospital (adjusted OR: 7.48; 95% CI, 1.02-55.01; *P* = 0.048).

**Discussion & Conclusion:**

Nursing home residents are at increased risk for MRSA acquisition in the hospital, and may require enhanced infection prevention measures. A longer study period is required to better assess the impact of daily octenidine bathing on MRSA acquisition.

**OP-CR-44**

**Risk Factors for Nosocomial Acquisition of Methicillin-resistant *Staphylococcus Aureus* Carriage Among Patients Admitted to the Communicable Disease Centre, Singapore**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Methicillin-resistant *Staphylococcus aureus* (MRSA) remains the most commonly identified antibiotic-resistant pathogen worldwide, creating major medical problems that pose a burden to healthcare services.

**Methods:**

We conducted a case-control study of patients admitted to the Communicable Disease Centre (CDC) in Singapore between 5 January 2009 and 31 December 2010 who were negative for MRSA at admission, comparing 84 case-patients who were tested positive at discharge, presumably acquiring MRSA during their hospital stay, with 252 control-patients who were MRSA-negative at discharge. We performed univariate logistic regression to look for risk factors contributing to MRSA acquisition, and multivariate analysis.

**Results:**

Cases tended to have longer hospital stay than controls (median 7 days vs. 5;  $P = 0.004$ ). On univariate analysis, age >65 years (odds ratio [OR]: 2.9; 95% confidence interval [CI], 1.6-5.2;  $P < 0.001$ ), patients admitted due to skin diseases (OR: 2.6; 95% CI, 1.6-4.3;  $P = 0.0002$ ) and chronic respiratory diseases (OR: 2.1; 95% CI, 1.0-4.5;  $P = 0.054$ ) were found to be associated with MRSA acquisition. On multivariate analysis, age >65 years (adjusted OR: 2.2; 95% CI, 1.1-4.3;  $P = 0.018$ ), patients admitted due to skin diseases (adjusted OR: 2.2; 95% CI, 1.2-4.2;  $P = 0.012$ ), presence of intravenous line (adjusted OR: 2.8; 95% CI: 1.4-5.6;  $P = 0.002$ ) and hospital stay >5 days (adjusted OR: 2.2; 95% CI, 1.2-4.2;  $P = 0.011$ ) were independently associated with nosocomial MRSA acquisition.

**Discussion & Conclusion:**

Patients aged >65, with skin disease, who had longer hospitalisation or intravenous lines were at increased risk of acquiring MRSA during hospitalisation. Patients with these risk factors may require enhanced precautions to prevent nosocomial MRSA acquisition.

**OP-CR-45**

**A Comparison of the Clinical Presentation and Outcomes of Severe Influenza Infections With Different Virus Subtypes**

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**Background & Hypothesis:**

Burden of influenza infection in tropical countries have been shown. We study the clinical differences among the various subtypes in Singapore.

**Methods:**

We retrospectively reviewed all influenza PCR-positive patients admitted to Tan Tock Seng Hospital from February 2011 to February 2012.

**Results:**

A total of 761 patients with influenza were admitted within the 13-month period, with 61.4% A/H3; 28.9% B; 6% A/H1N1-2009 and 3.7% A subtype undetermined (A/ND) respectively. Of these, 7% were severely ill patients requiring intensive care and/or had died. The median age of severely ill patients was 74 for A/H3; 65 for influenza B; 57 for A/H1N1 and 66 for A/ND ( $P = 0.089$ ). The difference in the proportion of severely ill patients aged 65 years or older with A/H3 (21/27; 78%), B (7/12; 58%), A/H1N1 (3/10; 30%) and A/ND (2/4; 50%) was statistically significant ( $P = 0.044$ ). There were no significant differences between the influenza subtypes with regards to gender, race, comorbidities, the reasons for admission, need for mechanical ventilation, length of stay, or death. Of these 53 patients, 47% died. There were no significant differences between those who died or survived in terms of gender, race, underlying medical conditions, the reasons for admission, flu subtypes and length of stay. However, age 65 years or older was an independent predictor (adjusted odds ratio [OR]; 7.0; 95% CI, 1.9-25.8;  $P = 0.003$ ) of death after adjusting for gender, race and flu subtypes.

**Discussion & Conclusion:**

There were no distinct characteristic differences among the various subtypes. However, severely ill patients aged 65 years or older was an independent predictor of fatality.

**OP-CR-46**

**Emergency Department Disposition of Suspected Appendicitis After Five Years of Observation  
Medicine: Has Diagnosis Accuracy Improved, and Can We Do Better?**

**WM NG<sup>1</sup>, B BUNIYA<sup>1</sup>, CL FOO<sup>1</sup>, CK OOI<sup>1</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Since the Emergency Department Treatment and Diagnostic Centre (EDOU) was established, we expect low-risk suspected appendicitis to be admitted there, and accuracy of general surgery (GS) admissions increased. This study aims to: 1) determine if the accuracy of GS admissions for suspected appendicitis has improved, and 2) discover predictors to identify low-risk cases for EDOU admission.

**Methods:**

This is a retrospective study of suspected appendicitis admitted to GS pre-(2006) and post-(2011) EDOU. Apart from appendicitis, admissions which a discharge diagnosis of other “non-benign” conditions (e.g. diverticulitis, abscess) were considered appropriate. Multivariate analysis was performed to identify variables significantly associated with appendicitis and other non-benign conditions.

**Results:**

A total of 245 pre- and 535 post-EDOU admissions to GS were recruited. There was a significant improvement in the diagnosis of both appendicitis (38.4%-47.6%,  $P = 0.016$ ), and non-benign conditions (60.4% vs. 68.4%,  $P = 0.029$ ). On univariate analysis, leucocytosis (OR 4.206), right iliac fossa pain (RIF) pain (OR 2.478), documented fever (OR 2.189), absence of diarrhoea (OR 1.946), history of fever (OR 1.68), absence of other tenderness (OR 1.678), guarding (OR 1.668) and rebound tenderness (OR 1.543), and were significantly associated with the diagnosis of appendicitis and non-benign conditions. All the predictors were still statistically significant after multivariate analysis except for RIF pain.

**Discussion & Conclusion:**

There has been significant improvement in accuracy of GS admissions for suspected appendicitis since the establishment of EDOU. Patients presenting with diarrhoea, no history of fever, afebrile at triage, no RIF tenderness/rebound/guarding, tenderness elsewhere apart from RIF, and no leucocytosis should be right-sited to EDOU.

OP-CR-47

**Empiric  $\beta$ -lactam/ $\beta$ -lactamase Inhibitors Versus Carbapenems in the Treatment of Extended-Spectrum  $\beta$ -lactamases-producing Enterobacteriaceae at an Acute Care Hospital in Singapore**

**TM NG<sup>1</sup>, WX KHOG<sup>1</sup>, PS ONG<sup>2</sup>, A CHOW<sup>3</sup>, P DE<sup>1</sup>, DC LYE<sup>1</sup>, TM NG<sup>1</sup>**

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**Background & Hypothesis:**

Extended spectrum B-lactamases (ESBL)-producing Enterobacteriaceae is a frequent cause of invasive infection with high mortality and carbapenems are the drug of choice. There is limited data that suggest B-lactam/B-lactamase inhibitors (BLBLI) could be effective. We aim to compare 30-day mortality of patients treated empirically with an active BLBLI versus a carbapenem.

**Methods:**

This was a retrospective cohort study. All patients received definitive carbapenem therapy. Mortality was compared between patients on empirical carbapenem and an active BLBLI. A propensity score for receiving carbapenem was used. Confounders were controlled using multivariate analysis.

**Results:**

A total of 324 patients had ESBL-producing *Escherichia coli* (ESBL-EC) and *Klebsiella pneumoniae* (ESBL-KP) bacteremia from August 2011 to May 2013; 57 (17.6%) were community acquired; 176 (51.5%) received active empiric therapy which consist of carbapenems (41.3%) (meropenem 60.9%, imipenem-cilastatin 33.3%, ertapenem 5.8%), piperacillin-tazobactam (53.3%) and amoxicillin-clavulanate (5.4%). All received definitive carbapenem therapy. Overall 30-day mortality was 15.0%. Patients receiving empiric carbapenem had significantly higher median APACHE II score (19 [IQR, 13.0-22.5] vs. 15 [IQR, 11.0-20.0],  $P = 0.009$ ). Thirty-day mortality in the empiric carbapenem versus active BLBLI group were 20.3% versus 11.2% respectively ( $P = 0.106$ ). After adjusting for confounders, use of empiric active BLBLI was not associated with an increase in mortality (AHR, 0.68; 95% CI, 0.24-1.93;  $P = 0.47$ ). APACHE II score (AHR, 1.09; 95% CI, 1.02-1.16;  $P = 0.011$ ) and respiratory source (AHR, 13.29; 95% CI, 3.21-55.0;  $P < 0.001$ ) was significantly associated with 30-day mortality.

**Discussion & Conclusion:**

The use of active BLBLI empirically is not associated with increased mortality for treatment of ESBL-EC or ESBL-KP bacteremia.

**OP-CR-48**

**The Use of Photodynamic Therapy to Treat Basal Cell Carcinoma, Squamous Cell Carcinoma in situ and Actinic Keratosis in National Skin Centre Singapore**

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**Background & Hypothesis:**

The incidence of skin cancers is on the rise in Singapore, in view of our ageing population and the island's location near the equator. Topical photodynamic therapy (PDT) is a treatment modality employing light and a topical photosensitiser to treat basal cell carcinomas (BCC), squamous cell carcinoma (SCC) in situ and actinic keratosis (AK). Most published data till date on PDT have been on Fitzpatrick skin types I/II. Our study evaluates the effectiveness of PDT in the treatment of the above skin conditions in skin type IV patients in Singapore.

**Methods:**

This is a retrospective analysis of Asian patients with histological confirmed skin tumours (BCC, SCC in situ and AK) who were treated with PDT at the National Skin Centre Singapore, over a period of 4 years.

**Results:**

The overall clearance rate of BCC at 3 months was 87.5% (7 out of 8 patients), SCC in situ 73.2% (41 out of 56 patients) and AK 81.8% (9 out of 11 patients). Mild to moderate pain during therapy was a common reported side effect.

**Discussion & Conclusion:**

PDT is a useful treatment modality for BCC, SCC in situ and AK in skin type IV Asian patients. Further larger prospective studies will be needed to evaluate its overall efficacy in Asian patients.

**OP-CR-49**

**Terra Firma-forme Dermatitis in Singaporean Patients: The “Alcohol Wipe” Sign**

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**Background & Hypothesis:**

The term “terra firma-forme dermatosis” arises from the Latin phrase “terra-firma” meaning dry land (dirt), thus implying dirt-like dermatosis. It is important for clinicians to recognise this entity, as it is benign, and can save patients from extensive work up.

**Methods:**

We wish to highlight 5 cases of terra firma-forme dermatosis presenting to our dermatology centre between 2012 and 2013. All patients presented to the dermatologist for persistent reticulated brown patches on their skin. These patients ranged from 6 years to 22 years of age. All patients had tried various cleansing soaps and agents but were unable to remove the patches. It was cosmetically unacceptable to the patients and the parents. Clinically, these patients had reticulated brown patches.

**Results:**

Rubbing 70% isopropyl alcohol wipes on the affected areas demonstrated clearance of the brown pigmented patches in all our cases. The diagnosis of terra firma-forme dermatosis is confirmed by forceful rubbing with a gauze pad immersed in 70% isopropyl alcohol or ethyl alcohol.

**Discussion & Conclusion:**

Patients should be reassured about the benign nature of TFFD and educated about the cleaning procedure. Recognition of this condition can assist physicians in making diagnosis and therapy with a simple alcohol wipe, preventing further unnecessary tests for patients.

**OP-CR-50**

**A Novel Heart Rate Variability Score is Better than APACHE II for Prediction of Mortality in Patients With Sepsis Presenting at the Emergency Department**

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**Background & Hypothesis:**

Sepsis imposes a growing burden on healthcare systems globally. It has become paramount for emergency physicians to identify sepsis early and treat it quickly. We aimed to derive a score incorporating heart rate variability (HRV) and traditional vital signs to predict mortality in patients diagnosed to have sepsis upon initial presentation to the emergency department (ED).

**Methods:**

HRV parameters (derived from a 5-minute electrocardiogram recording) and vital signs were prospectively recorded at triage for patients with clinical sepsis. A model was constructed with HRV variables and vital signs to be compared against the APACHE II score in predicting the primary outcome of mortality within 30 days in these patients.

**Results:**

A total of 111 patients met at least 2 of the 4 criteria for systemic inflammatory response syndrome and hence were included in this study; 18 patients met with primary outcome of mortality within 30 days. Stepwise logistic regression was used to derive a scoring model comprising 8 vital signs such as heart rate, respiratory rate and blood pressure, and 16 time domain and frequency domain HRV parameters. For predicting mortality within 30 days, the HRV risk score (AUC = 0.83, sensitivity = 77.8%, specificity = 71.0%, PPV = 34.1%, NPV = 94.3%) outperformed the APACHE II score (AUC = 0.60, sensitivity = 61.1%, specificity = 62.4%, PPV = 23.9%, NPV = 89.2%).

**Discussion & Conclusion:**

The score incorporating HRV and traditional vital signs performed better than APACHE II score in predicting mortality in sepsis patients. This pilot study shows the potential for a novel HRV score as a triage tool in stratifying the severity of sepsis and predict mortality.

**OP-CR-51**

**DNA Hypermethylation of Reelin Promoter is Associated With Childhood Trauma and Parenting in Juveniles at Ultra High Risk for Psychosis**

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**Background & Hypothesis:**

Traumatic experiences in childhood are associated with later development of psychiatric disorders, but the aetiopathogenesis remains unknown. We present a study to elucidate the epigenomic impact of parenting and childhood trauma on psychopathological risk. We posit this risk to be mediated by DNA hypermethylation in the promoter of the reelin gene, which is involved in neuronal migration and synaptogenesis.

**Methods:**

Participants aged 14 to 29 were recruited from the community. Their risk for psychiatric disorders was evaluated using the Structured Clinical interview for DSM IV Axis I (SCID-I) and the Comprehensive Assessment of At-Risk Mental State (CAARMS). Parent-child relationships were assessed by Parental Bonding Instrument (PBI) and Child Trauma Questionnaire (CTQ). Positive and Negative Syndrome Scale (PANSS), Calgary Depression Scale for Schizophrenia (CDSS) and Beck Anxiety Inventory (BAI) complemented the clinical assessment. Genomic DNA was extracted from peripheral blood leukocytes, bisulphite-converted, PCR-amplified and pyro-sequenced. Methylation percentage was entered into a regression model to predict clinical risk.

**Results:**

DNA hypermethylation on the reelin CpG island 1 was significantly associated with higher positive symptoms scores, higher emotional, physical, sexual abuse and physical neglect. The association between low PBI Maternal Care and reelin hypermethylation was marginally significant. Abnormal DNA hypermethylation on reelin CpG island 3 was positively and significantly associated with psychiatric risk.

**Discussion & Conclusion:**

Our results suggest that the impact of early socioemotional adversities is possibly mediated by reelin gene hypermethylation. This finding encourages us to further investigate the role of early life experiences to alter epigenetic patterns in genes crucial for neurodevelopment and mental health.

**OP-CR-52**

**Effect of Human Serum Albumin (5%) and Fresh Frozen Plasma as Dimethyl Sulfoxide Diluent on Cell Recovery, Viability and Clonogenic Potential of Cryopreserved Peripheral Blood Stem Cells**

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**Background & Hypothesis:**

Fresh frozen plasma (FFP) has widely been used as a dimethyl sulfoxide (DMSO) diluent in the cryopreservation of haematopoietic progenitor cells. However, in cases where concurrent FFP is unavailable, an alternative diluent has to be used. This study examined the equivalency of FFP and 5% human serum albumin (HSA) as DMSO diluents, as well as the effects of the 2 diluents on the post-thaw viability of peripheral blood stem cells (PBSCs).

**Methods:**

PBSC samples were cryopreserved using the 2 diluents and thawed in a warm water bath after at least 1 week storage. Stem cell viability was assessed by flow cytometry; using CD34 PE, CD45 FITC and 7-AAD. The percentage of viable CD34+, CD45 +/- cells was calculated and this served as a base of comparison. A CFU culture assay was carried out on each sample by culturing in MethoCult™ media, incubated for two weeks. Individual colonies formed were then counted and classified.

**Results:**

CFU assay results agree with percentage viability with the exception of FFP-2. Insufficient sample volume in the culture media, leading to lesser colony growth, could be the cause (21 BFU-E colonies in FFP, 490 in 5% HSA).

**Discussion & Conclusion:**

From current results (n = 2), flow cytometry indicates no significant difference between diluents (mean % viability HSA = 91.45%, mean % viability FFP = 94.85%). There is insufficient data to conclude, with certainty, that 5% HSA and FFP are equivalent as DMSO diluents in the cryopreservation process of PBSCs. As this study is ongoing, more results will be derived in the coming weeks.

**OP-CR-53**

**Roux En-Y Gastric Bypass Versus Sleeve Gastrectomy – Comparison of Metabolic and Nutritional Profile at a Tertiary Hospital**

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**Background & Hypothesis:**

Bariatric surgery (BS) induces significant weight loss and improvement in metabolic profiles including remission of diabetes mellitus. Our aim was to compare body weight, metabolic parameters and nutritional deficiencies between sleeve gastrectomy (SG) and Roux-en-Y gastric bypass (RGP).

**Methods:**

Retrospective evaluation of 100 BS patients at Tan Tock Seng Hospital, Singapore; 52 had RGP (34 females/mean age 47/42 with diabetes) and 48 underwent SG (23 female/mean age 40/15 with diabetes).

**Results:**

There was no significant difference between 2 groups in relation to lipid profile and reduction in weight; (BP vs. SG, Kg, Mean  $\pm$  SD); at 1 year;  $26.0 \pm 11.1$  vs.  $27.5 \pm 12.3$ , at 2 years;  $25.4 \pm 13.5$  vs.  $25.4 \pm 18.5$ . The glycaemic control (HbA1C) was better after RPG compared to SG (at 1 year;  $2.3 \pm 2.1\%$  vs.  $1.1 \pm 0.9\%$ ). However, the remission of diabetes and reduction in dosage of insulin/oral drugs were similar in both groups after surgery (BP vs. SG, 28.6 vs. 26.6%). Folate and vitamin D deficiencies were common before surgery in both groups. The prevalence of low haemoglobin, iron, B12, folate, vitamin D and albumin 1 year after surgery, respectively, is as follows (BP vs. SG %); 7.7 versus 10.4, 7.7 versus 8.3, 2 versus 0, 3.8 versus 0, 15 versus 2 and 3.8 versus 6.3.

**Discussion & Conclusion:**

Comparable reduction in weight was found after both types of surgery. Glycaemic control was better after RPG than SG, but this could be due to selection bias. Nutritional deficiencies are common in both groups after surgery and monitoring for nutritional deficiencies have been inadequate.

**OP-CR-54**

**Effects of Music on Perioperative Outcomes in Cataract Surgery**

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**Background & Hypothesis:**

Music is internationally used in medical procedures. However its effectiveness as an adjunct anaesthetic has never been evaluated locally. It is estimated that cataracts affect 78.6% of Singaporean elderly, with approximately 40,000 cataract surgeries done yearly. There is hence merit in improving patient experience whilst optimising peri and postoperative outcomes. We hypothesised that patient-selected music during a cataract procedure can reduce perioperative anxiety as determined by autonomic parameters, self-reported postoperative anxiety score, and salivary cortisol levels.

**Methods:**

A pilot study of 90 patients was conducted at Singapore National Eye Centre (SNEC) and National University Hospital (NUH). Patients were divided into 2 groups: an experimental group listened to music of their choice via headphones and a control group underwent their cataract surgery without any intervention. Patients were surveyed via the 6-point State-Trait Anxiety Index (STAI) before and after their surgery. Satisfaction scores of the patient and doctors were noted after surgery. Salivary cortisol samples were taken before and after the surgery. Intraoperatively, the patient's autonomic parameters and sedation requirements were noted.

**Results:**

Results from this pilot showed decreased stress levels as evidenced by decreased salivary cortisol levels as well as STAI scores, in the experimental group as compared to control group. Satisfaction was quantitatively and qualitatively higher amongst patients in the experimental group.

**Discussion & Conclusion:**

This pilot shows promising results towards the efficacy of listening to music during cataract surgery. In teaching hospitals, listening to music incurs the added benefit of allowing mentors to teach residents without causing undue anxiety to the patient.

**OP-CR-55**

**Atypical Fractures of the Femur: Effect of Anterolateral Bowing of the Femur on Fracture Location**

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**Background & Hypothesis:**

Bisphosphonate therapy has been associated with the development of atypical femoral fractures. The most common sites of bisphosphonate-associated fractures are at the subtrochanteric region followed by the femoral shaft. This retrospective study hypothesises that increasing anterolateral femoral bow is associated with more distal diaphyseal fractures. Awareness of this relationship is essential in the preoperative planning and successful surgical management of these fractures.

**Methods:**

We retrospectively reviewed 21 atypical subtrochanteric and femoral diaphyseal fractures and stress reactions within a 5-year period at our institution. Radiographs were assessed by 2 independent investigators for the degree of anterior and lateral femoral bow, and how distal the fracture was from the lesser trochanter. The relationship between the fracture position or stress reaction and degree of anterior and lateral bowing was analysed.

**Results:**

There was a statistically significant linear relationship between anterior and lateral femoral bowing, and the fracture position along the diaphysis (correlation coefficient 0.63 ( $P = 0.002$ ) and 0.684 ( $P = 0.001$ ) respectively). Interobserver reliability was highly correlated.

**Discussion & Conclusion:**

In atypical femoral fractures associated with bisphosphonate use, more distal diaphyseal fractures occurred with a higher degree of anterior and lateral bow.

**OP-CR-56**

**An Analysis of the Reasons for Transfer of Patients from General Ward to High Dependency/Intensive Care Unit Within 24 Hours of Admission from the Emergency Department**

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**Background & Hypothesis:**

The emergency department (ED) is the first recipient of most admitted patients in a hospital. Errors involving ED triage, management and disposition have adverse patient outcomes. Studies have shown that unplanned transfers from general ward (GW) to high dependency (HD)/intensive care units (ICU) are associated with increased morbidity and mortality. Primary aims are to determine the number of unplanned transfers among ED patients from GW to HD/ICU within 24 hours of admission and the mortality rate of such patients. The secondary aim is to evaluate the reasons for these unplanned transfers.

**Methods:**

We conducted a retrospective review of ED admission summaries and inpatient discharge summaries from October 2013 to March 2014. Information collected included demographics, admitting and final diagnosis, time to transfer, reason(s) for transfer and outcome. Data was analysed by SPSS v19.

**Results:**

There were 23,401 patients admitted from ED to GW with 326 (1.39%) unplanned transfers to HD/ICU within 24 hours of admission. The mortality rate was 11.0%. The most frequent diagnoses were acute coronary syndrome (15.0%) and pneumonia (14.1%). The top reasons for transfer were disease progression (27.6%) and postoperative monitoring (27.6%). Other reasons included admission to HD for monitoring (10.4%), HD/ICU requested but denied by inpatient team (7.1%), development of new unrelated problem(s) (5.0%) and misinterpretation of investigations (4.8%).

**Discussion & Conclusion:**

There is a low rate and mortality of unplanned transfers to HD/ICU. Qualitative analyses of cases should be done to guide and improve current ED protocols in order to decrease morbidity, mortality and healthcare costs.

**OP-CR-57**

**Quality of Life and Neurocognitive Functioning in Patients With Deficit and Non-deficit Schizophrenia**

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<sup>1</sup>*Institute of Mental Health, Singapore*

**Background & Hypothesis:**

Deficit syndrome is a schizophrenic subtype characterised by primary and enduring negative symptoms. This study investigated differences in quality of life (QOL) and neurocognitive functioning between deficit and non-deficit patients, and predictors of both outcomes. We hypothesised that deficit patients will show poorer QOL and neurocognitive functioning.

**Methods:**

Forty-eight healthy controls, 89 non-deficit and 27 deficit schizophrenia patients (classified based on Proxy for Deficit Syndrome Scale) matched for sex and age were assessed on symptomatology, QOL and neurocognitive functioning. Differences in outcomes between groups were examined using ANCOVA and multiple linear regression analyses were used to determine predictors of outcomes.

**Results:**

Significant difference was found in all QOL domains between all 3 groups: Physical health,  $F(2,154) = 4.991, P < .01$ , Psychological,  $F(2,154) = 4.010, P < .05$ , Social relationships,  $F(2,154) = 8.022, P < .01$ , Environment,  $F(2,154) = 4.604, P < .05$ , Overall perception of QOL,  $F(2,154) = 3.273, P < .05$ , Health satisfaction,  $F(2,154) = 3.186, P < .05$ . Specifically, deficit patients had significantly poorer physical health, social relationships and total QOL (all  $P < .05$ ). Controls had significantly better neurocognitive performance than patient groups: Overall performance,  $F(2,145) = 4.110, P < .05$ , tokens correct,  $F(2,152) = 4.674, P < .05$ , symbol coding,  $F(2,151) = 8.500, P < .01$ . Longer illness duration, single, and deficit syndrome predicted poorer QOL. Healthy controls had better neurocognitive functioning ( $P < .05$ ).

**Discussion & Conclusion:**

Deficit syndrome patients have poorer QOL compared with non-deficit patients but did not differ in neurocognitive functioning. The specific factors (diagnosis, illness duration) associated with neurocognitive functioning and quality of life can be potential clinical markers of poorer outcomes during clinical evaluation and management of these individuals with severe and crippling conditions.

**OP-CR-58**

**Cross Diagnostic Comparisons of Quality of Life and Clinical Cognitive Predictors in Psychotic Spectrum Disorders**

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**Background & Hypothesis:**

Data are wanting on cross diagnostic comparisons of quality of life (QOL) within psychotic spectrum conditions. This study examined QOL differences and clinical predictors between schizophrenia (SCZ) and bipolar disorder (BD). Based on extant data, we hypothesised that patient groups did not differ in QOL scores, and that symptoms and psychosocial functioning predicted QOL in our patients.

**Methods:**

A total of 222 subjects (44 BD, 122 SCZ, 56 healthy controls), matched for sex and age, were assessed on QOL, psychosocial functioning and symptomatology, using WHOQOL-Bref, GAF, and PANSS. A smaller subset (n = 98) was assessed on neurocognitive functioning using BACS. ANCOVA and multiple linear regression analyses were used to compare QOL across groups and determine clinical predictors.

**Results:**

Healthy controls reported significantly higher QOL than patients in all QOL domains, namely, physical, psychological health, social relationships (all  $P < .05$ ) and environment ( $P < .01$ ). There was no QOL difference between patients with SCZ and BD. Better performance on symbol coding was associated with better QOL. More severe negative symptoms but better Tower of London performance were associated with poorer QOL (all  $P < .05$ ).

**Discussion & Conclusion:**

Patients with SCZ and BD are equally affected in their QOL. The findings of specific neurocognitive domains as predictors of QOL highlighted potential cognitive markers of QOL and cognitive intervention as a potential future target for improving QOL.

**OP-CR-59**

**Phase 1 Study of Safety and Tolerance of Hypothermia for Preventing Chemotherapy-induced Peripheral Neuropathy**

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**Background & Hypothesis:**

Severe chemotherapy-induced peripheral neuropathy (CIPN) is a common adverse event with no effective treatment. In-vitro and animal studies suggest that hypothermia has neuro-protective effects and we hypothesise that limb hypothermia prevents CIPN. The objective of this study is to assess the safety/tolerability (reported here) and efficacy of limb hypothermia in preventing CIPN.

**Methods:**

Limb hypothermia was first studied in 15 healthy volunteers. Hypothermia was administered to one randomised arm and leg (up to digits) via a commercial cooling device (Blanketrol<sup>®</sup>) gradually decreasing from 25°C to 20°C. Then, breast cancer patients receiving adjuvant weekly paclitaxel underwent similar randomised hypothermia of one leg with every cycle of chemotherapy (3 hours) for a maximum of 12 cycles.

**Results:**

We achieved a minimum tolerated device temperature of 22°C in the healthy subjects with mean skin temperature reduction of 3.8°C (range 2.7-7.3°C). Seven breast cancer patients have undergone a total of 25 cycles of cooling so far (range, 1-11 cycles). Skin temperature reduction of 1°C to 3°C in the upper leg and 2°C to 10°C in the toes was achieved. Tolerability scores were well within limits with no early termination of cooling. Only 2 cycles required increase by 1°C intracycle. Minimal discomfort, numbness and skin discolouration was reported with no lasting adverse effects.

**Discussion & Conclusion:**

A tolerated device temperature of 22°C maintained over 3 hours was found in healthy subjects. In breast cancer patients, multiple cycles of 22°C limb hypothermia lasting the duration of chemotherapy were safe and well tolerated allowing this testing modality to be further evaluated. Efficacy of hypothermia in prevention of CIPN is awaited.

**OP-CR-60**

**Factor Determinants of Anxiety and Stress Levels in Cataract Surgery Patients**

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**Background & Hypothesis:**

It is estimated that cataracts affect 78.6% of Singaporean elderly, with approximately 40,000 cataract surgeries done yearly. Despite this, not much is known about the significance of different determinants of anxiety in cataract surgery patients. Our study analysed the predictive value of factors related to cataract surgery-induced anxiety in a Singaporean context.

**Methods:**

A pilot study of 90 patients was conducted at Singapore National Eye Centre (SNEC) and National University Hospital, Singapore (NUH) in 2014 on patients undergoing cataract surgeries. The 6-point State-Trait Anxiety Index (STAI) paired with salivary cortisol levels were used to subjectively and objectively assess stress levels, both pre and postoperatively. The survey incorporated factors stipulated to contribute to anxiety, including a previous cataract surgery, presence of family members who had undergone a similar procedure as well as doctor-patient relationship.

**Results:**

It was found that patients overall were minimally anxious about their surgery. Factors that were associated with lower stress levels included presence of a family member who had undergone cataract surgery as well as having been told about their surgery in their native language. Surprisingly, having met the surgeon before was not associated with decreased stress levels. Factors associated with higher stress levels included expectation of perfect vision after surgery as well as incongruency in expectation and outcome of anaesthesia.

**Discussion & Conclusion:**

We recommend that patient expectations be appropriately matched, specifically with regards to anaesthesia during surgery as well as the overall outcome of a cataract surgery. With clearer expectations, some of the factors contributing to patient anxiety can be alleviated.

**OP-CR-61**

**Imaging and Clinical Markers Predict Function and Quality of Life in Schizophrenia**

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**Background & Hypothesis:**

Psychiatric disorders such as schizophrenia are heterogenous in both presentation and outcome. While classified based on symptom criteria chosen for reliability, this may have little bearing on outcome. We sought to determine subtypes and dimensions from imaging and baseline symptoms that predict function and outcome.

**Methods:**

MRI scans were acquired for 100 Singaporean Chinese with schizophrenia, scored on psychotic symptoms, assessment of function, insight and quality of life. Machine learning was used to identify clusters and dimensions most predictive of outcome.

**Results:**

Analysis unveiled stable 2 and 3 cluster solutions. The initial 2 clusters of schizophrenia symptoms at onset differed in persecution ( $P = 7.0E-27$ ), delusions ( $P = 9.2E-25$ ), and unusual thought content ( $P = 2.6E-24$ ) and cingulate cortex volume ( $P = 0.0217$  fwe-corrected). The more severe symptom cluster is associated with impaired global functioning ( $9.0E-14$ ). The severe cluster precisely encompasses 2 clusters of the 3-cluster solution. Comparing the 2 subclusters, the first had more negative symptoms ( $P = 9.8E-13$ ) and increased CSF volume (594 ml vs. 508 ml,  $P = 0.017$ ) associated with worse insight ( $P = 0.0041$ ) and quality of life ( $P = 0.0069$ ). This was replicated in a larger cohort of 1000 patients.

**Discussion & Conclusion:**

This is the first study in a Singapore schizophrenia cohort reliably combining imaging and clinical data to predict outcome, function and quality of life. Instead of reflecting traditional subtypes, clusters divide by severity of classic symptoms of schizophrenia and then by the presence of a “deficit syndrome”. This has implications for the involvement of imaging in diagnostic work-up, to develop predictive tools for clinical use and eventually diagnostic criteria.

**OP-CR-62**

**Feasibility of Cone-beam Computed Tomography in Unipedicular Spinal Cement Augmentation Procedures**

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**Background & Hypothesis:**

Vertebral body stentoplasty, kyphoplasty, and vertebroplasty are increasingly being used in the treatment of vertebral body fractures. We aim to assess the feasibility of cone-beam computed tomography (CBCT) in the planning of unipedicular procedures.

**Methods:**

We retrospectively reviewed the records of 28 patients who underwent 33 unipedicular procedures utilising CBCT planning from January 2012 to May 2014. Postprocedural scans (axial and coronal) were evaluated to determine technical success of the procedure. Indices used to determine technical success of the 3 different procedures were the presence of cement crossover and percentage of cross-filling of cement into the contralateral half of the vertebra. Additionally, crossing of the device (stent in stentoplasty, balloon in kyphoplasty) over the midline was recorded and is an index of success in kyphoplasty and stentoplasty.

**Results:**

Procedures reviewed included stentoplasty (n = 16), kyphoplasty (n = 13), and vertebroplasty (n = 4). For stentoplasty and kyphoplasty, 86% (24/28) of cases demonstrated crossover filling of cement, and 75% (18/24) of the cases with cement crossover demonstrated more than 50% cross-filling; 90% (26/29) of cases demonstrated midline crossover of the device. For vertebroplasty, 100% (4/4) of cases demonstrated crossover filling of cement, and 75% (3/4) had more than 50% cross filling; 6% (2/33) of all procedures failed due to the sclerotic nature of the vertebral body.

**Discussion & Conclusion:**

CBCT is feasible as a tool in the planning of unipedicular spinal cement augmentation procedures, as demonstrated by the high success rates.

**OP-CR-63**

**A Retrospective Study on Recurrent Laryngeal Nerve Palsy Rates in Thyroidectomies – A Single Surgeon Experience in a Primary Hospital**

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**Background & Hypothesis:**

Recurrent laryngeal nerve (RLN) palsy is a potentially catastrophic complication of thyroid surgery. Our study aims to determine the transient and permanent RLN palsy rates in all personally-performed thyroidectomies of a single surgeon to date and assess for factors predictive of a higher incidence of palsy.

**Methods:**

A retrospective study of 445 patients who underwent thyroidectomy by a single otolaryngology surgeon at the National University Hospital, between August 2003 and March 2014. Laryngoscopy was done for all patients. Patients with new-onset RLN palsy postthyroidectomy were maintained on regular follow-up until mobile vocal cords were seen or loss to follow-up. Permanent RLN palsy was defined as inadvertent transection of the nerve or failure of palsy to resolve on follow-up. Nerves paralysed from tumour infiltration were excluded.

**Results:**

A total of 569 nerves were at risk; 13 nerves at risk were paralysed resulting in a total RLP palsy rate of 2.3% with transient and permanent paralysis rates of 1.8% and 0.5% respectively. The incidence of RLN palsy was highest in total thyroidectomies (4.6%) compared to hemithyroidectomies (1.3%) or completion thyroidectomies (1.8%). The incidence of RLN palsy was greater in patients above the age of 55 (OR: 5.60, 95% CI, 1.43-21.98,  $P = 0.006$ ) and in those with thyroid nodules larger than 5 cm in diameter (OR: 8.11, 95% CI, 2.11-31.21,  $P = 0.000$ ). Retrosternal extension and extension of thyroid nodule into strap muscles were associated with higher incidence of RLN palsy (OR: 16.40, 95% CI, 4.45-60.40,  $P = 0.000$  and OR: 7.94, 95% CI, 0.87-72.97,  $P = 0.030$ , respectively).

**Discussion & Conclusion:**

Knowledge about the potential predictive factors of RLN palsy allows surgeons to better counsel their patients in the preoperative setting about the risk of nerve palsy in thyroidectomies.

**OP-CR-64**

**Characterising Benign Fibrous Soft Tissue Tumours: Are We Misdiagnosing a Lot of Them?**

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**Background & Hypothesis:**

Fibrous tumours are amongst the most common soft tissue lesions encountered in clinical practice. They demonstrate varied biologic behaviour and imaging characteristics. Learning objectives: 1) describing the radiologic spectrum of benign fibrous soft-tissue tumours and, 2) describing their imaging characteristics, common sites of occurrence, recurrence risks and differential diagnosis.

**Methods:**

Imaging: MRI findings of histologically proven cases of benign fibrous soft tissue tumour in an adult population were reviewed. Broad categories include benign fibrous proliferations, fibromatoses and fibrosarcomas. Black and white mixed pattern on T2W images with low signal intensity foci on T1W images well depicts their histologic features. These tumours are highly vascular.

**Results:**

Lesions with large size, deeper locations and less defined borders are frequently misdiagnosed as malignant soft tissue tumours. Differential diagnosis for benign fibrous tumours includes pleomorphic undifferentiated sarcoma, peripheral nerve sheath tumour, nodular tenosynovitis, myositis ossificans, metastatic deposits etc.

**Discussion & Conclusion:**

Awareness of MR characteristics, pathological behaviour and common sites of occurrence of fibrous soft tissue tumours will help radiologists in determining appropriate differential diagnosis and guide patient management.

**OP-CR-65**

**Is Platelet Transfusion Effective in Patients Taking Antiplatelet Agents Who Suffer an Intracranial Haemorrhage?**

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**Background & Hypothesis:**

Patients with intracranial haemorrhage (ICH) who are taking antiplatelet agents (APAs) may receive platelet transfusions as part of treatment. We conducted a systematic review of its use.

**Methods:**

Cochrane, Medline, Embase and CINAHL databases were used, and studies included were randomised or case controlled studies comparing outcomes in adult patients (with APA-related ICH) who received or did not receive platelet transfusion. Study quality was measured using appropriate scores.

**Results:**

There were no randomised controlled trials. Six case controlled studies (4 traumatic, 2 primary ICH) were included. For APA-related traumatic ICH, the pooled OR for in-hospital mortality with platelet transfusion was 1.77 (95% CI, 1.00-3.13). There were no statistically significant differences for secondary outcomes except for proportion with medical decline (6/44 vs. 2/64;  $P = 0.006$ ). For APA-related primary ICH, the pooled OR for in-hospital mortality with platelet transfusion was 0.55 (95% CI, 0.27-1.12). There was no statistically significant differences for secondary outcomes between the 2 groups. The median Newcastle-Ottawa score for the studies was 6 (IQR, 2). These studies had important methodological limitations.

**Discussion & Conclusion:**

The evidence for platelet transfusion in APA-related ICH was inconclusive due to methodological limitations.

**OP-CR-66**

**Advanced Chronic Obstructive Pulmonary Disease (COPD) – A Long Neglected Population at the End-of-life?**

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**Background & Hypothesis:**

Patients with advanced chronic obstructive pulmonary disease (COPD) suffer reduced quality of life (QOL) and poor survival. We aim to evaluate the QOL amongst outpatient subjects with stage 3 and 4 COPD, and to determine factors associated with a low QOL score.

**Methods:**

This collaborative study evaluates outcomes of stage 3 and 4 COPD subjects recruited from the respiratory outpatient clinic.

**Results:**

Of 71 subjects recruited, 48 (68%) have stage 3 and 23 (32%) have stage 4 disease; 11.2% required intensive care interventions and 31% receives home domiciliary oxygen; 32.4% had recurrent hospital admissions in the past year and 46.5% couldn't complete the 6-minute-walk test, with 23.9% of subjects desaturating below 90% by the end of 2 minutes. A total of 25.7% were malnourished and 16.9% suffered comorbid anxiety and/or depression. QOL, measured by the St George's Respiratory Questionnaire (SGRQ) was low (mean SGRQ  $41.2 \pm 17.9$ ). A third of carers expressed caregiver stress. SGRQ strongly correlated with disease severity, and moderately so with hospitalisation frequency, domiciliary oxygen use, as well as anxiety and depression scores (*P* values <0.05). Stage 4 subjects experience poorer QOL (mean SGRQ 50.9 vs. 36.9; *P* <0.05). They also suffer higher rates of anxiety and depression, and were more likely to have  $\geq 3$  admissions in the previous year, although these did not reach statistical significance. Despite this, only 32% of stage 4 and 5% of stage 3 subjects have discussed advanced care plans.

**Discussion & Conclusion:**

There is a high level of unmet needs in this vulnerable population. This requires redress with multifaceted, interdisciplinary care.

**OP-CR-67**

**Prevalence of Hypohidrosis in Healthy Individuals Who Developed Exertional Heat Injury: A Prospective Open Cohort Study**

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**Background & Hypothesis:**

Exertional heat injury, a potentially fatal condition, is typically attributed to exogenous causes. We aim to determine the prevalence of hypohidrosis in healthy individuals who developed exertional heat injury.

**Methods:**

All soldiers from the Singapore Armed Forces, a conscript defense force, who developed heat exhaustion or heat stroke between 1 January 2012 and 31 December 2013 were consecutively invited to participate in the study. Individuals with a prior diagnosis of hypohidrosis or secondary aetiologies of hypohidrosis (drug, neurological or dermatological causes) were excluded. Subjects were induced to sweat and disseminated atomised starch-iodine powder was administered. If anhidrosis was present, a cholinomimetic agent (carbachol) was intradermally injected into a hidrotic area and an anhidrotic area.

**Results:**

Out of 65 males diagnosed with heat injury, 29 consented to undergo the investigations. Nine (31%) demonstrated hypohidrosis. Of these, 2 (22%) had acquired idiopathic generalised anhidrosis, 1 (11%) had miliaria profunda and 6 (67%) manifested a new phenotype which we termed acquired symmetrical segmental hypohidrosis. In the latter, 4 had hypohidrosis in a similar pattern: symmetrically involving well demarcated infradeltoid regions of upper limbs, whole of lower limbs, and lateral trunk. In all hypohidrotic cases except miliaria profunda, carbachol injection induced sweating in hidrotic areas but not in anhidrotic regions, indicating that anhidrosis was caused by a postsynaptic defect in the sweat glands.

**Discussion & Conclusion:**

Almost one-third of previously healthy military men who developed heat injury had hypohidrosis. All patients who develop heat injury should be screened for hypohidrosis to avoid a recurrence. We have concurrently identified a new phenotype of acquired symmetrical segmental hypohidrosis.

**OP-CR-68**

**Effectiveness of Universal Screening for Methicillin-resistant *Staphylococcus Aureus* (MRSA) Using Polymerase Chain Reaction Versus Culture-based Medium in a Tertiary Hospital**

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**Background & Hypothesis:**

Universal screening of all patients at admission and implementation of contact precautions can prevent healthcare-associated MRSA. We compared the performance of universal screening using the rapid polymerase chain reaction (PCR) test with the conventional culture method.

**Methods:**

We conducted a retrospective study of all patients admitted to Tan Tock Seng Hospital (TTSH) and the Communicable Diseases Centre (CDC), from 1 January 2012 to 31 December 2013. TTSH houses patients with acute general medical and surgical conditions, whereas CDC admits infectious diseases and dermatology inpatients. Patients screened for MRSA colonisation using both culture and PCR tests within 24 hours of admission were included. One swab from combined nares-axillae-groin (NAG) or nasal, axilla, groin and throat (NAGT) were cultured using chromogenic agar plates (MRSASelectTM, BioRad, France) and nasal swabs were tested by real time PCR (GeneXpert, Cepheid).

**Results:**

A total of 8019 patients were included in the analysis. The median age was 59 years (interquartile range, 41-74); 56.7% of patients were male. Comparing PCR with NAGT culture in CDC, PCR had a specificity of 96.9% and a sensitivity of 89.7%. Negative predictive value (NPV) was 99.7%. Comparing PCR with NAG culture in TTSH, PCR had a specificity of 99.2%, a sensitivity of 45.0% and NPV was 98.7%. PCR had a sensitivity of 70.0% and 60.0% among diabetic and cancer patients, and NPVs was 98.8% respectively.

**Discussion & Conclusion:**

PCR performance is comparable to conventional cultures. With a rapid turnaround, PCR is useful as a screening tool for MRSA, for timely implementation of contact precautions and transmission prevention.

**OP-CR-69**

**A Comparison of Clinical Outcomes for Primary Percutaneous Coronary Intervention in Elderly South-East Asian Patients (≥70 years) Versus Non Elderly Patients with ST-Elevation Myocardial Infarction in a Single-centre Registry**

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**Background & Hypothesis:**

The number of elderly citizens is set to triple by 2030. We expect an increased incidence of ST elevation myocardial infarction which would pose challenges to therapy and care. We aim to analyse clinical characteristics and in-hospital outcomes of the elderly

**Methods:**

Between January 2009 and December 2011, 958 patients presented to our hospital for STEMI and underwent PPCI. There were 186 and 772 persons in the elderly and non-elderly group. We studied their baseline clinical characteristics, treatment modalities and hospital course.

**Results:**

The elderly constituted 19% of the study population. Most of the elderly were Chinese and female. Hypertension was more common in the elderly but there were fewer smokers. The prevalence of diabetes, previous AMI and intervention were similar. There was no difference in the types of MI at presentation. Although the symptom onset-to-reperfusion time was similar, mean door-to-balloon time was longer in the elderly, more required femoral access. They had higher incidences of triple vessel and left main disease. The use of GIIb/IIIa inhibitors and DES during PPCI were also lower. Inpatient mortality was higher for the elderly but there was no difference with cardiogenic shock.

**Discussion & Conclusion:**

The elderly had poorer prognosis compared to the non-elderly. Extensive coronary disease, longer D2B time, and lower use of adjuncts may explain this. Anatomical difficulties, increased incidence of anaemia may explain the lower use of use of radial artery access, GIIb/IIIa inhibitors and DES during PPCI in the elderly. Hence, we would need further studies to improve STEMI management for the elderly.

**OP-CR-70**

**The Role of Danazol in Acute and Refractory Immune Thrombocytopenia**

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**Background & Hypothesis:**

After failing corticosteroids in immune thrombocytopenia (ITP), splenectomy or Rituximab would then be considered, reserving thrombopoietic stimulating (TPO) agents as third line treatment. However, many patients are reluctant to consider splenectomy, whilst Rituximab and TPO agents are costly alternatives. We report the efficacy of Danazol in 7 patients with ITP.

**Methods:**

Patients aged  $\geq 18$  years with ITP, who received Danazol and are under follow-up are included.

**Results:**

With Danazol and prednisolone as upfront therapy, one patient achieved a platelet count of  $133 \times 10^9/L$  on day 9 and remains in complete remission (CR) 7 months to date with Danazol monotherapy. Two patients received Danazol and Rituximab after failing corticosteroids, achieved CR within 3 and 2 weeks and remain in CR 7 and 3 months respectively to date. One patient remains in partial remission (PR) (platelet  $60 \times 10^9/L$ ) 9 months to date with Danazol, having failed corticosteroids and Rituximab. Low dose Danazol allowed a steroid-dependent patient to wean off corticosteroids within 4 weeks and remained in PR (platelet  $70-100 \times 10^9/L$ ) 4 years to date. In 2 other patients, Danazol was commenced to reduce the exposure to corticosteroids with promising results. The average time to achieve a platelet count of  $\geq 30 \times 10^9/L$  is 9 days.

**Discussion & Conclusion:**

The combination of Rituximab or corticosteroids, with Danazol, led to a rapid increment of platelet count, through synergistic immunomodulatory and thrombopoietic properties; sustaining the effects of Rituximab and limiting patients' exposure to corticosteroids. Often considered as fourth/fifth line therapies, its role in first and second line therapies should be confirmed in prospective studies.

**OP-CR-71**

**Increase Trend of Acquired Thrombotic Thrombocytopenic Purpura (TTP) and the Potential Role of ADAMTS-13 Assay**

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**Background & Hypothesis:**

The diagnosis of TTP, based on clinical presentation, thrombocytopenia and microangiopathic haemolytic anaemia, is often indistinguishable from other thrombotic microangiopathies. In view of the high risk of preventable deaths, plasma exchange (PEX), a costly procedure, is commenced without delay. Patients with TTP are severely deficient of ADAMTS-13, the principal regulator of von Willebrand factor (VWF) multimer size. We postulate that ADAMTS-13 assay, which is currently unavailable in Singapore, can reduce patients' exposure to the complications of unnecessary PEX and provide cost savings for healthcare providers.

**Methods:**

Patients aged  $\geq 18$  who underwent PEX between July 2007 to June 2014 were included.

**Results:**

Ninety-seven admissions and 635 PEX were carried out, of which 47% were in patients with suspected TTP. There is an increase in the number of PEX performed from around 80 to 120 per annum over the 7 years; mainly due to an increase in TTP cases. In the 26 admissions for TTP, the majority were female with a mean age of 53.8 years. The mean number of PEX per admission was 11.15 (range 1-28).

**Discussion & Conclusion:**

Whether there is a true increase in the incidence of TTP, or the revised diagnostic criteria leads to more TTP being diagnosed; some patients would inevitably be exposed to either unnecessary, or a duration of PEX that is longer than necessary. The introduction of ADAMTS-13 assay will have a valuable role in confirming the diagnosis and guide appropriate therapy, including the timely discontinuation of PEX in patients found not to have TTP, or whose condition have improved adequately.

**OP-CR-72**

**Results of Revision Anterior Cruciate Ligament Reconstruction Using a Transportal Technique: An Institutional Experience**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

As the number of primary ACL reconstruction surgeries increase, the number of reruptures has also subsequently increased. We look at the causes of failure in the primary surgery and also report the clinical and functional outcomes in our series of patients undergoing revision surgery.

**Methods:**

We performed a retrospective review of all revision ACL reconstructions performed by the senior author over a 3-year period using a transportal technique. Causes of failure were elucidated through clinical, radiological and intraoperative assessment. Outcomes of revision surgery were assessed clinically and functionally through the use of subjective knee scores, with a mean follow-up time of 27.5 months (range, 12-40).

**Results:**

In our series of 13 patients, all primary surgeries were performed originally via a transtibial technique, with a mean time to failure of 26.4 months (range, 6-65). Tunnel malposition was the most common cause of failure (61.5%), while purely traumatic causes accounted for 38.5%. New meniscal injuries were identified in 77%, and cartilage loss in 38.5%. There was a statistically significant improvement in functional outcomes in all patients, and whilst majority (92%) were able to return to sporting activities on a regular basis, only 54% were able to return to their previous level.

**Discussion & Conclusion:**

Tunnel malposition was the most common cause of graft failure in this series. Concomitant meniscal and cartilage pathologies were common intraoperative findings. Improved knee stability and functional outcomes is expected following revision, and majority will be able to return to some form of sporting activity, albeit at lower levels than before for some patients.

**OP-CR-73**

**The Impact of a Limited Subsidy on Access to Antiretroviral Therapy (ART) and Patient Outcomes in Singapore**

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**Background & Hypothesis:**

In 2010, the Singapore government extended Medifund assistance to ART for citizens with no other financial resources. We investigated the impact of these changes on HIV care and outcomes in an ecological study.

**Methods:**

A database of individuals newly presenting with HIV infection at the Communicable Diseases Centre has been collected retrospectively since 2005. The sample was split into 2 cohorts: patients entering into care from 2005-8 ('Pre-Medifund') and 2010-11 ('Post-Medifund') and details of the first year of care were extracted.

**Results:**

A total of 389 cases 'pre-Medifund' were reviewed, and 256 'post-Medifund'. Baseline characteristics were similar between the 2 cohorts with no significant differences in age (mean 41 years, 17-81years,  $P = 0.262$ ), income (32% no income,  $P = 0.632$ ), gender (94% male,  $P = 0.928$ ) and presenting CD4 counts [median 198 (14%),  $P = 0.122$ ]. A significant reduction in deaths (4.6% vs. 0.4%,  $P < 0.01$ ) and hospitalisations (1.05 vs. 0.72,  $P < 0.01$ ) was observed, and shorter time from AIDS diagnosis to starting ART (median 39 days vs. 15,  $P < 0.001$ ). No income at diagnosis predicted older age (45 vs. 40 years,  $P < 0.05$ ), lower education level (65% vs. 36% no formal qualifications,  $P < 0.001$ ), late presentation [median CD4+ 102 (10%) vs. 224 (14%), CD4+ <200 62% vs. 46%,  $P < 0.001$ ] and more hospital admissions (mean 1.38 vs. 0.75,  $P < 0.001$ ) in both cohorts. However no income was only associated with an increased risk of death ( $P < 0.01$ ) and reduced access to ART ( $P < 0.05$ ) in the 2005-8 cohort.

**Discussion & Conclusion:**

A remarkable improvement in outcomes was observed. Government funding appears to have improved access to ART, most benefiting those with the greatest need.

**OP-CR-74**

**Predictors of Mortality in Human Immunodeficiency Virus and Tuberculosis (HIV/TB) Coinfected Patients in Singapore, 2006 to 2011**

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**Background & Hypothesis:**

TB is a common infection in patients with HIV. Management is complicated by potential adverse drug events from TB and HIV therapy. We investigated how these issues affect outcomes in Singapore.

**Methods:**

Electronic and paper records of patients attending the combined HIV/TB treatment clinic at the Tuberculosis Control Unit, Tan Tock Seng Hospital were entered into a database. Data was extracted and an exploratory analysis performed to identify predictors of death during TB treatment.

**Results:**

Out of 257 patients, 181 of them who attended the combined clinic were identified as HIV/TB coinfecting. Fifteen (8.3%) died during TB treatment; 4 were lost to follow-up. Seven of the deaths occurred during the first 6 months of TB treatment, with 11 attributed to complications of TB or its treatment. Age (mean, 58 vs. 48 years,  $P = 0.002$ ) and absolute CD4+ count (median, 38 vs. 55 cells/mm<sup>3</sup>,  $P = 0.030$ ) at diagnosis of TB were associated with death. Opportunistic infections (OIs) at TB diagnosis (OR: 4.24, 95% CI, 1.4,13.1) or during TB treatment (OR: 5.29, 95% CI, 1.8,16.0) were significantly associated with death. OIs during TB treatment were significantly associated with ART delayed beyond 4 weeks (OR: 4.92, 95% CI, 1.4, 17.0). Despite a trend towards better survival with antiretroviral therapy (ART) within 4 weeks from TB diagnosis (11.9% vs. 3.8%), this was not significantly different—plausibly due to insufficient statistical power, as 13/15 deaths occurred in the delayed ART group.

**Discussion & Conclusion:**

An increased risk of death in HIV/TB coinfection is associated with more advanced immune dysfunction, and delayed ART.

**OP-CR-75**

**Endoscopic Approaches to Parasphenoid Lesions**

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**Background & Hypothesis:**

This paper describes our experiences in the management of skull base lesions in the parasphenoid region in about 100 cases. Pituitary tumours form the main bulk of our experience.

**Methods:**

Parasphenoidal lesions endoscopically removed by the same surgeon over the last 5 years are presented.

**Results:**

We describe the rationale of our surgical approaches based on the lessons we have learned, including the site of incisions, anatomical structures to be preserved, surgical equipment and indications for its use, recommendations for cerebrospinal fluid repair when it occurs and postoperative care of the surgical site including prevention of postoperative epistaxis. The use of IGS in an augmented reality mode to identify important structures such as the internal carotids and the basilar artery on the operative video monitor will be illustrated.

**Discussion & Conclusion:**

This paper aims to present a safe and efficacious endoscopic approach to parasphenoid lesions—ranging from pituitary adenomas, mucocèles, encephalocèles, clival chordomas to infective masses.

**OP-HPE-01**

**Views and Perceptions of Diagnostic Radiography Staff and Students in a Preprofessional Learning Environment in Singapore**

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**Background & Hypothesis:**

Students attend clinical placements to develop knowledge and skills. It is assumed that the local educational system enables staff and students to mutually benefit from the clinical placement experience. However, there is no clear evidence that the clinical placement arrangements are conducive for students to learn, and for staff to benefit from teaching and supervising them.

**Methods:**

Six focus groups with 17 students (year 2 and 3) and 15 diagnostic radiography staff (junior, senior and principal radiographers and managers) were conducted to collect information on the perspectives of staff and students in a preprofessional learning environment in an acute hospital. Grounded theory analysis was used. Open coding was applied and thematic categories were identified.

**Results:**

Students appreciated learning about different modalities on placements that they could not experience in school. They also expressed that they valued autonomy in hands-on practice with patients as they often felt competent enough but were not given sufficient opportunities. However, the staff recommended that students have realistic expectations and consider patients' needs first. They also urged that students embrace all parts of the job and seize opportunities to learn.

**Discussion & Conclusion:**

Taken together, the comments from students and staff contribute to understanding how a conducive learning environment for clinical placements can be constructed, and empathy of the different roles. The findings can raise awareness of the dynamic nature of the diagnostic radiography learning environment, as well as contribute to improving the quality and experience for students and staff during a clinical placement.

**OP-HPE-02**

**Starting on the Right Foot – The Standardised Training in Assessment, Resuscitation and Treatment of Surgical Patients for Interns in a Surgical Department**

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**Background and Hypothesis:**

Postgraduate year-1 doctors (interns) are required to complete general surgery rotations after medical school. Transition from medical student to intern poses several challenges, primarily in translating theoretical knowledge to clinical practice, situational appreciation and teamwork. In time-sensitive acute surgical care, critical decision-making ensuring timely and appropriate care poses a further challenge. To prepare surgical interns for such a role, the NHG General Surgery Residency introduced the Standardised Training in Assessment, Resuscitation and Treatment (START) programme to ground interns in the supervised management of common surgical emergencies and develop their functional capability within surgical teams.

**Methods:**

The START curriculum was introduced in 2013. It incorporates surgical practice principles, especially in common acute conditions, communications and teamwork concepts while meeting HOTC foundational requirements. The programme commences on the second week of the intern's 3-monthly surgical rotation. Paedagogical approaches include 10 once-a-week interactive didactic sessions utilising problem-based learning and 1 simulation session. Preprogramme surveys on the interns' key concerns, teamwork perceptions and capability and postprogramme surveys on the structure, quality and relevance of the curriculum in addressing these concerns were conducted.

**Results:**

In 2013 to 2014, three START programmes were conducted. Eighty-one participants achieved over 80% attendance. The interns' 3 main concerns were patient safety, acute care, and complex situations. Over 88% agreed or strongly agreed that the curriculum was relevant and useful for their surgical internship.

**Discussion & Conclusion:**

START has been found relevant to surgical interns in developing their confidence and clinical capability. Their feedback will be used for continued programme improvement.

**OP-HPE-03**

**Simplified or Standard Cardiopulmonary Resuscitation Teaching: A Randomised Controlled Trial on Laypersons' Performance in a Simulated Cardiac Arrest Scenario**

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**Background & Hypothesis:**

The effectiveness of simplified cardiopulmonary resuscitation (CPR) in improving out-of-hospital cardiac arrest (OHCA) survival outcomes is well established in clinical studies. Simplified CPR has been proposed to improve bystander CPR performance as it is easier to learn, retain and perform. However, it is unclear whether bystanders who learn simplified CPR can perform better than those who undergo standard CPR training. This study aims to compare the effectiveness of a simplified CPR teaching intervention with standard CPR in terms of improving CPR performance.

**Methods:**

Eighty-five laypersons with no CPR experience were recruited and randomly assigned to either the control or intervention group. The control group underwent a standard CPR training programme consisting of chest compressions and mouth-to-mouth ventilation while the intervention group underwent a simplified CPR training programme consisting of only chest compressions. Quality of CPR performance was assessed 2 months after training using a simulated OHCA scenario. This was evaluated using the CPR Algorithm Checklist and recording manikins.

**Results:**

Simplified CPR was superior to standard CPR with regards to the proportion of appropriate chest compressions ( $P = 0.003$ ) and number of appropriate chest compressions ( $P = 0.001$ ). Time without chest compression in the simplified CPR group was also significantly shorter than in the standard CPR group ( $P < 0.001$ ).

**Discussion & Conclusion:**

Simplified CPR appears to be effective in improving bystanders' CPR performance. It shows to be a promising alternative CPR method to be taught to the lay public. On a policy level, the implications of this study highlight a need for resuscitation councils to consider simplifying the existing citizen CPR teaching guidelines.

**OP-HPE-04**

**Survey of Healthcare Professionals on the Perceived Responsibilities in Discharge Communication**

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**Background & Hypothesis:**

Comprehensive discharge with adequate education improves patient's autonomy, ensures safe transition from hospital to the community and thus reduces unnecessary hospital readmissions. Our study aims to identify perceptions of healthcare professionals on the responsibilities in communicating discharge instructions.

**Methods:**

Between 15 December 2013 and 1 June 2014, written questionnaires were sent out to 4 groups of healthcare professionals – nurses, physicians, pharmacists and allied health professionals (speech therapists, occupational therapists, physiotherapists and dieticians). Data was collected on the perceived responsibilities of the 7 aspects surrounding patient's discharge education: 1) medical diagnosis on discharge, 2) summary of inpatient findings and treatment, 3) changes in medications, 4) medication – administration and side effects, 5) symptom management at home, 6) follow-up appointments, and 7) caregiver education.

**Results:**

Eighty-seven participants (30 nurses, 25 doctors, 12 pharmacists and 20 allied health professionals) responded; 87.5% of participants felt physicians should communicate on medical diagnosis and summary of inpatient findings; 67.25% felt medication administration and side effects should be pharmacist's responsibility; 50.8% felt that symptom management, follow-up appointments and caregiver education should primarily be physician's responsibility, but only 26.66% of physicians felt the same.

**Discussion & Conclusion:**

Majority have identified responsibilities in communicating diagnosis, inpatient findings, medication administration and side effects. However, symptom management, follow-up appointments and caregiver education had less clearly defined roles. Responsibilities of each member of multidisciplinary team in discharge communication have to be clearly identified to avoid the ambiguity.

**OP-HPE-05**

**Characteristics of Internal Medicine Residents Interested in Geriatric Medicine**

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**Background & Hypothesis:**

More geriatric medicine (GRM) specialists are needed globally, but GRM is often an unpopular choice amongst residents. Our study aims to examine characteristics of residents interested in GRM as a career.

**Methods:**

We conducted a cross-sectional study involving 31 internal medicine residents. Variables collected include demographics, subspecialty interest and factors affecting their choices. We chose the Specialty Indecision Scale (SIS), a 35-item inventory examining readiness, information, identity, barriers, indecisiveness and self-doubt. We also studied the influence of contextual factors, categorising them as programme characteristics, subject matter and lifestyle factors. Information on burnout was collected with the Maslach Burnout Inventory (MBI). We conducted univariate comparisons of demographic covariates, SIS scores, contextual factors and MBI scores between residents interested in GRM versus those who were not.

**Results:**

Eight (25.8%) residents indicated interest in GRM. They tended to be younger (mean age:  $24.7 \pm 1.2$  vs.  $26.6 \pm 2.5$ ,  $P < 0.009$ ). Their MBI scores trended towards lower emotional exhaustion ( $24.0 \pm 8.6$  vs.  $27.4 \pm 8.2$ ) and depersonalisation and higher personal accomplishment ( $33.4 \pm 6.1$  vs.  $32.7 \pm 7.0$ ), implying lower burnout. However, despite their interest, they were unready to commit as revealed by lower SIS scores of readiness ( $12.1 \pm 2.2$ ) and higher self-doubt ( $12.3 \pm 3.8$ ).

**Discussion & Conclusion:**

Around one-quarter of surveyed residents expressed interest in pursuing GRM. They tended to be younger and less prone to burnout. However, they were less self-confident and less ready to commit to their decision. Follow-up would be useful to see how these factors may change over time.

**OP-HPE-06**

**Effective Communication and Teaching Skills Training Equips Physiotherapy Mentors' for Their Educator Roles**

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<sup>1</sup>National Healthcare Group HQ, Singapore, <sup>2</sup>Tan Tock Seng Hospital, Singapore

**Background & Hypothesis:**

Physiotherapists often need to assume the role as a clinical educator to teach junior physiotherapists or students with no or little formal training in clinical education. Feedback from the juniors pointed to a gap in effective communication skills of the mentors. A pilot mentor training programme that included communication and teaching skills modules was implemented in our department. The aim of the study was to evaluate the effectiveness of the communication and teaching module.

**Methods:**

A focus group consisting of 6 senior physiotherapists was formed to discuss and evaluate the key skills and knowledge for effective mentoring. A survey was formulated by the group for the evaluation of the new mentor training programme. A 6-hour communication and teaching skills module was implemented for 26 senior physiotherapists from March 2013 to September 2013 as part of the preceptor training. The senior physiotherapists completed the survey prior and after the preceptor training programme.

**Results:**

There was a 60% increase in the senior physiotherapists' perception of the helpfulness of the training programme in preparing them for the role as educators. This difference was shown to be significant with Fisher's exact test ( $P < 0.001$ ).

**Discussion & Conclusion:**

The new mentor training programme which emphasised effective communication and teaching skills had demonstrated significant impact on preparing mentors for their educational role. It will remain as a key feature of the physiotherapy mentor training programme.

**OP-HPE-07**

**British to American Psychiatric Training: 5-year Study of Singapore Psychiatric Training**

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<sup>1</sup>*Institute of Mental Health, Singapore*

**Background & Hypothesis:**

Singapore had a British-style medical specialisation training programme until 2010 when it adopted an American-styled residency training programme. Despite having purported strengths in structured, competency-based and formative learning, a recent survey found that Singapore psychiatry residents rated their educational environment worse than non-residency psychiatry trainees in areas of strength for residency training. We set out to confirm these findings by repeating a 2008 survey of perceived importance and adequacy of 11 aspects of psychiatric training among psychiatry trainees in Singapore.

**Methods:**

An electronic survey was sent to all psychiatry trainees in Singapore (residents and non-residents). Trainees were asked to rate their perceived importance and adequacy on 11 aspects of psychiatric training on a 5-point Likert scale. Results were analysed with paired or independent t-test analysis as appropriate with *P* values at 0.05.

**Results:**

The survey was conducted from April 2013 to August 2013 with a response rate of 57.9% (n = 44). Trainees rated the perceived adequacy of training lower than its perceived importance in 2008 and 2013. The perceived importance of training was similar in both 2008 and 2013. The perceived adequacy of training was significantly better in 2013 with 6 of 11 aspects of training rated higher in 2013. Residents had higher ratings in 16 of 19 significant between-group differences of perceived adequacy of training.

**Discussion & Conclusion:**

In conclusion, an American-style residency programme has resulted in improved perceived adequacy of psychiatric training compared to a British-style programme. Further research to assess objective adequacy of psychiatric training is recommended.

**OP-HSR-01**

**The Cost of Absenteeism Attributable to Mental Disorders Among Full-time Employees in Singapore**

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<sup>1</sup>*Institute of Mental Health, Singapore*

**Background & Hypothesis:**

Findings from the Singapore Mental Health Study (SMHS), suggest that about 330,000 people in Singapore are affected by lifetime mood, anxiety or alcohol use disorder. Research shows that mental illnesses are associated with significant loss of productivity. This study examines the cost of absenteeism from work attributable to mental disorder.

**Methods:**

Data were based on full-time employees identified by the SMHS, a cross-sectional, epidemiological study of Singapore residents aged  $\geq 18$  years. Mental disorders were diagnosed using the Composite International Diagnostic Interview. Incremental cost of absenteeism (in SGD) was estimated using 2-part regression models. Incremental costs refer to those additional costs incurred exclusively by people with mental illnesses after subtracting the cost of those without these disorders.

**Results:**

The sample comprised 3396 persons, representing 1.6 million fulltime employees in Singapore. The annual incremental cost of absenteeism attributable to major depressive disorder (MDD) (\$532), obsessive compulsive disorder (OCD) (\$323), anxiety disorder (OCD and generalised anxiety disorder) (\$429) and, mood disorder (MDD, dysthymia and bipolar disorder) (\$549) were significantly higher than in those without these conditions. Extrapolation of these results to Singapore's employee population suggests that the cost of absenteeism due to mood and anxiety disorder are \$61.4 and S\$29.2 million per year. After adjusting for age, gender and any chronic medical condition, the incremental cost of absenteeism attributable to anxiety disorders remained significantly higher.

**Discussion & Conclusion:**

Given the significant absenteeism cost among employees due to mental disorders; workplace mental health initiatives could result in significant savings to the individual, employers and society.

**OP-HSR-02**

**An Analysis of Youth's Perspectives and Attitudes Towards Electronic-cigarettes in Singapore**

**BAR RESTRIA FAUZIANA<sup>1</sup>, BMS SHAZANA<sup>1</sup>, JA VAINGANKAR<sup>1</sup>, L PICCO<sup>1</sup>, SA CHONG<sup>1</sup>, M SUBRAMANIAM<sup>1</sup>**

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**Background & Hypothesis:**

Electronic-cigarettes (e-cigarettes) are battery operated devices which simulate cigarette smoking by vapourising a liquid solution containing mainly nicotine. The use of e-cigarettes, though illegal, is steadily gaining popularity (over 2400 units were seized in Singapore by the Health Science Authority in early 2013). This study explores the perspectives and attitudes youth smokers have towards e-cigarettes.

**Methods:**

In a study to explore the risks and protective factors for tobacco use among youths, 51 current smokers aged 14-29 years were invited to participate in focus group discussions (FGDs) on their perspectives about smoking. The topic of e-cigarettes came up spontaneously in several FGDs and a decision was made to explore the topic with participants in future groups. The discussions were then transcribed and analysed thematically and coded for themes and patterns that emerged.

**Results:**

Despite the ban in Singapore, many youth smokers have some knowledge of and have tried e-cigarettes. Participants generally feel that e-cigarettes are a safer and healthier substitute to cigarettes and as a result, feel it could potentially be a tool to reduce, quit or replace cigarettes. However, many users eventually abandon the device and revert to cigarettes, claiming smoking to be a more satisfying experience.

**Discussion & Conclusion:**

There is an apparent lack of knowledge and ignorance of the possible risks and side effects of e-cigarettes among youths. The need for proper, unbiased information is crucial to make appropriate decisions about e-cigarettes. The dangers and inconsistency of the composition of e-cigarettes needs to be highlighted to ensure that users reach an informed judgement.

**OP-HSR-03**

**End-of-life Medical Costs of Patients Who Died in a Tertiary Hospital in Singapore**

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<sup>1</sup>*National Healthcare Group HQ, Singapore*

**Background & Hypothesis:**

End-of-life medical costs are high worldwide. The aim of the study is to compute the end-of-life medical costs of inpatient deaths in a tertiary hospital.

**Methods:**

This is a retrospective cohort study of 2285 patients [mean age, 75.2 years (SD: 14.3 years)] who died in Tan Tock Seng Hospital (TTSH) in 2013. Their healthcare utilisations for the last 360 days prior to death were extracted. These included TTSH admissions, TTSH specialist outpatient clinic visits, TTSH emergency department visits and National Healthcare Group Polyclinic (NHGP) visits. Medical costs were computed based on gross amount which included government subsidies (if applicable), medical insurance (if applicable) and out-of-pocket payment by patients.

**Results:**

The mean medical costs were \$32,848.35 (SD: \$36,252.20). Majority of costs incurred were from TTSH admissions (90.3%), followed by TTSH specialist outpatient clinic visits (7.0%), TTSH emergency department visits (2.1%) and NHGP visits (0.6%). Majority of costs were incurred in the last 30 days prior to death (44.8%), last 60 days prior to death (58.4%) and last 90 days prior to death (66.3%).

**Discussion & Conclusion:**

The mean medical costs is about 63.5% of Singapore's 2012 GDP per capita (\$51,709) and reaffirms the high end-of-life medical costs as reported worldwide. Further research to look at end-of-life medical costs of patients who did not die in tertiary hospital and/or receiving palliative care is warranted to compare with the figures reported in the study.

**OP-HSR-04**

**Forming Friendships and Surmounting Stress Through Cigarette Sticks: Results of a Qualitative Analysis**

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**Background & Hypothesis:**

The escalating trend of youth smoking as indicated in a recent national survey is alarming in Singapore's increasingly health-conscious milieu. Traditional approaches to curbing smoking may have reached its efficacious limit, calling for new directions in antismoking strategies. In this study, we examined the youth's awareness of the ills of smoking and their motivations to continue smoking, to provide updated information for intervention.

**Methods:**

Ten focus group discussions (FGDs) were conducted with current cigarette smokers aged between 14 to 29 years. Each FGD involved an average of 8 participants. One section of the FGD queried participants on their thoughts regarding the benefits and harms of smoking. Thematic analysis was used to identify broad categories emerging from this section of the FGD.

**Results:**

Major themes that arose relating to the benefits of smoking were classified into 4 categories: 1) forming and maintaining friendships, 2) relieving stress, 3) “killing time “ and boredom, and 4) providing a sense of well-being. Major themes pertaining to the ills of smoking were also classified into 4 categories: 1) short- and long-term health hazards, 2) high monetary cost, 3) being unfairly judged, and 4) physical and psychological dependence.

**Discussion & Conclusion:**

Youths are well aware of the unhealthy and addictive consequences of cigarette smoking and identify financial cost and stigma as other important consequences—reflecting the thrust of traditional antismoking tactics. It is important to note that youths turn to cigarettes as an attractive tool to surmount developmental challenges of forming relationships and coping with day-to-day hassles. It is imperative that future antismoking efforts address these psychosocial motivations for smoking.

**OP-HSR-05**

**A 3-staged Teaching Approach to Improve Caregiver Training for Home Suctioning – A Quality Improvement Project**

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**Background & Hypothesis:**

Caregiver training is part of the physiotherapy services offered in the acute care inpatient setting to equip the designated carer/s with the necessary knowledge and skills to manage the long-term care of the patient at home. Physiotherapists have observed that some caregivers required further suctioning training even after completing training in the hospital. This disparity between a caregiver's rated and actual performance may indicate suboptimal care of the patient at home. The aim of the project was to ensure that all carers required to perform home suctioning were able to perform suctioning safely and correctly before a patient's discharge from hospital.

**Methods:**

Observations of the inpatient physiotherapists and carers during caregiver training were conducted. Root cause analysis conducted revealed 2 main reasons for the disparity between a carer's rated and actual performance: physiotherapists are not taught to conduct caregiver training in schools, and the possibility of a language barrier between physiotherapists and carers. The proposed intervention is the implementation of an illustrated, bilingual pamphlet in English and Malay, structured as a progressive 3-stage programme to guide the flow of caregiver training.

**Results:**

Carers' suctioning performance improved from 66% error-free to 90% after the intervention. Results were sustained after 1 year at 93% error-free performance.

**Discussion & Conclusion:**

The use of a staged, progressive, multilingual training programme can improve the effectiveness of caregiver training. It serves to standardise the content, techniques and teaching method of suctioning during caregiver training. The training principles can be adopted for caregiver training by other healthcare groups.

**OP-HSR-06**

**An Evaluation of a Care Transition Process Pilot in Singapore**

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<sup>3</sup>Changi General Hospital Pte Ltd, Singapore

**Background & Hypothesis:**

Despite the need for centre- and home-based long-term care services (CHLTCS) among patients to be discharged from acute care hospitals, the services take-up rate is about 50% in Singapore. A re-engineered acute-to-CHLTCS transition process that provides timely and accurate service information is evaluated on its ability to reduce patient waiting time, and increase take-up rate.

**Methods:**

Data was obtained from records of patients who were assessed to be likely to benefit from CHLTCS prior to discharge from an acute care hospital. The intervention group comprised 39 patients from 6 clinical specialty wards over a 5- and an 8-day period in July 2013 and August 2013. CHLTCS referral management staff were deployed alongside the hospital team to assess these patients' care needs, provide information on alternative service providers and obtain the patients' and families' commitment to a service provider before a CHLTCS referral was submitted via the national referral management system. The comparator group comprised 209 patients from all wards in May 2013 and June 2013. These patients underwent the existing care transition process where they were assessed and referred to CHLTCS by only the hospital team.

**Results:**

The intervention group's CHLTCS take-up rate was higher than the comparator group's (82% vs. 50%). More patients in the intervention group were referred to CHLTCS service within 1 day (77% vs. 58%) and assigned to service providers on the day of referral submission (76% vs. 46%).

**Discussion & Conclusion:**

The re-engineered care transition process increased CHLTCS take-up rate substantially, suggesting that there is potential continued need for CHLTCS in Singapore.

**OP-HSR-07**

**Predictors for Cellulitis Patients Suitable for Outpatient Parenteral Antibiotics Therapy (OPAT) in the Emergency Department (ED) – A Pilot Study**

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**Background & Hypothesis:**

Patients with moderately severe cellulitis are usually admitted from ED for intravenous antibiotics. Such admissions can be potentially avoided through the use of OPAT. Our objective was to look for clinical predictors amongst cellulitis patients who are suitable for OPAT.

**Methods:**

We conducted a retrospective review over a 3-month period. Data for the following clinical predictors was collected: 1) age, 2) sex, 3) area of cellulitis, 4) concurrent medical problems, 5) fever, 6) random hypocount, and 7) leukocytosis. Our composite primary outcomes (suitable patients for OPAT) were: 1) discharge diagnosis of cellulitis, 2) requiring intravenous antibiotics, and 3) length of stay 3 days or less. Significant clinical predictors were selected on univariate analysis. Multivariate analysis was performed to look for best fitting model.

**Results:**

A total of 449 patients were admitted for cellulitis between 1 January 2012 to 31 March 2012; 376 patients (83.7%) had a discharge diagnosis of cellulitis. Patients who were suitable for OPAT were younger (53.4 years vs. 60.8 years,  $P < 0.01$ ), did not have concurrent medical problems (15.4% vs. 29.6%,  $P < 0.01$ ), less likely to have cellulitis on the legs (48% vs. 64%,  $P < 0.01$ ) and had total white count of  $P < 12$  (22.4% vs. 35.7%,  $P < 0.01$ ). These clinical predictors were still statistically significant in a multivariate logistic regression model, with 70.4% correct prediction (at cut value of 0.5).

**Discussion & Conclusion:**

We identified a set of clinical predictors that can be used in ED for selecting suitable cellulitis patients for OPAT. A larger sample size is required to ascertain the robustness of this prediction model.

**OP-HSR-08**

**Motivational and Behavioural Differences of Hand Hygiene Compliance Between Doctors, Nurses and Allied Health Workers**

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**Background & Hypothesis:**

Although hand hygiene (HH) is proven effective in limiting healthcare-associated infection, it is not consistently practised. Audit reports in our hospital constantly show suboptimal adherence rates at 50% to 60%. More importantly, the audits revealed that compliance rates differ between groups of healthcare workers (HCWs): physicians, nurses and allied health professionals (AH). Understanding these differences may be pivotal to designing better HH compliance strategies.

**Methods:**

In this mixed method cross-sectional study, 1456 Tan Tock Seng Hospital Singapore HCWs participated in an anonymous questionnaire survey. Personal motivation and cognitive domains affecting HH compliance were compared between the three HCW groups.

**Results:**

We obtained 1064 valid surveys for analysis. Nurses reported the highest HH compliance rate (40.2% vs. medical 22.8%, AH 31.0%,  $P < 0.01$ ) and motivation for improving their own HH compliance compared to the other groups (98.9% vs. physicians 96.5%, AH 94.1%,  $P < 0.01$ ). The trend recapitulated well with the hospital's bimonthly HH audit (nursing 58.9%, medical 36.8%, AH 48.8%,  $P < 0.05$ ). The survey also showed that nurses were more superior to the other professional groups ( $P < 0.01$ ) in terms of HH knowledge, required less external reminders, and relied more on internal motivations to practice good HH. However, in the presence of hindrances to performing HH, all 3 groups' compliance suffered.

**Discussion & Conclusion:**

Our study has identified cognitive domains that predict occupation-specific shortcomings of HH compliance in the hospital setting. These results could then be used to create strategies for motivating HH in our hospital that are specifically tailored to different HCWs.

**OP-HSR-09**

**Association Between Positive Screening of Anxiety Disorders and Chronic Physical Conditions**

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<sup>1</sup>*Institute of Mental Health, Singapore*

**Background & Hypothesis:**

People with anxiety disorders report higher rates of medical illness. This study examined the association of chronic physical conditions among those screened positive for anxiety disorders.

**Methods:**

A total of 6616 respondents from the Singapore Mental Health Study (SMHS) were included in this analysis. By using Composite International Diagnostic Interview (CIDI) screening module, respondents were screened for panic disorder, generalised anxiety disorder (GAD), specific phobia, social phobia, and agoraphobia. Data on lifetime chronic physical conditions was obtained as a self-report. Logistic regression was used to examine the association of physical conditions and anxiety disorders positive screening.

**Results:**

A total of 49.35% (n = 3337) of respondents was screened positive for at least 1 anxiety disorder. After controlling the effect of age group, gender and ethnicity, respiratory conditions (OR: 1.6), hypertension (OR: 1.4), chronic pain (OR: 1.6), cancer (OR: 3.1), cardiovascular conditions (OR: 2.0) and ulcer (OR: 2.4) were significantly associated with panic disorder positive screening. Positive screening for GAD was associated with respiratory conditions (OR: 1.5), diabetes (OR: 1.5), chronic pain (OR: 2.0), and ulcer (OR: 1.9). Chronic pain was found to be common in this sample (18.3%), however only significantly associated with positive screening of panic disorder (OR: 1.6), GAD (OR: 2.0) and social phobia (OR: 1.6).

**Discussion & Conclusion:**

Anxiety disorders positive screening, particularly panic disorder and generalised anxiety disorder was associated with physical conditions. Patients who present with either condition need further evaluation for comorbidity.

## OP-HSR-10

### Novel Way of Measuring the Weight of Chair Bound Patients

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#### **Background & Hypothesis:**

At a recent JCI audit, PACH team was asked, “How do we determine patients had improved in nutritional status?”. This study aims to prove that the bathroom scale can be modified to weigh chair bound patients safely and accurately.

#### **Methods:**

An electronic bathroom scale was modified with pressure transducers configured to be placed under the legs of a chair to measure a person's weight sitting. The machine could be zeroed to correct for weight of the chair. Five staff had their weight measured with the standard SECA sitting weighing scale and novel machine. The weights of 20 patients attending an outpatient clinic in May 14 were measured following the above method. Patients were asked to report any discomfort during weighing. A further study was carried out at the homes of 5 consecutive chair bound patients. The null hypothesis was that the novel machine was not able to measure the weight of the patient accurately and the percentage error would exceed 2%.

#### **Results:**

Mean weight of 20 patients measured with SECA scale was 49.9 kg (sd +7.7) and novel machine was 50.0 (sd +7.7). Absolute error between the SECA and novel scales ranged from 0 to 0.7 kg. Percentage error between the 2 ranged from 0 to 1.61%. Staff, outpatients and home bound patients did not express any discomfort.

#### **Discussion & Conclusion:**

The modified bathroom electronic scale can be used to measure weight of chair bound patients with an accuracy of up to 2% and is cost-effective and safe for home use.

**OP-HSR-11**

**Assessing the Effectiveness of the Outpatient Medication Review Service at Tan Tock Seng Hospital Using Preselected Indicators**

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**Background and Hypothesis:**

The inappropriate use of medications has been linked with an increased risk of adverse drug events. One way to address this is to conduct medication reviews. There is no validated set of indicators to assess effectiveness of a medication review service. This study aims to identify potentially appropriate indicators; and to apply them to data obtained from medication review patients at Tan Tock Seng Hospital (TTSH), to gauge effectiveness.

**Methods:**

A literature review was conducted to identify potential indicators. These were the quality of prescribing measured by the Medication Appropriateness Index (MAI), and identification and attempted resolution of drug related problems (DRPs). A retrospective review of medication review records for the year 2012 was conducted, and the indicators were applied to these records.

**Results:**

There was an improvement, no changes, and reduction in prescribing quality, in 11, 17 and 2 cases respectively. The most common DRPs, and their respective resolution rates were: 69 (32.2%) incidents of patients not being aware of drugs' indications, 85.5% resolved; 44 (20.6%) incidents of patients failing to receive medications due to adherence issues, 93.2% resolved; 21 (9.8%) incidents of therapeutic duplications, 85.7% resolved; 19 (8.9%) incidents of patients who were medication hoarding, 100% resolved; and 10 (4.6%) incidents of drug use without indication, 100% resolved.

**Discussion & Conclusion:**

The medication review service has generally resulted in improved outcomes. The indicators used however, are not without limitations. Effective communication is essential between the patient and healthcare provider, and also among various healthcare providers, for such a service to be effective.

## OP-HSR-12

### **How Strong is Our Grip?: Comparison of Singapore Community Dwellers with Consolidated Norms**

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<sup>1</sup>*Khoo Teck Puat Hospital, Singapore*

#### **Background & Hypothesis:**

Handgrip-strength is an indicator for fall's risk, quality of life and fitness. Presently, there is no local normative data, which arguably, could differ from global norms derived from a largely Caucasian population. Therefore, the aim of this study is to 1) ascertain the normative grip-strength value of community dwelling Singaporeans, and 2) compare this value with available norms.

#### **Methods:**

This is a cross-sectional study of 709 residents (age 20-85; 496 females, 213 males) who attended community health screening carnivals in northern Singapore over 4 events in 2013. Grip-strength was measured using the JAMAR dynamometer based on a standardised test protocol. Basic demographics and anthropometric measures were also recorded. Percentage difference and 95% confidence intervals were calculated to compare the local value with 1) consolidated norms, and 2) Taiwanese Chinese norms.

#### **Results:**

The mean grip-strength of the overall sample was 29.76kg±0.7. Our results were lower than consolidated norms (female 15%, male 17%), but higher than Taiwanese Chinese norms (male 12%, female 17%), that was consistent across age groups. Female grip-strength was ~64% that of male. Grip-strength peaked in females aged 25-29 years (29.8 kg±2.1), and males aged 30-34 years (45.9 kg±4.6). For every year increase in age, grip-strength reduces by 0.19 kg in females and 0.32 kg in males.

#### **Discussion & Conclusion:**

The mean grip-strength of Singaporeans sampled differs from available norms, and rate of decline is sharper in males compared to females. This may have implication when inferring cut-offs and guidelines derived from different populations to the local setting. Establishing local normative values may provide a better appraisal of our local population.

**OP-HSR-13**

**Compliance to Shift Handover Guidelines: A Qualitative Analysis of the Culture and Practices Amongst Medical Officers in Tan Tock Seng Hospital**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

The hospital conducted an internal audit on medical officers' adherence to its published inpatient shift handover guidelines. This qualitative study explores the culture and practices of inpatient shift handovers amongst medical officers.

**Methods:**

A semistructured dialogue guide was used to explore the peer auditors' experiences and views relating to medical officers' shift handover culture and practices, and the hospital's shift handover policy. Verbatim transcriptions and coding were performed by the principal researcher. Key themes were analysed and identified in an iterative manner using qualitative analysis.

**Results:**

A total of 11 topics and 4 themes were generated. The 4 themes are: 1) “Doctors show poor awareness of handover guidelines, but handovers are still taking place”, 2) “Knowing which patients to handover requires clinical acumen which takes time to develop”, 3) “Existing handover guidelines are useful; they can be streamlined but it is hard to find the sweet spot”, and 4) “Guidelines are especially useful for junior doctors; seniors still play an important role in guiding juniors”.

**Discussion & Conclusion:**

No “gold standards” exist to identify patients who need handovers. Some hospitals have adopted guidelines which are useful for doctors to refer to. Establishing the credibility of such a guideline and improving its adherence requires understanding of the local culture and existing practices. This study uncovered some reasons why some doctors do not subscribe to these guidelines and provides a basis for the hospital to improve communication with its stakeholders. Better guidelines and improved adherence will enhance patient safety and continuity of care.

## OP-HSR-14

### Patient Satisfaction Survey Analysis Dashboard

**CT LING<sup>1</sup>, DCW SEAH<sup>1</sup>, JKC KHOO<sup>1</sup>, SH GOH<sup>1</sup>, D WU<sup>1</sup>**

<sup>1</sup>*Khoo Teck Puat Hospital, Singapore*

#### **Background & Hypothesis:**

Since 2012, the Khoo Teck Puat Hospital (KTPH) Quality Service Management (QSM) department implemented Microsoft CRM to streamline patient satisfaction survey processes. However, the hospital has had limited means of analysing the generated data. A dashboard prototype was created in June 2014 to automate reporting and improve the depth of analysis.

#### **Methods:**

Sample surveys containing verbatim and nonverbatim responses were used. Visualisation was done using stacked bar, line charts and tables. Brushing and drill-down techniques were used to explore survey data and gain insights across multiple feedback categories. The standard deviation of patient feedback scores was also used to create new KPIs to obtain more insights such as inconsistencies within patient feedback scores for each department. After discussions, a prototype algorithm was also developed to grade departmental performance and guide operational decisions.

#### **Results:**

Dashboard users can now automatically generate analyses from multiple monthly spreadsheets instead of manually counting and analysing patient feedback. This resulted in savings of over 80% of man-hours usually required to generate similar results, such as finding the top and worst performing departments and feedback categories. Creation of new KPIs, such as the patient deviation score, has enabled managers to identify the performing and non-performing staff or categories in each department.

#### **Discussion & Conclusion:**

The project gave the hospital an efficient tool to discover insights from patient feedback. These insights have led to new focus areas and potentially new feedback workflows. Going forward, the dashboard will be deployed live to assist in operations management.

## OP-HSR-15

### Role of FROP-Com Screening Tool in Targeted Fall Prevention in the Community

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#### **Background & Hypothesis:**

Majority of older adults at fall risk remains unidentified. We evaluated the effectiveness of a Fall Risk for Older People in the Community (FROP-Com) questionnaire in screening and providing targeted intervention to reduce falls in older adults.

#### **Methods:**

A multifactorial fall risk assessment was conducted using FROP-Com questionnaire on a cohort of older adults age >55 years old in Singapore. Fall prevention advice was provided based on participants' FROP-Com risk and high-risk individuals were advised to seek medical review if adjustment of medications were necessary or vision needed to be corrected. Long-term follow-up was conducted via telephone calls.

#### **Results:**

A total of 66 participants completed the assessment, of which 60 participants were available for follow-up. The mean age was  $73.4 \pm 9.2$  years old and 43.3% were male. Baseline fall prevalence in the past year was 45.0%, and fall prevalence postintervention at 9 month follow-up was 13.3% ( $P < 0.001$ ). Based on the FROP-Com, the baseline fall risk profile was 15%, 35% and 50% (high, moderate and low fall risk respectively). When comparing pre and postintervention fall prevalence, participants at low fall risk showed similar fall rates (5% vs. 10% respectively,  $P = 0.706$ ). Participants at moderate/high fall risk had a significant reduction in falls (73.3% pre-intervention vs. 16.7% postintervention,  $P < 0.001$ ).

#### **Discussion & Conclusion:**

The FROP-Com is an effective screening tool and targeted intervention resulted in a significant reduction in falls especially in moderate and high-risk group. Above screening tool may have a future role in large-scale community fall screening.

**OP-HSR-16**

**Hospital Bed Crunch: Has Hot Clinic Helped? Safety and Appropriateness Examined**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Hot clinics are outpatient appointments obtained within 72 hours of discharge from the emergency department (ED), based on preagreed criteria, and thereby avoiding inpatient admissions. This retrospective study aims to quantify reductions in admissions due to hot clinics without compromising safety and appropriateness.

**Methods:**

ED records of 400 patients, obtained from stratified randomised sampling of 2133 patient in the months of August 2013 and December 2013, were reviewed for appropriateness of referral. Default rates, and admission rates after ED visit and within 3 days of appointment were measured.

**Results:**

Four cases (1%) that were admitted after appointment for hot clinics was obtained; 2 cases from general surgery clinic, 1 from orthopaedic clinic, and 1 reattended ED before appointment whence he was admitted. A total of 93% of referrals were appropriate. The default rate was 18%.

**Discussion & Conclusion:**

Hot clinic referrals are appropriate and safe, and reduce admissions.

**OP-HSR-17**

**Enhancing the End-of-life Care of Hospitalised Patients With Advanced Dementia Through Advance Care Planning**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

A study by Mitchell SL et al (2004) found that elderly persons with advanced dementia were less likely than those with cancer to have directives limiting care and more likely to experience burdensome interventions. The project aims to improve the end-of-life (EOL) care of advanced dementia patients by establishing advance care plans (ACP) with surrogate decision-makers.

**Methods:**

Recruitment was conducted with the consent of primary medical team and patients' next-of-kin. Family members identified as surrogate decision-makers then underwent an ACP discussion with a trained facilitator and the team doctor. This was followed up by a phone call 2 weeks postdischarge. The EOL care of patients who eventually passed away in the hospital were audited through retrospective chart reviews. Patients who fulfilled the study criteria during the preintervention phase served as the control group.

**Results:**

Patients in the intervention group (94 episodes) had better symptom control, (pain, agitation and constipation), as compared to the control group (214 episodes). There were also higher rates of discontinuation or limited use of antibiotics (64% as compared to 24%) and non-essential medications (64% as compared to 54%) among the intervention group in the last 24 hours of life. Family members of intervention group reported a higher rating (score of 8.04) on overall satisfaction with care received compared to the control group (score of 7.76).

**Discussion & Conclusion:**

ACP discussion with surrogate decision-makers is important in ensuring care provided to advanced dementia patients is not burdensome and is consistent with established standards of good EOL care.

**OP-HSR-18**

**Preliminary Results From a Pilot Study of the “Better Robotic Prostatectomy” Project: A Perioperative Pathway with Evidence-based Best Practices for Robot-assisted Laparoscopic Prostatectomy**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Collaborating with Geisinger Medical Centre (Pennsylvania, USA), 16 evidence-based best practice elements (BPEs) related to the perioperative management of prostate cancer patients treated with robot-assisted laparoscopic prostatectomy (RALP) were selected from the medical literature. These 16 BPEs were “hard-wired” in the medical record system with the aim of delivering them 100% of the time in all patients undergoing RALP at TTSH.

**Methods:**

From August 2013 to December 2013, 10 consecutive patients listed for RALP in the department were recruited for the pilot study. Each episode of care began at the point of listing for surgery and ended 8 weeks after surgery. From the 16 BPEs selected, a total of 20 verifiable points were incorporated in the redesigned perioperative pathway. At the end of the episode of care, compliance with each verifiable point was audited by a team of nonclinicians independent of the surgical team.

**Results:**

Overall compliance of all verifiable audit points across all 10 patients was 81%. Median compliance rate for each patient was 78% (range, 72-100%). The compliance rate of each of the 20 verifiable audit points ranged from 10% to 100%, with 10 audit points achieving 100% compliance. None of the patients was readmitted within 30 days of discharge. The mean length of stay during the pilot period was 2.2 days (SD: 1.2) compared to 3.5 days (SD: 2.1) from a historical cohort of 10 consecutive patients before the project started.

**Discussion & Conclusion:**

This pilot study demonstrated the feasibility of adapting an American standardised, acute episodic care model to a Singapore context.

## OP-HSR-19

### Patterns and Predictors of Dropout from Mental Health Treatment in an Asian Population

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#### **Background & Hypothesis:**

In comparison to barriers to treatment access, relatively less is known about treatment dropout. The current study explored the patterns and predictors of mental health treatment dropout across the various healthcare sectors in Singapore.

#### **Methods:**

Data was utilised from the Singapore Mental Health Study (SMHS), a cross-sectional epidemiological survey conducted among adult population (n = 6616) aged 18 years and above. The World Mental Health Composite International Diagnostic Interview Version 3.0 (CIDI 3.0) was used to determine diagnoses of mental disorders, service utilisation and the prevalence of dropout among those who had sought treatment in the past 12 months.

#### **Results:**

Of those who had received treatment, 37.6% had ended treatment prematurely, 23.2% had completed treatment and 39.2% were still in treatment. The religious and spiritual sector (83.1%) had the highest dropout, followed by the general medical sector (34.6%), mental health services sector (33.9%), and social services sector (30%). Marital status emerged as the only sociodemographic factor that significantly predicted treatment dropout; with married individuals being significantly less likely to drop out than those who were single or divorced.

#### **Discussion & Conclusion:**

The overall dropout rate in this study was comparable to that reported by the WHO World Mental Health Survey. The high dropout rate from the religious and spiritual sector suggests a possible mismatch between the needs of the individuals and expertise of professionals in this sector. A more comprehensive understanding of treatment dropout is however needed to improve treatment outcomes and facilitate use of healthcare resources.

**OP-HSR-20**

**Can Nurses Predict Admission at Triage in the Emergency Department? A Preliminary Study**

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**Background & Hypothesis:**

This was a 6-month retrospective case review of triage nurses' prediction of patients' disposition.

**Methods:**

The following variables were collected: 1) Patient's presenting complaint; 2) triage nurses' prediction, whether admitted and discharged; and 3) seniority of triage nurses. The admission rate, sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were calculated.

**Results:**

There were 77,338 cases triaged during the study period. A total of 4635 cases (6%) were excluded due to missing data. Nurses predicted the disposition for 45,384 (62%) cases; 30,607 (67%) and 14,391 (32%) of the cases were triaged by staff grade and senior staff grade nurses respectively. The overall performance of the prediction was: sensitivity of 29%, specificity of 96%, PPV of 77%, and NPV of 74%. The overall admission rate was 32%. The nurses were undecided on the disposition of 27,319 cases (38%). The predictive ability of the nurses was similar across different ranks.

**Discussion & Conclusion:**

Triage nurses were better at predicting patients who would be discharged subsequently. Based on the admission rate of 32%, triage nurses were able to predict 77% of the admissions. The nurses were undecided regarding the disposition on a significant number of cases. Further research and understanding is required to elucidate the reasons behind this.

**OP-HSR-21**

**A Study on the Diabetic Foot Care Behaviours of Diabetic Patients in Singapore**

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**Background & Hypothesis:**

Diabetes mellitus comprises the fourth largest cause of polyclinic attendance yearly. It has significant complications which add to the disease burden, such as diabetic foot problems. Studies have shown that better foot care can help prevent the sequelae of diabetic foot problems such as ulcers, gangrene and the subsequent need for amputations. Our study hence aimed to assess the behaviours of patients with diabetes mellitus in Singapore.

**Methods:**

A total of 200 diabetic respondents were randomly surveyed at Jurong Polyclinic from 10 June 2013 to 5 July 2013. The anonymous and voluntary survey included a list of 26 questions based on good diabetic foot care (DFC) as stipulated by the NHGP Foot Care Advice Handout.

**Results:**

The results were binarised into “good behaviour” and “poor behaviour” based on whether or not they tallied with the NHGP recommendations. The best and worst DFC behaviours were noted and analysed. The types of footwear commonly used in the Singaporean population both inside the home and outside were also trended.

**Discussion & Conclusion:**

The results suggest that despite strategic measures implemented by polyclinics, such as having diabetic foot care nurses and pamphlets, there continues to be poor DFC behaviour, including issues with the selection of footwear. We recommend that the importance of having good DFC behaviour be increasingly emphasised through even more effective means in the primary care setting, to prevent long-term diabetic foot sequelae.

**OP-HSR-22**

**The Use of FROP-Com and Grip Strength as a Screening Tool for Older Adults At Risk of Falls in the Community**

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**Background & Hypothesis:**

Falls are the leading cause of morbidity and mortality in the elderly. We sought to identify the prevalence and predictors of fall risk in a cohort of older adults using the Falls Risk for Older People in the Community (FROP-Com) screening tool developed and validated in Australia and grip strength.

**Methods:**

A comprehensive fall risk assessment, consisting of the FROP-Com, 3-minute nutritional screening, visual acuity, orthostatic hypotension and grip strength assessment was conducted on older adults >55 years under a charity organisation in Singapore.

**Results:**

A total of 67 participants completed the fall risk assessment, of which 31 completed the grip strength assessment. The mean age of our participants was  $73.5 \pm 9.3$  years and 42.6% were male. Based on the FROP-Com, the fall risk profile was 14.8% (high fall risk), 34.3% (moderate fall risk) and 50.7% (low fall risk); 23.1% were at risk of malnutrition, 37.5% had poor visual function (<3/12) and 16.4% had orthostatic hypotension. High/moderate fall risk was associated with: greater body mass index ( $26.6 \pm 5.7$  vs.  $23.4 \pm 5.1$ ,  $P = 0.038$ ), increased number of falls ( $P < 0.001$ ), increased usage of high fall risk drugs ( $P = 0.005$ ) and an increased number of chronic medical conditions affecting balance and mobility ( $P = 0.020$ ). High/moderate fall risk was correlated with a poorer grip strength ( $12.2 \text{ kg} \pm 5.0$  vs.  $18.0 \text{ kg} \pm 5.8$ ,  $P = 0.006$ ).

**Discussion & Conclusion:**

Up to half of our community-dwelling elderly are at increased risk of falls. The use of grip strength as a screening tool in falls prevention needs to be further validated.

**OP-HSR-23**

**The Study of Healthcare Problems and Needs of the Homebound Elderly in Mahasarakham Municipality Area**

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<sup>1</sup>*Mahasarakham University, Thailand*

**Background & Hypothesis:**

The homebound elderly in Thailand are regarded as high-risk to becoming bedbound elderly who cannot care for themselves if there are no appropriate healthcare. The objective of this descriptive study was to explore the problems and needs of healthcare service of the homebound elderly who live in Mahasarakham municipality area.

**Methods:**

Data was collected by questionnaires and in-depth interviews, by sample of 273 and 8 respectively. The collected data were analysed by computer programmes, including percentage, average, standard deviation, maximum and minimum values, and content analysis.

**Results:**

The results showed that most of the respondents were female with an average age of 69 years, tend to live alone, graduated with an elementary education level, were out of work and had a monthly income below \$31. In terms of their healthcare situation, 67% of them received health checks and 45% of them were identified by their disease including diabetes, heart disease and high blood pressure. The in-depth interview has reviewed that the elderly had a problem in the lack of knowledge in food sanitation and were treated incorrectly, a lack of exercise, and the environment was not suitable for living. In terms of health requirement perspective, the respondents needed a health service and home visit from health agencies regularly. From a psychological perspective, the respondents were depressed and needed care from their children.

**Discussion & Conclusion:**

Therefore, the appropriate healthcare service must rely on the cooperation from the people, family and community, as well as the relevant agencies with a supporting role in providing the appropriate healthcare for the elderly.

**OP-HSR-24**

**A Community-based Study of Hepatitis B Virus (HBV) Infection, Screening and Vaccination Among Singaporeans**

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**Background & Hypothesis:**

Hepatitis B virus (HBV) infection is the most common cause of liver disease and liver cancer in Singapore, being endemic despite availability of an efficacious vaccine. In this study, we hope to assess the facilitators and barriers with respect to HBV screening and vaccination.

**Methods:**

Using mixed methods analysis, focus group discussions were conducted alongside a cross-sectional study amongst 784 Singapore citizens and permanent residents aged 25 to 69 residing in Housing and Development Board (HDB) flats.

**Results:**

Amongst the respondents, 50.6% were screened and 37.8% were vaccinated. The self-reported prevalence of HBV infection was 3.4% and that of HBsAg seropositivity among those screened was 4.3%. Routine health screening was the most common reason cited for screening (32.9%) while doctors' recommendation was the most common reason for vaccination (42.7%). For both screening and vaccination, knowledge and cost were the top facilitators and barriers respectively. Multivariable regression models revealed the most significant factors associated with not undergoing screening to be poor knowledge ( $P < 0.001$ ), fear of knowing their statuses ( $P = 0.001$ ), lower annual dwelling value ( $P < 0.001$ ) and absence of family history ( $P < 0.002$ ), while that of not undergoing vaccination to be having not underwent screening ( $P < 0.001$ ), lack of knowledge of the possibility of HBV causing liver cancer ( $P < 0.001$ ), deterrence due to cost ( $P = 0.03$ ) and lower education level ( $P < 0.001$ ).

**Discussion & Conclusion:**

Several facilitators and barriers are seen to regulate health-seeking behaviour towards HBV infection. Public initiatives including education and financial relief targeting specific population groups should be considered to increase uptake rates of HBV screening and vaccination.

**OP-HSR-25**

**Cigarette Smoking Initiation and Maintenance Among Young Smokers in Singapore**

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M SUBRAMANIAM<sup>1</sup>**

<sup>1</sup>*Institute of Mental Health, Singapore*

**Background & Hypothesis:**

Majority of smokers start smoking as adolescents and get addicted to nicotine by early adulthood. Informed approach is essential for effective prevention and control among youths. This study identified factors for smoking initiation and maintenance in Singapore from the perspective of young smokers.

**Methods:**

Six focus group discussions (FGDs) were conducted involving an average of 8 participants per group, consisting of current cigarette smokers aged 14 to 29 years. Thematic analysis was used to code transcripts for concepts, patterns and themes related to their smoking behaviours, specifically exploring factors for initiation and continual smoking.

**Results:**

Participants included 51 smokers comprising 29 men and 22 women (median, 23 years). In general, social dimension emerged as important themes across all FGDs. Three main factors were identified by participants for initiating cigarette use: 1) social and family influences, including the need to be accepted into a “group”, 2) using it as a coping strategy for poor mood and rebellious tendencies, and 3) using it for pleasure and gains, such as gaining new experiences and work breaks. Factors influencing maintenance of smoking were: 1) social and physical dependence, encompassing the need for maintaining group relationships, withdrawal problems and lack of motivation to quit, 2) coping, and 3) pleasure or indulgence.

**Discussion & Conclusion:**

The need for social relationships, coping strategies and pleasurable experiences appear to be important reasons for initiating cigarette smoking among youth in Singapore, while social and physical dependence was the biggest maintenance factor. Youth-centred smoking prevention and control activities warrant aggressive early prevention and creation of a social environment that is conducive for these.

**OP-HSR-26**

**Connecting the Dots: Building the Ongoing Story of Potentially Hazardous Cosmetic Ingredients**

**IH VORA**<sup>1</sup>

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**Background & Hypothesis:**

An extensive scientific research work has shown pieces of evidences towards the potential hazards of using hair dyes. However, due to the lack of direct, systematic evidence, the toxicity is not legally proven. Hypothesis: Chemicals labelled as nonhazardous could actually be hazardous. Scientific evidences can be pieced together to understand actual biological effects.

**Methods:**

Human hair swatches were treated with various hair dyes and then observed under microscope for the physical effects. For biological effects, as a proof of concept, this study selected propylparaben – a weak endocrine-active compound (EAC) and followed it through extensive data analysis using various databases made available by National Library of Medicine and National Cancer Informatics Program (NCIP) Bethesda, MD, USA.

**Results:**

Hair shafts were 30% more damaged with permanent hair dyes than temporary dyes. Though propylparaben is 1000-fold less potent than 17 $\beta$ -estradiol, actual biological effect results from combined exposure to many cosmetic products that are simultaneously used including EACs in diet such as phytoestrogen soybeans. Its entry through scalp does not readily allow its decomposition to a 1000-fold less potent p-hydroxybenzoic acid (PHBA) by liver carboxyl esterase.

**Discussion & Conclusion:**

The proof of concept presented here shows how big data can be applied to classify a large number of cosmetics and make consumers aware in time to minimise the damages which could impact generations. Potency or dose determination through isolated experiments is different from the overall biological effect. The current approach could be strategically employed to advise the patients who cannot metabolise toxic substances efficiently.

**OP-HSR-27**

**Smoking and Sociodemographic Correlates of BMI**

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**Background & Hypothesis:**

Smoking and obesity are the leading causes of preventable death in high income countries. The prevalence of obesity and consumption of nicotine products has been increasing worldwide. This study examined the associations of BMI with sociodemographic factors, and smoking in the Singapore resident population.

**Methods:**

The Singapore Mental Health Study was a cross-sectional epidemiological study of 6616 Singapore residents aged 18 years and above. Sociodemographic and smoking status were recorded in a standardised data collection form. BMI was calculated using height and weight which were self-reported by respondents and classified into 4 categories according to the WHO International classification.

**Results:**

A multinomial logistic regression analysis was conducted. Ethnicity, gender and education status were associated with obesity. Malays (4.7 times), Indians (3.6 times) and those belonging to “Other” ethnicities (2.7 times) were more likely to be obese as compared to the Chinese. Females were 0.7 times less likely to be obese as compared to males. Lower education was also significantly associated with obesity. There was an interaction effect between ethnicity and smoking status, affecting BMI. Indian and Malay smokers were less likely to be obese compared to Chinese smokers. The relationship between ethnicity and BMI was thus reversed when smoking was taken into account.

**Discussion & Conclusion:**

Ethnicity, gender and education were significantly related to obesity. Interestingly, the interaction effect suggests smoking is a moderating factor between ethnicity and obesity. Research has suggested that smoking is associated with energy expenditure, with resting energy expenditure differing between ethnicities. More research is needed in this area.

**OP-HSR-28**

**Determinants of Long-term Care Needs Among Community-dwelling Older People in Singapore**

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**Background & Hypothesis:**

Community care needs assessment identifies needs and service gaps. There is limited information on the determinants of long-term care (LTC) needs of community-dwelling older people. The proportion of older residents in Marine Parade town public housing reflects what other precincts will become in 15 years' time. We studied the determinants of self-reported care needs these residents.

**Methods:**

We conducted a cross-sectional survey on 3752 residents aged  $\geq 60$  years. Data collected included sociodemographic characteristics, health status including chronic diseases, functional status, depression, LTC needs, and reasons for any unmet needs. LTC needs were defined as needs for: healthcare, social help, emotional or financial support services.

**Results:**

Majority of the respondents were female (57%) and aged 65 to 74 years (47%). Multiple logistic regression showed that number of chronic conditions, functional status, presence of depressive symptoms, educational level, type of residence and living arrangement (whether living with close/extended family) were significant determinants of LTC needs.

**Discussion & Conclusion:**

Older people of higher socioeconomic status or living with family are less likely to have care needs compared to those living in rental housing or alone. Actual use of formal LTC services was determined by enabling factors – education, household income of care-recipient, coresidence with informal caregiver and high value housing of caregiver. Those who need the care and support may be less likely to use services. Targeted interventions for this vulnerable group like care coordination and/or management linked to the health service are needed to support older people with care needs but at risk of doing without the necessary services.

## OP-HSR-29

### Compliance to Shift Handover Guidelines: Do Medical Officers Follow the Guidelines in Tan Tock Seng Hospital?

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#### **Background & Hypothesis:**

Inpatient shift handovers are important in patient safety and ensuring continuity of care of patients. This study explores the adherence of medical officers to the hospital's shift handover guidelines, in an inpatient setting.

#### **Methods:**

Our audit was conducted on 4 nights over 2 weeks. A random sample of minimally 15% of existing inpatients under the Division of Medicine were reviewed. Information collected include: number of patients who met the handover criteria, reasons for handover and correlation between the observed handover rates and projected baseline handover rate.

#### **Results:**

A total of 109 patients were reviewed over 4 nonconsecutive days; 19.3% of these patients sampled (range, 10.3-24%) met the handover criteria; the observed mean handover rate to the on-call was 51.3% (range, 31.9-95.9%). Of the 22 patients who met the criteria for handover, 14 required handover due to "clinical review" and 3 under the "Dangerously Ill (DIL)" category. Of the 50 patients handed over to the on-call by the primary team, 27 were for being DIL and 23 were for "clinical review". Out of the 8 patients, the on-call doctors were called to review, 4 met the criteria for handover, and of these 4 patients, 3 were handed over.

#### **Discussion & Conclusion:**

Shift handovers are taking place but compliance is only 51.3%. The published guideline for shift handovers was developed based on expert consensus and serves as a useful reference point. In our study, the poor compliance did not result in adverse patient outcomes, suggesting that more research can be done to optimise guidelines for better effectiveness.

**OP-HSR-30**

**Validation and Re-estimation of Disease Weights in Charlson Comorbidity Index Among Singapore Patients**

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**Background & Hypothesis:**

Measures of complexity are used in epidemiological and health services research to predict survival and as risk adjusters. The most widely used is the Charlson comorbidity Index (CCI) developed with weights assigned to various diseases that are predictive of 1-year mortality. Several studies have updated and validated the CCI weights. This study aims to re-estimate the weights in Singapore patients.

**Methods:**

Data for 2012 (n = 175,419) was derived from the Population Health Management database comprising 3 acute hospitals and 9 polyclinics. It was randomly divided into estimation cohort (90%) and validation cohort (10%). Cox-Proportional-Hazard-Model was used to update weights for the 13 chronic conditions in the CCI. Logistic regression model was used to predict 1-year mortality and model performance was measured using C statistics.

**Results:**

Of the 175,419 patients, 5261 died in the following year. The updated weights for Singapore were: 0 for peptic ulcer disease, rheumatologic disease, TIA, diabetes; 1 for cerebrovascular disease, diabetes with chronic complications, chronic pulmonary disease, hemiplegia or paraplegia, mild liver disease; 2 for CHF, dementia, myocardial infarction, peripheral vascular disease, renal disease; 3 for moderate or severe liver disease; and 6 for metastatic solid tumour. For each point increase in the score, the odds ratio for 1-year mortality was 1.51 (95% CI, 1.49-1.53). The index with Singapore weights had higher C statistics (0.83) than the original CCI and other studies (0.81).

**Discussion & Conclusion:**

The re-estimated weights from Singapore patients have a higher predictive power and can be deployed in our risk adjustments for patients' complexity.

**OP-HSR-31**

**Specialist Outpatient Clinics – A Potential Contact Point for Targeted Vaccination to Reduce the Risk of Hospital Admission**

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**Background & Hypothesis:**

The association between influenza epidemics and increased hospital utilisation is well documented. To help inform whether opportunistic vaccination at hospital specialist outpatient clinics (SOC) could be beneficial, we analysed hospital admissions data in relation to prior outpatient clinic visits.

**Methods:**

We extracted all emergency admission episodes from 1 January 2010 to 31 August 2012, to Tan Tock Seng Hospital (TTSH). We then populated the database with TTSH outpatient clinic appointments from 1 January 2009 to 31 August 2012. We also included the most recent outpatient clinic specialty the patient attended before their admission episode.

**Results:**

From 1 January 2010 to 31 August 2012, there were 136,338 emergency admissions from 84,404 individuals to TTSH. Of these, 33,463 (43.2%) were in the recommended risk group to receive influenza vaccine on the basis of being >65 years old. We found that 73.7% and 86.0% of them had a prior outpatient clinic appointment <6 months and <12 months respectively before a hospital admission episode. The top 3 medical specialties the patients visited prior to their hospital admissions were ophthalmology (13.4%), cardiology (10.9%) and geriatric medicine (7.4%).

**Discussion & Conclusion:**

We have found that a large proportion of emergency hospital admissions had a prior outpatient clinic visit 6 to 12 months prior. The proportions reported here were only based on age criteria recommendations for vaccination and were likely an underestimate. SOC may provide an ideal opportunity for targeted vaccination e.g. influenza or pneumococcal vaccines as a cost-effective strategy to relieve bed pressures in acute hospitals.

**OP-HSR-32**

**Influenza Vaccine Effectiveness Against All-cause Hospital Admissions in the Tropics**

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**Background & Hypothesis:**

Influenza vaccination has indirect benefits amongst chronic disease and risk groups which extend beyond preventing influenza illness. We describe a novel method using the self-controlled case series to evaluate the effectiveness of influenza vaccine in reducing all-cause hospital emergency admissions in an acute hospital.

**Methods:**

We extracted all emergency admission episodes to Tan Tock Seng Hospital, Singapore (TTSH) and their influenza vaccination records from 1 January 2010 to 31 August 2012. The observation period was divided into 3: preprotection = 1 January 2010 to 15 days postdate of influenza vaccination; protection period = 15 days after vaccination to 365 days; postprotection period = 365 days postvaccination to 31 August 2012. A subject-specific Poisson regression model adjusted for month/year was applied to ascertain the incidence risk ratio (IRR) of emergency admission during the protection period compared to the baseline (preprotection and postprotection).

**Results:**

From 1 January 2010 to 31 August 2012, there were 136,338 emergency admissions from 84,404 individuals to TTSH; 4313 had a history of having received 1 influenza vaccine which was used for analysis. The mean age of the cohort was 65 years and there were slightly more males (60%). After adjusting for month and year, the IRR during the protection period was 0.89 (95% CI, 0.85-0.93) compared to the baseline risk of hospital admission.

**Discussion & Conclusion:**

Influenza vaccine is 11% effective in protecting against all-cause emergency admissions in tropical Singapore. Our novel method also adjusts for known and unknown fixed confounders such as gender, genetics, etc. Increasing influenza vaccination coverage could help relieve bed pressures in acute hospitals.

**OP-NR-01**

**Improving the Form Management Process in Inpatient Wards**

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**Background & Hypothesis:**

Forms used by the inpatient wards in Tan Tock Seng Hospital (TTSH) were printed by external vendors, who would then deliver them to TTSH. This resulted in wastage whenever the forms were being updated. Most importantly, valuable time was wasted for the patient service associates (PSA) and nurses as they managed the forms in inpatient wards. The purpose of this project aimed to reduce/eliminate: 1) form wastage through on-demand printing, 2) risks of errors associated with the use of obsolete forms, and 3) non-value-added work related to form handling.

**Methods:**

Adopting the methodology from Flinders' Redesigning Care, we tracked nurses and nursing work to obtain a baseline data. It captured interruptions and wastage while performing the activities. The issue of form management surfaced. We collaborated with an outsourced vendor to work on the Document Efficiency System (DES) for form management. Through Plan-Do-Check-Act approach, we successfully implemented the DES in all inpatient wards in TTSH.

**Results:**

Search time for forms is significantly reduced by 90%. It reduces 98% cost wastage when a form is revised and implemented; 100% of the forms in the DES are up-to-date. Time taken to prepare 20 sets of admission kits is reduced by 90%, which reduces the non-value-added work related to form handling.

**Discussion & Conclusion:**

DES provides electronic forms that can be printed on-demand. Thus eliminates the laborious tasks associated with this process. DES achieved an improved process of form management through cost neutrality and time saved can be translated to time spent on direct patient care.

**OP-NR-02**

**Post Total Knee Arthroplasty Pain Experience, Self-Management and Perceptions Towards Analgesics: Comparisons Between Singaporeans and Australians**

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**Background & Hypothesis:**

It is unclear if cultural differences influence pain experience after total knee arthroplasty (TKA). We examined if pain severity, self-management behaviours and perceptions of analgesics use following TKA differed between 2 culturally diverse cohorts.

**Methods:**

This was a cross-sectional study. We surveyed individuals who had undergone TKA in a tertiary Singaporean hospital and 10 Australian hospitals, 2 weeks following hospital discharge. Participants answered a questionnaire on their pain severity, analgesics consumption, side effects, perceptions of analgesics use, and satisfaction with analgesia.

**Results:**

A total of 105 Singaporeans and 171 Australians completed the survey. Compared with the Australians, significantly fewer Singaporeans reported that their worst pain occurred during the first 2 weeks at home (odds ratio (OR) 0.25, 95% confidence intervals (CI) 0.14-0.43), and that their average pain was “severe/extreme” (OR 0.20, CI 0.08-0.48). Fewer Singaporeans consumed an opioid (OR 0.20, CI 0.11-0.34) or experienced analgesia-related side effects (OR 0.13, CI 0.07-0.23). More Singaporeans perceived that analgesics could not control pain (OR 2.50, CI 1.43-3.33); were concerned about addiction (OR 2.00, CI 1.25-3.33) or about developing tolerance to analgesics (OR 2.50, CI 1.43-5.00); or preferred enduring pain than analgesics-related side effects (OR 2.00, CI 1.25-3.33). There was no significant difference in satisfaction with analgesia between the 2 cohorts.

**Discussion & Conclusion:**

Following TKA, there were marked differences in pain experience, self-management behaviours and perceptions of analgesics use, between the Singaporean and Australian cohorts. The findings indicate the need for culturally-specific postoperative pain management strategies.

**OP-NR-03**

**Influence of Education on Health-related Quality of Life After Total Knee Arthroplasty**

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**Background & Hypothesis:**

Health-related quality of life (QOL) is an important patient reported outcome. The level of education may influence QOL. We examined if formal education affected health-related QOL after total knee arthroplasty (TKA).

**Methods:**

This cohort study was nested within a randomised controlled trial comparing different postoperative analgesics following TKA. Patients undergoing TKA in a Singaporean hospital completed a questionnaire on Short Form (SF-12) QOL, preoperation, 2 weeks and 3 months postoperation. Differences in percentage change in SF-12 mental and physical health scores between the formal and no education groups were analysed using General Linear Model, adjusting for age, gender, race, work status, marital status, preoperation pain, and type of postoperative analgesics.

**Results:**

Among 200 patients, 142 (71%) received some formal education. Patients with formal education reported lower improvements (mean +/- SD) in SF-12 mental scores at 2 weeks (10.11 +/- 27.21 vs. 19.19 +/- 31.28;  $P = 0.032$ ), and at 3 months (10.10 +/- 29.12 vs. 16.87 +/- 32.79;  $P = 0.052$ ). There were no group differences in the improvements in SF-12 physical scores at 2 weeks and 3 months.

**Discussion & Conclusion:**

Patients with formal education have worse mental but not physical QOL improvements at 2-weeks and 3-months postsurgery compared to patients with no education. One possible explanation is that patients with formal education may have higher expectations of their recovery. Unmet expectations could have led to dissatisfactions and lower mental QOL despite having similar physical QOL as patients with no education. Preoperation education should include realistic expectations following surgery especially for educated patients.

**OP-NR-04**

**Need Help Visualising Patient's Veins in Intravenous Cannulation? – Effectiveness of Veinviewer for Vein Visualisation in Intravenous Cannulation on Patients With Difficult Veins Access**

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**Background & Hypothesis:**

Common challenges faced by doctors and nurses are patients with difficult venous access. The study aims to determine the effectiveness of the Veinviewer for intravenous cannulation by using near-infrared light to visualise superficial peripheral veins. The study hypothesises shorter time taken to achieve successful cannulation at first attempt in the intervention group, with positive user's feedback.

**Methods:**

Study was conducted in Tan Tock Seng Hospital, Singapore on May 2014. Quasi-experimental approach comparing blind puncture versus use of Veinviewer was adopted. Patient variables such as veins characteristics, medical history and operators' experiences in cannulation were obtained using descriptive statistics. Study outcomes were 1) time taken for intravenous cannulation, 2) proportion of successful cannulation on first attempt, and 3) user's feedback. Data collected were analysed using chi-square and t-test using SPSS v18.0.

**Results:**

Forty patients (median age of 76.5 years) were recruited. Approximately 80% has underlying vascular-related diseases, 70% presents with fragile veins and 52.2% with oedematous limbs. Lower success rates at first insertion attempt using veinviewer as compared to blind puncture (27.8% vs. 45.5%) was reported. Overall cannulation time was longer in the Veinviewer group (3.5 vs. 2.3 minutes) ( $P = 0.0607$ ); 84.2% found vein visualisation easy using the Veinviewer, 25.3% found it somewhat helpful in facilitating cannulation, citing discomfort from glaring light.

**Discussion & Conclusion:**

The authors acknowledge the value of the device but conclude that successful cannulation boils down to with user's skill, influenced by patients' vein characteristics. In addition, patients with challenging vascular conditions may require alternative invasive methods to avoid unnecessary multiple attempts of intravenous cannulation.

**OP-NR-05**

**The Development of a Documentation Plan and Psychosocial Support Intervention for Patients With Venous Leg Ulcer in the National Skin Centre (NSC)**

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**Background & Hypothesis:**

Venous leg ulcer is a long-term condition which often takes months or years to heal, with high rates of recurrence after healing. Weekly 4 layer dressing is done for patients with venous leg ulcer. Currently, documentation for patients in the National Skin Centre (NSC) with venous ulcers include location, number, wound size at baseline, 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> months (widest length x breath), percentage reduction in size after 3<sup>rd</sup> month, duration to healing, and brand of dressing used. This study aims to improve the documentation plan, and to develop a psychosocial support intervention for patients with venous leg ulcers.

**Methods:**

A review of the literature will be conducted to understand the documentation and psychosocial support interventions for patients with venous leg ulcers. The literature search will be conducted using the following databases: Cinahl, Medline, and Google Scholar.

**Results:**

Improvement to documentation for patient with venous leg ulcer can include tracing of wound size and calculating area using dot-point method, presence of comorbidities, duration to relapse, blood pressure, body mass index (BMI), duration of ulceration prior to treatment, and frequency of venous socks worn. Psychosocial support intervention could include assessing depression and social support. Intervention for patients could include discussing strategies to reduce depression, increase social support, and take on strategies to promote healing and prevent recurrence.

**Discussion & Conclusion:**

The proposed documentation plan and psychosocial support intervention could help improve healing and prevent recurrence of venous leg ulcer.

**OP-NR-06**

**Self-management, Symptom Management and Antiretroviral Therapy Adherence in People Living With HIV/AIDS (PLWHA)**

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**Background & Hypothesis:**

HIV/AIDS is not curable yet and antiretroviral therapy (ART) is the only treatment option to delay disease progression and prevent opportunistic infection (OI). Compliance with ART remains a challenge in clinical practice although proven interventions to improve medication adherence are available. Objective: Explore effects of symptom management on ART adherence.

**Methods:**

A review of literature using a systematic approach. Databases searched included: Medline/Ovid, Cochrane library, EMBASE, CINAHL and PsycINFO. Articles were in English and published between 1990 to 2012. All possible source of publications in the hierarchy of evidence was eligible for inclusion as long as ART adherence, symptom management and self-management were the focus in the publication. Non-English and studies based in Africa were excluded. Data from all selected studies were extracted and analysed using a thematic approach. A narrative synthesis was performed.

**Results:**

Twelve studies met the inclusion criteria; sample size ranged from 24 to 775. All studies identified had explored the effects of symptom management, with 6 using symptom management as intervention. Evidence was unable to indicate symptom management's direct effect on adherence but it clearly improves symptom burden. Symptom management is used with other self-management strategies to achieve improved adherence. Addressing symptom burden, healthcare professional (HCP) relationship and self-efficacy in PLWHA is pivotal to ART adherence.

**Discussion & Conclusion:**

A self-management programme is proposed to improve ART adherence for PLWHA. A self-management programme had the potential to empower and reverse PLWHA's negative impression of symptoms on adherence. ART adherence translates to better quality of life (QOL) and lower healthcare cost arising from OI.

**OP-NR-07**

**Perceptions Towards Death and Dying Among Community-dwelling Adults Over 50 Years Old in Singapore**

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**Background & Hypothesis:**

Singapore's palliative care needs continue to grow with an ageing population but little is known about how adults over 50 years old view dying and what constitutes a good death. Because a good death is not always attainable, adults over 50 years old are encouraged to begin planning as early as possible in order to preserve their autonomy at the end-of-life.

**Methods:**

A cross-sectional descriptive design using the modified AARP North Carolina End-of-life Questionnaire was conducted on 121 respondents with a response rate of 82.7%. Prior to the study, content validity index and test-retest reliability of the questionnaire was established. The questionnaire was translated into Chinese.

**Results:**

Respondents wanted a pain-free death (97.5%) and to avoid burdening others (96.6%) at the end-of-life. Despite these wishes, only 41.3% had begun some form of ACP. Postdeath arrangements such as a will (28.9%) and funeral arrangements (16.5%) were more common than predeath arrangements. Most (49.6%) felt that planning should begin before getting sick or when they were first diagnosed with illness. However, 26.4% “did not know” when the appropriate time to begin planning was. Majority (50.4-66.9%) perceived their family to be an important source of support and family involvement in decision-making was preferred by 28.9% of the respondents regardless of the perception of financial burden.

**Discussion & Conclusion:**

A good death involves a good dying process. However, it was evident from the participants' planning behaviours that they were more prepared for death rather than dying, highlighting the need for education about the benefits of early ACP.

**OP-NR-08**

**The E-PCI Cart Project: An Initiative Towards Standardising Workflow in Primary Percutaneous Coronary Intervention (PPCI)**

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**Background & Hypothesis:**

Previously PPCI items were obtained from various locations causing reduction in staff efficiency. To improve the process, we aim to create a new workflow and standardised the items required.

**Methods:**

An E-PCI Cart was designed to store all the important standard items required. The proceduralists and nurses came to a consensus on the list of selected items to be placed on the e-PCI cart. The items were numbered in the order of sequence to start the PPCI procedure to ease any staff (not limiting to trained nurses) to assist in the preparation. It was first tested on a normal procedure trolley, before the final cart was fabricated.

**Results:**

FASTER! Time saved: 1 min 38 secs (8.2% component of an average ICL door-to-balloon time).

**Discussion & Conclusion:**

This project was an important initiation to shorten the door-to-balloon time. Every staff (including radiographers and cardiac technicians) is trained to utilise the E-PCI Cart.

**OP-NR-09**

**Physical Restraints Increase Length of Stay for Patients with Dementia in Acute Hospitals**

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**Background & Hypothesis:**

Dementia is fast becoming a major public health issue in Singapore given our rapidly ageing population. Patients with dementia (PWD) often require hospitalisation but little has been published locally on this subject. We sought to profile PWD admitted to the acute hospital and determine factors associated with prolonged length of stay (LOS).

**Methods:**

We included consecutive PWD admitted to a geriatric ward in a local tertiary hospital over a period of 1 year. Demographic information (e.g. age, gender, marital status), clinical characteristics (e.g. primary diagnosis, dementia type and severity, comorbidities, functional status) and information relevant to the admission (e.g. use of restraints, catheter, nasogastric (NG) tube, length of stay) were collected. Univariate and multivariate analysis were performed to evaluate factors associated with LOS >21days.

**Results:**

A total of 237 patients were included; mean age  $83 \pm 7.7$  years, 51% male, 77% Chinese. Functional status (Modified Barthel Index) averaged  $54.4 \pm 38.1$ . The commonest causes for admission were falls, behavioural issues and pneumonia. Physical restraints were applied to 15% of patients while 4.5% required NG feeding and urinary catheter insertion. As regards LOS, multivariate analysis revealed that patients with physical restraints were at a significantly greater risk of LOS  $\geq 21$  days (OR: 3.08, 95% CI, 1.27-7.47,  $P = 0.01$ ) adjusted for other covariates. No other factor emerged significant.

**Discussion & Conclusion:**

Physical restraints are used on a significant proportion of PWD in the acute hospital and increase LOS. The findings call for closer scrutiny on the appropriateness of physical restraints and their impact on patient well-being and hospital KPIs.

**OP-NR-10**

**The Effect of Illness Self-Management and Recovery Programme in Reducing Symptoms and Increasing Social Functioning of People With Mental Illness in the Community**

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**Background & Hypothesis:**

Revolving door syndrome and the inability to integrate back into our society remains a challenge for people with mental illness. The Illness Self-Management Recovery (ISMR) modules could help them to explore coping strategies, thus facilitating their recovery in the community. This study aims to examine the effectiveness of the ISMR programme in reducing admissions and improving social functioning.

**Methods:**

A randomised controlled trial was conducted on 50 subjects who met the eligibility criteria from the caseloads of the Community Mental Health team. A total of 25 subjects each were randomly assigned to the experimental group receiving 24 sessions of ISMR programme for 12 months and the control group receiving usual care. Baseline and postintervention data were collected on the ISMR scale, brief psychiatric rating scale (BPRS) and Global Assessment Scale (GAS). Independent samples t-test was employed to examine the differences between the experimental and control group.

**Results:**

Outcomes in the experimental group differed significantly from the control group. Subjects in the experimental group have lower rates of readmission, shorter length of hospital stay, and higher scores for recovery self-rating and global functioning as compared to the control group after 12 months. The results sustained till 24 months later.

**Discussion & Conclusion:**

Participants who received the ISMR programme had better outcomes than those who did possibly due to the coping strategies that patients had attained through the programme. Outcomes of this study will serve as evidence and direction for the implementation of the ISMR programme within the hospital and the community.

**OP-NR-11**

**Nursing Care Outcomes in a High Dependency Psychiatric Care Unit: From the Patients', Caregivers' and Nurses' Perspectives**

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**Background & Hypothesis:**

Nurses manage acutely disturbed patients in the High Dependency Psychiatric Care Unit (HDPCU) using either primary nursing (PN) which requires a specific nurse to provide complete care for a patient, or functional nursing (FN) that emphasises the completion of nursing tasks for a patient by various nurses. Although commonly associated with positive experience of patients, little is known about PN's impact on the management of acutely disturbed psychiatric inpatients. This study aimed to compare patients', caregivers' and nurses' perception, experience and satisfaction between PN and FN.

**Methods:**

In this mixed methods comparative study, 80 eligible inpatients received care for 1 month through PN or FN. Outcomes were assessed using Likert scale surveys and focus group interviews. Differences in scores depicting mean perception, experience and satisfaction between PN and FN were compared using independent samples t-tests. Thematic analysis was employed to review qualitative data from focus groups.

**Results:**

Patients receiving PN had significantly better perception and experience of nursing care,  $t(38) = 4.04$ ,  $P < 0.001$  and  $t(38) = 4.18$ ,  $P < 0.001$  respectively. They perceived nurses as being concerned about them and experienced nurses' availability. Both caregivers and nurses were more satisfied with PN,  $t(38) = 7.49$ ,  $P < 0.001$  and  $t(26) = 3.47$ ,  $P < 0.01$  respectively. Qualitative analysis also revealed that nurses had more autonomy and were more responsible when delivering PN.

**Discussion & Conclusion:**

This study offered the unique opportunity to triangulate data from patients', caregivers' and nurses' perspectives. Valuable evidence supporting the utilisation of PN in delivering intensive nursing care for acutely disturbed patients in HDPCU was gained.

**OP-NR-12**

**A Comprehensive Systematic Review of Risk Factors for Osteoporosis in Adults With Serious Mental Illnesses**

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**Background & Hypothesis:**

Osteoporosis is associated with increased fragility and fractures, leading to health and economic burden. People with mental illness have higher prevalence of medical conditions including osteoporosis, than the general population. The aim of this review is to synthesise the best available evidence regarding the risk factors for osteoporosis in adults with mental illness.

**Methods:**

An extensive literature search was undertaken over multiple databases and libraries using specified keywords and related terms to retrieve published and unpublished studies for risk factors for osteoporosis in adults with mental illness. A total of 26 articles were selected after being reviewed independently by 2 reviewers and assessed to be of methodologically rigorous using critical appraisal instruments adapted from Joanna Briggs Institute.

**Results:**

About half of the retrieved studies were descriptive while the rest were comparable cohort or case control studies. People with schizophrenia, bipolar disorders, depression were found to have increased risk of osteoporosis than healthy individuals. Across these conditions, higher occurrences of osteoporosis were found in elderly and in people who consumed psychotropic medications. Although females were also more likely to have increased risk of osteoporosis than males, the evidence between gender and osteoporosis were not consistent across diagnoses. Besides, alcohol and drugs use also impacted bone mineral density negatively.

**Discussion & Conclusion:**

People with mental illnesses risked developing osteoporosis. The risk factors were multifactorial ranging from personal factors, to mental health conditions and usage of psychotropics. The knowledge is useful for developing interventions to reduce the risk that people with serious mental illnesses have towards osteoporosis.

**OP-NR-13**

**Tackling Rejected Pathology Specimens Through Innovation Means in General Medical Wards in a Local Hospital**

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**Background & Hypothesis:**

Mislabelling of specimen may result in inappropriate or delayed treatment with legal implications. In some cases, the errors may not be rectifiable such as fully excised tumours or skin lesions that cannot be replaced. In all cases, the laboratory will not process the unlabelled or mislabelled specimens. In 2011, the total rejection rate for general medical wards was 17; it increased to 40 in 2012. The aim of the project was to eliminate rejected specimens within 6 months.

**Methods:**

We first used Gap analysis to identify key contributory factors and develop appropriate interventions. The factors included 1) no or wrong nature of specimen written on the specimen bottle, 2) mismatch of patient's 2 identifiers on the laboratory request form with the specimen, and 3) incomplete patient's history on the request form. After brainstorming and discussion, we implemented the following process changes: 1) institution of sign-out process in the dispatch book, 2) visual aids to guide sign-out process, and 3) designation of storage area to hold pathology specimens. The outcome measured was the rejection count generated by the laboratory on a monthly basis.

**Results:**

Since the implementation began on 24 July 2013, the team managed to achieve lower rejection rate for all 4 general inpatient wards. Issues encountered include non-compliance to sign-out process while despatching specimens.

**Discussion & Conclusion:**

The sign-out process has shown to be an effective solution to reduce specimen rejection rates. Good compliance and team effort are keys to sustain the low rates.

## OP-PCR-01

### Characteristics of Type 2 Diabetic Patients with Complex Care Issues

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#### **Background & Hypothesis:**

Poorly controlled type 2 diabetes (T2DM) patients who are found to have complex care issues following a comprehensive assessment will be enrolled into the Continuing Care Patient (CCP) programme that provides multidisciplinary care to improve clinical outcome. The aim of this study is to delineate any distinctive characteristics of patients in the programme compared to those who have been screened but not enrolled.

#### **Methods:**

T2DM patients at Hougang Polyclinic who had at least 2 separate episodes of HbA1c more than 9.0% were identified for comprehensive assessment. Demographic and clinical data were collected and compared between those enrolled and those who were not using Fisher's exact tests.

#### **Results:**

Patients more than 70 years old were more likely to be enrolled into the CCP programme (OR: 6.82, 95% CI, 2.31-20.12). The odds of T2DM patients with hypertension (OR: 6.44, 95% CI, 1.10-inf) or heart failure (OR: 6.47, 95% CI, 1.36-25.09) were more than 6 times that of T2DM patients without the 2 conditions. Having concomitant chronic diseases like asthma, dyslipidaemia, stroke etc. were not noted to be significantly different between the 2 groups. Patients with more than 4 chronic diseases ( $P < 0.001$ ) were more likely to be enrolled.

#### **Discussion & Conclusion:**

CCP patients tend to be more than 70 years old and have more than 4 chronic diseases especially heart failure and hypertension. This information may enable us to identify poorly controlled T2DM patients with the above characteristics who refuse to undergo comprehensive assessment so that multidisciplinary care can be initiated.

**OP-PCR-02**

**Did a Telephone Reminder Help to Reduce Default Rate for First Visit Physiotherapy Session?  
A Longitudinal Cohort Study**

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**Background & Hypothesis:**

Patients who did not attend their initial physiotherapy appointment was high. The study investigated if a telephone reminder a few days before patient's appointment would reduce the attendance default rate.

**Methods:**

New cases attendance default was monitored from January 2013 to April 2014 in Bukit Batok physiotherapy centre. Patients were not contacted from January 2013 to September 2013. October 2013 involved operational preparation and was excluded from the analysis. Patients were contacted from November 2013 to April 2014. Comparison between the nonreminder and reminder groups was performed using student's t-test. Within group analysis of variance (ANOVA) with Bonferroni adjustment was performed to evaluate attendance default rate between each month.

**Results:**

Similar in both groups, the age range of 45 to 64 years accounted for the highest attendance default rate (45.4-47.1%). Attendance default rate was proportionately higher in the nonreminder group, 38.9% (769 cases) than the reminder group, 33.2% (477 cases), and statistically different between groups, mean 5.7%, 95% CI, 2.3 to 9.9,  $P = 0.002$ . ANOVA revealed that in the nonreminder group, June 2013 attendance default rate (%) was higher and statistically significantly different when compared to March 2013, mean, 15.7, 95% CI, 0.6 to 30.9,  $P = 0.034$ , and April 2013, mean, 16.1, 95% CI, 0.9 to 31.2,  $P = 0.027$ . Other statistical comparisons did not reveal statistical significance,  $P > 0.05$ .

**Discussion & Conclusion:**

A 5.7% attendance improvement with telephone reminder translated to an estimated 21 additional new visit attendance each month. This improvement was operationally important and telephone reminders should be continued.

**OP-PCR-03**

**The Telecare Programme for Patients with Stable Diabetes, Hypertension or Dyslipidaemia at the National Healthcare Group Polyclinics**

**HSS LEONG<sup>1</sup>, LS YEO<sup>1</sup>, DEJ SEAH<sup>1</sup>, KP CHAN<sup>1</sup>, M ZHANG<sup>1</sup>, ST CHOONG<sup>1</sup>, EYQ LEE<sup>2</sup>**

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**Background & Hypothesis:**

This is a care manager (CM)-led home monitoring programme involving patients with stable diabetes mellitus, hypertension or dyslipidaemia (DHL). Patients submit their glucose (if diabetic), blood pressure (BP) and weight readings through <http://www.Healthy.sg> which generates automated online care plans for patients. CMs (nurses trained in disease management) conduct teleconsultations once every 3 to 4 months. The aim is to maintain good clinical outcomes while achieving operational efficiency.

**Methods:**

Retrospective case note review was done. Clinical outcomes and operational information were derived from the Chronic Disease Management Database and Business Intelligence reports.

**Results:**

Comparing the 123 telecare patients in the programme between February 2013 and February 2014 with 22,1189 DHL patients, 87.0% were Chinese and 60.2% were men versus 77.6% Chinese ( $P = 0.013$ , Chi-square test) and 46.8% men ( $P = 0.003$ , Chi-square test). Most telecare patients were aged 40 to 64 years; 4 had diabetes, 113 hypertension and 6 with single disease of dyslipidaemia. Among telecare patients, the mean readings at baseline and at 6 months for systolic BP were (124 mmHg; 126 mmHg) ( $P = 0.273$ , paired t-test), diastolic BP (76 mmHg; 72 mmHg) ( $P = 0.030$ , CI, 0.350-6.555, paired t-test) and BMI (25.3 kg/m<sup>2</sup>; 24.9 kg/m<sup>2</sup>) ( $P = 0.131$ , paired t-test). Two diabetic patients who reached 6 months of follow-up at the time of review continued to have HbA1c <7%. There were no adverse outcomes such as uncontrolled hypertension or hypoglycaemia. There was an average reduction of 53.2 minutes in the turn-around-time of teleconsultation process versus clinic visit.

**Discussion & Conclusion:**

A CM-led home monitoring programme can be implemented safely at primary care through careful selection of patients.

**OP-PCR-04**

**A Pilot Study: Would Parental Concerns of Childhood Immunisation Affect the Actual Uptake of Childhood Immunisation?**

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<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

**Background & Hypothesis:**

Knowledge about the determinants of parents' decision to vaccinate their child may affect the success of an immunisation programme. A previous study conducted in Hougang Polyclinic found that approximately 30% of parents were hesitant to follow the recommended National Childhood Immunisation Programme (NCIP). The aim of the study seeks to assess the actual uptake of PCV13 in Hougang Polyclinic as compared to the national uptake rate. We hypothesise that the uptake of PCV13 is similar to the national average assuming that the same proportion of parents is hesitant to childhood immunisation nationally.

**Methods:**

Fifty random immunisation records of children aged 20 months were obtained and screened for the 13-valent pneumococcal conjugate vaccine (PCV13) in Hougang Polyclinic. PCV13 was selected as this is the only NCIP vaccine that is not offered free in the polyclinic. A complete uptake of vaccination was defined as "complete" if a child received at least 2 recommended doses of PCV13.

**Results:**

The PCV13 uptake rate of this study was 78% (95% CI, 66.5-89.5). This was significantly higher than the national uptake rate of 60%.

**Discussion & Conclusion:**

The study shows that the PCV13 uptake rate is higher than the national average take-up rate. This may be because parental hesitancy does not influence the actual uptake of childhood immunisation. Another possibility is that the hesitancy of parents nationally may be higher than the purported 30%. Additionally, there may also be other localised factors at Hougang Polyclinic that resulted in a higher uptake. A prospective cohort study is proposed to find the answer.

**OP-PCR-05**

**Do Asthma Patients Being Followed Up in the Polyclinics Have Their Disease Control Monitored Regularly?**

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<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

**Background & Hypothesis:**

Findings from developed nations have shown that many primary care practices do not adhere to the recommendations of asthma management guidelines. This study aims to find out how often are the asthma control test (ACT) score documented as compared to the developed nations. The study also explores the frequency, accuracy and ease of documenting other asthma control indicators such as body mass index (BMI), written asthma action plan (WAAP), smoking status and exercise activity in the electronic medical records (EMR).

**Methods:**

A total of 1029 adult patients were randomly selected from 9909 asthma patients who visited NHG polyclinics twice in the past year. Patient demographics and asthma control indicators were retrieved directly from the EMR database without perusing the medical notes.

**Results:**

A total of 61.4% (95% CI, 58.44-64.39) of patients had at least 1 ACT done in the past 6 months. This is significantly higher than the developed nations (56%). The accuracy of the ACT score was 99.9%. WAAP and exercise activity could not be retrievable from the EMR database. A total of 82.8% of patients had their BMI recorded in the past 12 months with accuracy of 99.4%. More than half of the patients (57.1%) had no smoking status recorded and the accuracy of those recorded was only 60.1%.

**Discussion & Conclusion:**

Although we document ACT scores more frequently than developed nations, more than one third of the patients still do not have their ACT scores recorded. There seems to be a paucity of user-friendly elements in the EMR to help with the ease and accurate documentation of some asthma control indicators.

**OP-PCR-06**

**Can We Predict Poor Clinical Outcomes in Patients With Asthma by Looking at the Medications Prescribed Over a 1-Year Period?**

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<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

**Background & Hypothesis:**

Asthma is commonly managed in primary care. It has been noted that some asthmatic medications confer protection against asthma exacerbations while others do not. This study serves to explore the prescription patterns of asthmatic patients in primary care to see whether they can predict asthma exacerbations.

**Methods:**

Data was extracted from the institution's health information system. A total of 1029 patients aged 18 and above with diagnosis of asthma and without chronic obstructive pulmonary disease were selected. Four distinct prescription patterns over the last year were chosen as predictor variables – salbutamol tablets, number of prescriptions of prednisolone tablets, 4 or more canisters of salbutamol inhalers and, no preventer/reliever inhalers. These were analysed using logistic regression analysis against the outcome variable of administration of nebulisation in the clinic. Prescriptions given on the same date of nebulisation were excluded.

**Results:**

The odds of having nebulisation among patients with 2 prednisolone prescriptions or more is 3 times that of patients with 1 prednisolone prescription or less (OR: 3.11, 95% CI, 1.96-4.93). The odds of having nebulisation among patients with any inhalers dispensed is 50% lower than those without any inhalers dispensed in a year (OR: 0.46, 95% CI, 0.31-0.66). The prescription of oral salbutamol tablets ( $P = 0.877$ ) or 4 or more canisters of salbutamol inhalers over a 1-year period ( $P = 0.645$ ) are not associated with the frequency of nebulisation.

**Discussion & Conclusion:**

Having 2 or more prescriptions of prednisolone tablets and zero inhalers prescribed over a 1-year period for asthma patients may predict poorer clinical outcomes.

**OP-PCR-07**

**Use of Photographic Food Records in Diabetic Patients: Findings and the Patient's Perspective**

**TC WON<sup>1</sup>, KW WONG<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

**Background & Hypothesis:**

Photographic food records (PFR) are shown to be an accurate method of measuring food intake in adults. We aimed to study the use of PFR in assessing diabetic patients as a complement to the diet recall history (DRH), and patient perspectives on its use.

**Methods:**

Fifty-two type 2 diabetic patients were recruited in Toa Payoh Polyclinic from 2012 to 2013. Participants were taught to record 3-day PFR using their smartphones and were educated by the dietitian on optimal food groups portioning and cooking methods. At the second dietitian visit, DRH was taken followed by viewing of the PFR. Accuracy of diet recall was verified with PFR and the dietitian highlighted discrepancies using PFR as an educational tool. The visit concluded with a questionnaire examining the participants' perceptions of PFR. Data was analysed using STATA SE version 12.

**Results:**

Forty-nine participants completed the study. We found that only 71.4% and 48.9% of the participants accurately reported their vegetable and fruit portions respectively when verified with PFR; 63.2% were unaware their meals were too oily. Results of the questionnaire showed that 63.3% of participants became more aware of their food choices. When compared with diet recall, 61.2% preferred PFR and 75.5% clearly identified dietary improvements and learned better food portion estimation; 51.3% indicated they would continue using PFR.

**Discussion & Conclusion:**

Use of PFR as a complement to diet recall helped diabetic patients identify dietary gaps and learn better food portion estimation. We recommend further studies to explore the outcomes of the use of PFR in patients with diabetes.

**OP-PCR-08**

**Assessing Clinical Complexity in Poorly Controlled Diabetic Patients: A Pilot Study**

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**Background & Hypothesis:**

Clinical complexity (CC) refers to the presence of non-disease-related factors, such as psychosocial and behavioural affects, which often makes patient management more challenging. We aimed to study the impact of CC on the outcomes of patients with poorly controlled diabetes.

**Methods:**

Diabetic patients with HbA1C above 9% were assessed with a comprehensive assessment chart when they were referred to a care manager in NHG Polyclinics from June 2012. The care manager assessed for CC, defined as issues in 2 out of 4 domains: Dietary, Medication, Psychosocial and Function, and conducted follow-up visits with referrals to allied health services (AHS) as required. The control group consisted of diabetic patients who saw a care manager, but did not have CC. They were matched for demographics, comorbidities and baseline disease control using propensity scoring. Clinical outcomes and use of AHS were studied after 1 year.

**Results:**

A total of 486 patients were identified with CC with 486 matched patients. HbA1C in the study group was significantly reduced by a mean of 1.17% ( $P < 0.01$ ) (baseline, 10.8%). However, this was significantly lower than the control group (1.49%,  $P < 0.01$ ). There was no significant change in LDL, BMI, systolic or diastolic blood pressure. Patients with CC were also more likely to see a dietician, medical social worker or psychologist (OR: 5.1, 32.0, 35.0,  $P < 0.01$ ).

**Discussion & Conclusion:**

Poorly controlled diabetic patients with CC had poorer diabetes outcomes despite increased use of allied health resources. Further research should be carried out to study effective interventions for these patients.

**OP-PCR-09**

**Attitudes Towards Interprofessional Collaboration Among Public Primary Care Physicians and Nurses in Singapore, in Comparison to Other Countries**

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**Background & Hypothesis:**

Interprofessional collaboration (IPC) improves patient outcome, cost efficiency, health professional satisfaction and enhances healthy workplaces. The objectives of this study are to: 1) Find out attitudes of public primary care physicians and nurses towards IPC, 2) Find out if demographic characteristics influence attitudes, 3) Find out factors perceived to facilitate IPC, and 4) Compare the results to that of other countries. Our study hypotheses are: 1) Public primary care nurses have better attitudes towards IPC than physicians, 2) Public primary care physicians and nurses with higher education level have better attitudes towards IPC, compared to their fellow counterparts with basic education level.

**Methods:**

A self-administered anonymous cross-sectional questionnaire, adapted from the Jefferson scale of attitudes toward physician-nurse collaboration (JSAPNC) was given out to primary healthcare physicians and nurses in the National Healthcare Group Polyclinics (NHGP) (n = 455). The JSAPNC score was the outcome measured. Higher scores indicated better attitudes (maximum score = 60).

**Results:**

The average total JSAPNC scores for physicians and nurses were 50.39 (95% CI, 49.67-51.16) and 51.61 (95% CI, 51.09-52.13) respectively. The difference was statistically significant ( $P = 0.011$ ). Nurses with specialty education had higher JSAPNC score (mean, 52.28, 95% CI, 51.48-53.08) than nurses with basic education (mean, 51.12, 95% CI, 50.44-51.79). This was statistically significant ( $P = 0.027$ ). Many participants believed that conducting training, adequate time allocation, revision of regulations and working in a fixed team of professionals would facilitate IPC. Comparison made to international studies showed that physicians and nurses in this study had comparatively good attitudes towards IPC.

**Discussion & Conclusion:**

Public primary care physicians and nurses have similarly good attitudes towards IPC. While the organisation could implement strategies to improve attitudes further, it is pertinent to explore other factors such as resources, organisational structures and individual capacity to collaborate as well.

**PP-AH-01**

**Improvement of Pathology Laboratory's 'Fix and Trim' Room**

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**Background & Hypothesis:**

The pathology laboratory in Tan Tock Seng Hospital is CAP accredited. The 'Fix and Trim' room is where the preparation of patient specimens begins. Over the years, there has been an increase in the number of specimens, causing space constraint due to the limited size of the room. This made it difficult for the laboratory to stay compliant to the specimen storage and laboratory safety regulations while utilising the current workflow and equipment. The goal of this project is to create a more well organised and safe working environment and improve work efficiency in the 'Fix and Trim' room.

**Methods:**

Changes were made to the 'Fix and Trim' room to help pathologists and medical technologists complete the work efficiently and safely within the allocated time frame, without compromising the quality of work. These changes include increasing the specimen storage areas, relocation of request forms, improving workplace safety and more. Feedback regarding the changes was collected to gauge the success of the change. The preparation and planning of the project was spread out among the staff to minimise the disruptions to daily routine work.

**Results:**

After implementing the changes, there was a decrease in workplace accidents, and increase in work efficiency. Better space management also allowed for more manoeuvrability and increased storage areas for specimens.

**Discussion & Conclusion:**

A combination of individual talent and excellent team work contributed to the success of this project. In conclusion, work efficiency in the 'Fix and Trim' room was increased, and a more well organised and safe working environment was created.

**PP-AH-02**

**The Use of Lupus Anticoagulant in the Screening of Antiphospholipid Syndrome and its Correlation with Anticardiolipin Antibodies as well as  $\beta$ -2 Glycoprotein I**

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**Background & Hypothesis:**

Diagnosis of antiphospholipid syndrome suspected by clinical manifestation is supported by laboratory criteria which include screening for the presence of lupus anticoagulant (LA), anticardiolipin IgM and IgG antibodies (ACAM, ACAG) and anti-B2 glycoprotein I (B2GP1). We retrospectively investigated the concordance between the above laboratory tests.

**Methods:**

Results of 1412 samples tested for LA between 2010 to 2011 were correlated with their respective ACAM and/or ACAG and/or B2GP1 results.

**Results:**

Of the 1239 samples tested for LA and ACAM/ACAG, 1132 (91.4%) were negative for both tests; similarly, 74 out of 78 (94.9%) samples were negative when tested for both LA and B2GP1; 26/100 (26%) B2GP1 negative samples were positive for LA; 81/1213 (6.7%) ACAG/M negative samples were positive for LA; 4/78 (5.1%) LA negative samples were positive for B2GP1; 107/1239 (8.6%) LA negative samples were positive for ACAG/M.

**Discussion & Conclusion:**

LA testing can detect majority (>90%) of the samples without antiphospholipid antibodies, which may be of good practical use for laboratories with limited resources. Testing with ACAM/ACAG as well as B2GP1 is useful in identifying a small number (<10%) of those who would otherwise be missed, including 8.6% of those detected by screening ACAM/ACAG and 5.1% of those diagnosed by a positive B2GP1. These tests should be performed in patients with clinical features suggestive of antiphospholipid syndrome but tested negative for LA.

**PP-AH-03**

**The Advance Care Planning (ACP) Coordinator – An Evolving Role**

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**Background & Hypothesis:**

In 2010, the Ministry of Health (MOH) provided funding through the Agency of Integrated (AIC) to restructured hospitals to initiate advance care planning (ACP) conversations with patients and families. In December 2011, an ACP coordinator was employed in Tan Tock Seng Hospital, Singapore to help drive this initiative. As the scope of work expanded, a second ACP coordinator joined in August 2013.

**Methods:**

A descriptive review of the work scope of the ACP coordinator in TTSH.

**Results:**

From January 2012 to April 2014, a total of 688 ACP were completed in TTSH by ACP coordinators and ACP pilot teams from various disciplines. From the 688, the ACP coordinators completed a total of 180 (26%) ACP, namely 176 (98%) preferred plan of care (PPC), 3 (2%) general ACP and 1 disease-specific ACP. Majority of the ACP was referred from the clinical disciplines of general medicine (56%), geriatric medicine (21%) and cardiology (9%). A total of 42% of patients with completed ACP have deceased.

**Discussion & Conclusion:**

The ACP coordinator is a new role in Singapore that has evolved into many dimensions. It is integral to the expansion of ACP work and plays an important role in laying the foundations of a successful ACP, namely in the training of healthcare professionals, community engagement, continual audit and quality improvement. There is currently expanded awareness of ACP in TTSH as well as a steady level of ACP activity. The role of the ACP coordinator is an evolving and expanding one and is pivotal in implementation of a successful ACP programme.

**PP-AH-04**

**Well-being of the Singapore Elderly (WiSE) Survey: Does Using Different Names Affects Respondents' Ability to Perform the Task that Assesses Delayed Recall of Interviewers' Names?**

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**Background & Hypothesis:**

One memory task in cognitive assessments is respondents' ability to recall their respective interviewers' names. This study aimed to investigate whether using different names affects respondents' ability to perform the task that assesses delayed recall of interviewers' names.

**Methods:**

Data from the Well-being of the Singapore Elderly study, an epidemiological survey of 2565 residents aged 60 years and above was used. Immediate recall was tested by asking respondents to repeat their respective interviewers' names at the beginning of the interview. After a series of questions, a delayed recall was tested by asking respondents to recall this name [NRECALL]. Data from 2080 interviews conducted by 10 top performing interviewers were included in the analysis to identify determinants of the [NRECALL] outcome using logistic regression.

**Results:**

After adjusting for age-group, gender, education and ethnicity match (where respondents and their interviewers belonged to the same ethnic group), using the [NRECALL] outcome as an assessment of delayed recall, significant differences in response were found in 5 interviewers' cases compared to the reference interviewer. Respondents of these 5 interviewers had lower odds of recalling [NRECALL] correctly; [INT3] – (OR = 0.2,  $P < .0001$ ); [INT7] – (OR = 0.1,  $P < .0001$ ); [INT8] – (OR = 0.2,  $P < .0001$ ); [INT9] – (OR = 0.5,  $P < .05$ ); [INT10] – (OR = 0.4,  $P < .05$ ).

**Discussion & Conclusion:**

Poorer delayed recall outcome of [NRECALL] among respondents of these 5 interviewers may be due to unfamiliarity with the interviewers' names. Incorporating ethnically relevant and standardised items in tools that make reference to people's names, particularly in surveys with multiethnic interviewers and interviewees, should be explored and investigated.

**PP-AH-05**

**Faster Turnaround Time (TAT) of Emergency Department (ED) and Urgent Outpatient Full Blood Count (FBC) Results**

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**Background & Hypothesis:**

Timely reporting of diagnostic test results is critical for faster diagnosis and prompt clinical management of patients. In the annual review of quality indicators in 2011, the department set the target of 90% of ED and urgent outpatient FBC results reported within 30 minutes of receipt of specimens in the laboratory. To improve the TAT without compromising the quality of service, laboratory staff gathered to review the internal processes and propose changes to the workflow.

**Methods:**

One of the limiting factors was that these specimens could not be prioritised and would have to queue with all other specimens on the automation line for testing by the analysers on the line. To improve the TAT, these specimens have been processed on a separate analyser dedicated for urgent specimens since December 2011. Other changes made include 1) giving priority to ED and urgent outpatient FBC cases that require microscopic review, 2) monitoring outstanding FBC requests half-hourly, 3) preliminary reporting of FBC results before microscopic review, and 4) performing root-cause-analysis on TAT outliers on a weekly basis.

**Results:**

From the baseline of 76.3% in financial year (FY) 2010, the average TAT improved to 81.8% in FY 2011, 89.1% in FY 2012, and 90.7% in FY 2013.

**Discussion & Conclusion:**

The continuous improvement in TAT was sustainable over 3 FYs due to staff buy-in to the objective of this improvement project that translated to high level of teamwork amongst staff to ensure the target was met.

**PP-AH-06**

**Increased Clinical Productivity and Reduced Cost of Care Through Patient-valued Dietetic Services**

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**Background & Hypothesis:**

Dietary counselling is the cornerstone of diabetes and high blood cholesterol management. Inpatient dietary counselling can be ineffective if patient is not ready for change. A pilot protocol was implemented with support from an assistant dietitian to streamline patients to appropriate dietary interventions. It aims to increase the dietitians' productivity through provision of patient-valued dietetic services.

**Methods:**

Patients referred for diabetes and/or cholesterol counseling were screened by an assistant dietitian for readiness to change diet, prior exposure to a dietitian and preference for inpatient dietary consult. Patients who declined a dietitian were given basic dietary information and empowered to arrange individualised outpatient consultation. Associations between the preference to see a dietitian and the related factors were analysed using chi-square tests.

**Results:**

Over 8 months, 215 patients aged  $59.0 \pm 13.4$  years were included in the care protocol. Ninety-two percent were already or planning to make dietary changes. Fifty-eight percent had no prior exposure to a dietitian. Sixty-three percent of the patients proceeded with dietary counselling. More patients ready for dietary changes (66% vs. 25%) and without prior exposure to a dietitian (78% vs. 42%) were keen for a dietitian consultation ( $P < 0.05$ ). Amongst patients ready for change, more patients without prior exposure to a dietitian (81%) than with exposure (48%) were keen for dietary consultation ( $P < 0.05$ ).

**Discussion & Conclusion:**

The pilot protocol identified patients who were ready for dietary changes, had lack of prior exposure to a dietitian and keen for inpatient dietary counselling. This allowed dietitians to focus on delivering interventions valued by patients, increase clinical productivity and decrease cost of care.

**PP-AH-07**

**A Descriptive Study of Case Management on Patients with Psychiatric and Chronic Illnesses**

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**Background & Hypothesis:**

Case management provides the necessary linkages and engagement for patients to relevant services. It is observed that patients on antipsychotics to suffer from common chronic illness like hypertension, diabetes mellitus and hyperlipidaemia, and this warrants for special attention as it could exacerbate existing psychiatric condition. This paper will highlight the management of patients with psychiatric and chronic illnesses.

**Methods:**

The psychiatrist conducts a comprehensive review and needs analysis of patients' psychiatric and medical needs. Data mining of patients on the programme from January 2013 to April 2014 was done and the results analysed using Microsoft Excel.

**Results:**

A total of 4927 patients with either schizophrenia or delusional disorder were reviewed. Demographic profile indicated that there were 48% male and 52% female; with a majority (29%) aged 50 to 59 years. According to the needs analysis, 381 referrals were made, predominately to outpatient specialist clinic (40%). Other linkages include to medical social worker, vocational centre, psychologist; 84% of the individuals requiring treatment for any of the chronic illnesses is or/and are continuing to follow-up with either the polyclinic or GP. However, the remaining 16% are resistant towards addressing their medical needs. Reasons include a lack of insight to its seriousness, troublesome to follow-up at multiple locations, afraid of blood tests, work commitment, financial difficulties. Case managers provided the necessary assistance to alleviate these issues.

**Discussion & Conclusion:**

Case management provides a continuation of care to psychiatric patients with medical needs in an effort to optimise their quality of life in both psychiatric and medical illness.

**PP-AH-08**

**Reducing the Number of Prescription-keying “Near-Misses” Attributed by Keying Errors to Zero Within Bukit Batok Pharmacy in 6 Months**

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**Background & Hypothesis:**

From January 2012 to December 2012, a total of 118 dispensing errors were reported across 9 NHG polyclinics; out of which 49 (41%) cases were due to keying errors. Between January 2013 and April 2013, a total of 10 dispensing errors were reported in Bukit Batok Pharmacy and 5 (50%) were due to keying errors. Our objective is to reduce the number of prescription-keying “near-misses” to zero within 6 months, hence leading to a reduction in actual dispensing errors.

**Methods:**

This is a clinical practice improvement project using quality planning tools. A total of 49 root causes were identified using the fishbone diagram. After 3 rounds of multivoting, 7 main root causes were identified and plotted into a Pareto chart. Based on Pareto's principle, we worked on the “vital few” root causes. The interventions, which include role reassignment, workflow changes, staff education and system enhancements, went through a series of Plan-Do-Study-Act (PDSA) cycles to enhance their effectiveness.

**Results:**

Data on keying “near-misses” was collected before, during and after implementation of interventions. Prior to our interventions, an average of 18 keying “near-misses” per month was documented. A total of 7 interventions were implemented over a period of 4 months and 2 were found to be unsustainable in the long run.

**Discussion & Conclusion:**

The interventions implemented managed to progressively reduce the number of keying “near-misses” by 66%, reaching a low of 6 keying “near misses” per month, by September 2013. The journey to bring down the number to zero will have to be a continuous effort, utilising new technological improvements.

**PP-AH-09**

**Evaluation of In-house Prepared Reagents for Urine Porphobilinogen**

**JBJ LEE<sup>1</sup>, RC HAWKINS<sup>1</sup>**

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**Background & Hypothesis:**

Acute porphyria is a disorder of haem synthesis and involves the accumulation of urinary porphobilinogen (PBG). Following changes in regulatory requirement, the commercial kit (ThermoFisher) is not available. In this study, we evaluated the performance of our in-house prepared reagents.

**Methods:**

A total of 1 ml of urine (pH 6-8, adjusted with ammonium hydroxide) is drawn with a syringe containing 1 g of anion resin. A filter is attached to retain the resin. Resin is washed with 1 ml of deionised water. PBG is eluted with 1 ml of glacial acetic acid (1 M) and added to 1 ml of Ehrlich's reagent. If PBG is present, a magenta colour develops after 3 minutes. The colour is compared with a colour chart and graded from negative to 3+. Negative and positive QCs were analysed. Due to the lack of patient samples, old (12 months) QA samples were used for comparison.

**Results:**

QCs were acceptable. ThermoFisher: 1 + (n = 5), In-house: negative (n = 4), 1 + (n = 1); ThermoFisher: 2 + (n = 3), In-house: 1 + (n = 2), 2 + (n = 1); ThermoFisher: 3 + (n = 4), In-house: 2 + (n = 2), 3 + (n = 2).

**Discussion & Conclusion:**

Our method is cheap, easy to set up and can be used to screen for acute porphyria. The use of old QA samples might be the reason for the under-reading of our results. Further work is required to verify reagent stability.

**PP-AH-10**

**An Exploratory Study on Social Workers' Perception and Practice of Spirituality in the Recovery of People with Mental Illness**

**KY LEE**<sup>1</sup>

<sup>1</sup>*Institute of Mental Health, Singapore*

**Background & Hypothesis:**

This qualitative study of 6 social workers in the field of mental health recovery is an attempt to explore their perspectives on spirituality, how they integrated it into their intervention with clients and the impact on the recovery of people with mental illness.

**Methods:**

Snowball sampling was used in recruitment of respondents in Hong Kong. The method of inquiry adopted for this research is the case study research method of multiple case studies. Analysis of data was done through coding of the transcripts and members' check was conducted to increase validity of data.

**Results:**

Analyses of the interview scripts revealed that social workers had different interpretations of spirituality. They are guided by these interpretations and professional ethics when exploring with their clients on clients' spirituality and spiritual resources.

**Discussion & Conclusion:**

Corresponding to the literature, this study gathered that spirituality is positively viewed as a source of support for expression of feelings, to give clients sense of hope and direction and help clients make sense of their suffering and mental illness. On the flip side, workers viewed spirituality as having negative impact on their clients when clients held on too strongly to their religious belief to the extent of being overly critical of others and self. It could be concluded that social workers would be able to carry out a more holistic assessment of clients by including spirituality. Apart from being sensitive to clients' cultural background, specialised training in exploration of spirituality would enhance workers' ability to help clients make sense of their spiritual resources.

**PP-AH-11**

**Photovoice: The Journey**

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<sup>1</sup>*Institute of Mental Health, Singapore*

**Background & Hypothesis:**

Photovoice aims to provide insight and perspectives of people who lead different lifestyles or are stereotyped or discriminated. It directly engages participants, recruited within populations that are often marginalised, to freely express themselves via photographic images.

**Methods:**

Young people with first episode psychosis or at risk of developing psychosis from EPIP participated in a Photovoice project consisting of class lectures, field trips, homework and reflection. The project enlisted the help of mentor photographers to teach and inspire the clients. Eleven out of the 18 clients who participated in Photovoice agreed to participate in the qualitative study. Semi-structured interviews using an interview guide were conducted individually. Transcripts were analysed using thematic analysis which identified key categories.

**Results:**

Participants expressed key challenges and benefits from the project. The overarching theme for challenges was “fear”. They were afraid that they had not delivered their messages well to the public through their projects and were also fearful of not excelling in it. One of the paramount benefits they expressed was on social relationships and forming meaningful friendships as part of the project.

**Discussion & Conclusion:**

Photovoice has offered a platform for the clients to express and relate their stories in a non-threatening environment. Clients felt empowered through this journey and the issues they had raised from fear to social relationships are age appropriate concerns that youth of their age are also facing.

**PP-AH-12**

**Adverse Drug Reactions to Oral Antibiotics Used for Dermatological Indications: A Preliminary Study**

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<sup>1</sup>*National Skin Centre, Singapore*

**Background & Hypothesis:**

Adverse drug reactions (ADR) are noxious and unintended responses to drugs which occur at doses normally used in man. Most ADR are mild and self-resolving after drug discontinuation, but some are severe and last longer. The prevalence of ADR was estimated to be 0.5% annually, and antibiotics contribute to 6.8% of all ADR in ambulatory care settings. Oral antibiotics are commonly used to treat dermatological conditions in outpatients. This preliminary study seeks to examine the ADR to oral antibiotics used for dermatological indications.

**Methods:**

Retrospective case review of outpatients reported to experience ADR to oral antibiotics used for dermatological indications in National Skin Centre were reviewed for year 2013. Each ADR was categorised into Types A to E, and its severity was assigned using harm categories adapted from National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) Index.

**Results:**

Twenty-eight cases were reviewed for year 2013. For all cases, oral antibiotics were used appropriately for their approved indications, including acne (22), eczema (3), and folliculitis (3). There were 18 Type A ADR, consisting of gastrointestinal-related (12), elevated liver enzymes (2), central nervous system (2), phototoxicity (1), and amenorrhea (1). There were 10 Type B ADR, consisting of urticaria (8), exanthems (1), and respiratory-related (1). In terms of severity of ADR, there were 4 ADR in NCCMERP Category D and 24 ADR in Category E.

**Discussion & Conclusion:**

This preliminary study showed that ADR to oral antibiotics used in dermatological indications were Type A and B ADR, and belonged to NCCMERP Category D and E.

**PP-AH-13**

**Reducing Adverse Drug Events with Multicentre High-alert Medications (HAM) Collaborative**

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**Background & Hypothesis:**

High-alert medications (HAM) have heightened risks of patient harm and associated with severe adverse drug events (ADE) and sentinel events with devastating consequences. HAM are widely used in both inpatient and outpatient treatment of various medical conditions. Hence, it is important to enable the safe and conscientious use of HAM. HAM Collaborative seeks to reduce HAM-related ADE through improving safe medication practices in local healthcare institutions.

**Methods:**

HAM Collaborative, a multicentre quality collaborative driven by National Healthcare Group from 2009 to 2013, comprised 3 general hospitals, 2 speciality hospitals/centres, and 1 primary care institution. Change packages, consisting of evidence-based improvements, were developed for 19 HAM drug classes and implemented in participating institutions. Baseline, postimplementation, and sustainability reviews were conducted by centrally coordinated reviewers using adapted Institute of Healthcare Improvement (IHI) global trigger tools methodology and medication-specific protocols (adapted from IHI ADE trigger tools). For each review, 30 random cases were reviewed per HAM drug class per institution. Reduction of total and preventable HAM-related ADE rate were used as primary measures.

**Results:**

Implementation of change packages reduced the total and preventable HAM-related ADE rate by 26.7% and 41.2% respectively (n = 1280). Spread and sustenance of change packages led to a further reduction of total and preventable HAM-related ADE rate by 63.6% and 50% respectively (n = 723). This resulted in the overall reduction of total and preventable HAM-related ADE rate by 73.3% and 70.6% respectively.

**Discussion & Conclusion:**

HAM collaborative achieved considerable reduction of HAM-related ADE rate with the implementation, spread, and sustenance of change packages with evidence-based improvements.

**PP-AH-14**

**Efficient and Highly Sensitive Screen for Myotonic Dystrophy Type 1 Using a One-Step Triplet-Primed PCR and Melting Curve Assay**

**M LIAN<sup>1</sup>, IS RAJAN-BABU<sup>1</sup>, K SINGH<sup>1</sup>, CG LEE<sup>1</sup>, HY LAW<sup>2</sup>, SS CHONG<sup>1</sup>**

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**Background & Hypothesis:**

Instability and expansion of a CTG repeat in the *DMPK* gene cause myotonic dystrophy type 1 (DM1), the most common adult onset neuromuscular disorder. Overlapping clinical features between DM1 and other myotonic disorders necessitate molecular confirmation in order for definitive diagnosis. We describe an efficient and highly sensitive one-step screen for DM1, as well as a companion protocol for rapid sizing of screen-positive amplicons.

**Methods:**

We optimised triplet-primed PCR (TP-PCR) and automated melting curve analysis (MCA) on 17 DNAs from DM1-affected and unaffected cell lines. A blinded test was performed on 60 previously genotyped clinical samples. Plasmid construct pDMPK(CTG)48 was used to establish a threshold temperature (TT) separating DM1-affected from unaffected samples. Rapid repeat size determination of screen-positive TP-PCR amplicons was achieved using a quick labelled-primer extension protocol followed by capillary electrophoresis (CE).

**Results:**

TP-PCR MCA melt peak temperatures of unaffected and DM1-affected samples were lower and higher than the TT generated by pDMPK(CTG)48 control plasmid, respectively. MCA profiles of all samples were completely concordant with CE results.

**Discussion & Conclusion:**

TP-PCR MCA is a simple, efficient, highly sensitive, and cost-effective screening tool for rapid identification of myotonic dystrophy type 1. For confirmation of positive status, CTG repeat size can be rapidly determined by CE of postmelt TP-PCR amplicons after a quick labelling step. This strategy avoids the need to perform CE sizing on all test samples, limiting CE analysis to only the subset of cases that are screen-positive.

**PP-AH-15**

**PTT-LA Normalised Ratio As an Alternative Test System for Detection Of Lupus Anticoagulant**

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**Background & Hypothesis:**

Lupus Anticoagulant (LA) is a heterogeneous group of antiphospholipid antibodies, which cannot be definitively diagnosed by any single test. Current practice for the laboratory testing of LA involves the use of 2 clot-based assays with different clotting principles, of which dRVVT is the most frequently used. We studied the performance of dilute PTT as an alternative assay for the detection of LA.

**Methods:**

Clinical specimens tested for aPTT (Stago<sup>®</sup> Cephascreen<sup>™</sup>), PTT-LA (Stago<sup>®</sup> PTT-LA<sup>™</sup>) and dRVVT (Life Diagnostics<sup>®</sup>) were identified through laboratory information system. Where there were discordant results, Staclot<sup>™</sup> LA (Stago Diagnostica) was used to confirm or exclude the presence of LA. All assays were performed using STA Evolution (Stago Diagnostica<sup>®</sup>). A PTT-LA normalised ratio (PTT-LA NR) was derived for each sample using aPTT as the confirmatory step (more phospholipids).

**Results:**

A total of 845 specimens were analysed. Based on ROC curve, a PTT-LA NR of 1.15 will yield a specificity of 90% and a sensitivity of 68% with an AUC of 0.81. The negative predictive value and positive predictive value were 95.9% and 43.7% respectively. Likelihood ratios were 6.85 (+) and 0.35 (-).

**Discussion & Conclusion:**

Given the observed high specificity and negative predictive value, PTT-LA NR can be a useful test system for the exclusion of lupus anticoagulant when used together with dRVVT, potentially obviates the need for another confirmatory test.

**PP-AH-16**

**Formulary Review of Tocilizumab Infusion (Actemra®)**

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<sup>1</sup>*National University Hospital, Singapore*

**Background & Hypothesis:**

With the local registration of tocilizumab (an antihuman interleukin-6 (IL-6) receptor monoclonal antibody), request to also include it in the National University Hospital, Singapore (NUH) formulary arose. This article aims to present the evidences in a manner representing the thought processes of the Pharmacy and Therapeutics Committee in this respect.

**Methods:**

Each factor of considerations was divided into different sections for ease of comparison. Similar substitutes available in the hospital were determined. Prescribing information of tocilizumab and alternatives were obtained from the Health Sciences Authority. PubMed was searched for registration trials.

**Results:**

Existing antirheumatic biologics are etanercept, infliximab and adalimumab, which are all tumour necrosis factor (TNF) blockers. Tocilizumab is only labelled for rheumatoid arthritis (RA) and juvenile idiopathic arthritis, while others are approved for more indications. It requires more infusions than infliximab. Tocilizumab has to be infused intravenously over 1 hour, but adalimumab and etanercept can be easily injected subcutaneously. All unopened products need to be refrigerated. Their efficacy profiles appear to be similar according to phase III RA trials. Infections occur very commonly among all of them, though the frequency is slightly lower for infliximab. Tocilizumab costs the cheapest for both private and subsidised patients within the first year of treatment.

**Discussion & Conclusion:**

Tocilizumab is an IL-6 receptor antagonist which acts differently from existing TNF blockers. Its advantages appear to be its use among RA patients who responded inadequately to previous therapies of disease-modifying antirheumatic drugs or TNF blockers, and cheaper price of treatment. It was included in NUH formulary.

PP-AH-17

## Morphological Features of Haematopoietic Cells in Bone Marrow of HIV+ Patients Over 3 Years

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### **Background & Hypothesis:**

Cytopenia is common in HIV+ patients. Causes include drugs, infections and malignancies. When the cause is not evident, bone marrow evaluation provides useful information. This study aims to describe morphological features of bone marrow aspirates in HIV+ patients over 3 years.

### **Methods:**

We reviewed the bone marrow aspirate slides of 50 HIV+ patients over 3 years. Morphological features were reported by haemato-pathologists and reviewed by a single assessor.

### **Results:**

Fifty HIV+ patients underwent bone marrow examination over 3 years. Indications included unexplained cytopenia(s), unexplained fever or suspected malignancy. A definitive diagnosis was obtained in 8 patients (16%). Dysplastic changes were seen in 39 patients (78%) and were seen in all myeloid lineages. Dysplasia in the erythroid, granulocytic and megakaryocytic lineages was seen in 72%, 28% and 48% of marrows respectively. Dysplasia in 2 out of 3 myeloid lineages was seen in 26% of patients. Dysplasia in all 3 myeloid lineages was seen in 22% of patients. A plasma cell count of 10% or more was seen in 4 patients (8%). Iron stores were increased (median iron score 4/6) in most patients (61.9%).

### **Discussion & Conclusion:**

Among the 50 patients, 8 patients (16%) had a definitive diagnosis made. Dysplastic changes in 1 or more of the 3 myeloid lineages are frequent in HIV+ patients but are only associated with cytogenetic changes in 1 patient. These dysplastic changes are possibly due to drugs or the HIV infection itself. The increased iron stores seen in most patients is likely due to reticuloendothelial iron blockade (anaemia of chronic inflammation).

PP-AH-18

**Detection of Methylated Septin 9 (SEPT9) and Transcription Factor AP-2 Epsilon (TFAP2E) in Circulating Tumour Cells**

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**Background & Hypothesis:**

Circulating tumour cells (CTCs) are associated with poorer prognosis and have been proposed as a liquid biopsy for follow-up examinations. As CpG island methylation is a common epigenetic mechanism in cancer development, we aimed to detect methylated *SEPT9* and *TFAP2E* genes in CTCs isolated from cancer patients using quantitative methylation-specific polymerase chain reaction (qMSP) assay.

**Methods:**

CTCs were enriched from blood using a size-exclusion microsieve device (CellSieve, Singapore). DNA from CTCs, cell lines and normal leucocytes were extracted, bisulfite converted and subjected to qMSP. qPCR-based standard curves for B-actin, methylated and unmethylated *SEPT9* and *TFAP2E* were established using PCR amplicons. The qMSP assays were evaluated for sensitivity and specificity using decreasing amounts of methylated DNA from YCC16 cells in a background of unmethylated DNA from normal leucocytes.

**Results:**

Reproducible amplifications with between-run variations (CVs) of 1.3-5.4% were achieved from  $1 \times 10^{-3}$  to  $1 \times 10^{-7}$  ng DNA. Methylation of *SEPT9* and *TFAP2E* genes were observed in colon (YCC16), breast (MCF7 and MB231) and liver (HepG2) cell lines. A low level of *TFAP2E* methylation (20%) but not *SEPT9* methylation was observed in normal leucocytes. The assay detected 1% of methylated *SEPT9* DNA in a background of unmethylated DNA from normal leucocytes. Methylation of *SEPT9* (11.0%-14.6%) but not *TFAP2E* was observed in CTCs from 2 breast cancer patients.

**Discussion & Conclusion:**

We developed a qMSP assay for detection of methylated *SEPT9* and *TFAP2E* genes in CTCs from clinical samples, which could aid the development of diagnostic and prognostic markers for cancer detection and management.

**PP-AH-19**

**Eliminating Inappropriate Omeprazole Usage in IMH Long Stay Wards Block 4 and 5: A CPIP Project**

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<sup>1</sup>*Institute of Mental Health, Singapore*

**Background & Hypothesis:**

Proton pump inhibitors are widely prescribed for acid peptic diseases due to their superior efficacy to other treatment options as well as their relatively good safety profile. The objective of this project is to eliminate inappropriate chronic usage of proton pump inhibitors in long stay wards block 4 and 5 in the Institute of Mental Health.

**Methods:**

The inclusion criterion for intervention was defined and patients fitting the criteria were identified. A root cause analysis was conducted and 4 priority root causes to be addressed were identified via a multivoting process. Intervention plans for these root causes were agreed upon and implemented in 2 phases. Staff educational materials were first produced and disseminated. Then, the omeprazole reduction and monitoring workflow were decided with the medical doctors based on established guidelines and implemented poststaff education.

**Results:**

Sixteen patients were identified to fit the inclusion criteria. Two patients were decanted to nursing homes midway through and were thus dropped out of the project. Of the remaining 14 patients, 13 patients were successfully weaned off omeprazole. None of the patients who were weaned off omeprazole reported adverse effects and full blood count monitoring 1 month postdiscontinuation for 6 patients had no adverse findings in them. None of the patients who were weaned off omeprazole required the restarting of omeprazole or other acid suppressants.

**Discussion & Conclusion:**

Although the number of patients involved was small, this project showed that omeprazole can be discontinued safely in patients with long-term uses with the appropriate workflow and monitoring.

**PP-AH-20**

**Reduction of Medication Picking Errors in Clementi Polyclinic Pharmacy by 50% in 6 Months**

**S NEO<sup>1</sup>, MS NG<sup>1</sup>, HH WANG<sup>1</sup>, ME LIM<sup>1</sup>, JX WOO<sup>1</sup>, YLE NG<sup>1</sup>, S SUPAHAN<sup>1</sup>**

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**Background & Hypothesis:**

Medication errors are common problems and may result in harm to patients. Up to 50% of dispensing errors were a result of wrong drug picked. Baseline data collected showed 30 picking errors per 10,000 items. The root causes identified were interruption, duty roster, look-alike/spell-alike (LASA) drugs and multiple strengths and complicated names.

**Methods:**

The primary focus of this project was on the picking of wrong strength and wrong drug. Data collection was done using tally sheets at 2 points: at the packing counters where the drugs were packed and labelled and at the point of dispensing. A series of interventions were carried out over 3 months and continuous improvement was done to refine the interventions. The first intervention done was “pick-to-bin” whereby a bin code/location was assigned to each drug. The staff reads a 4-character code instead of the drug names. The second intervention was the introduction of “rework” pegs to reduce inopportune interruptions to the packers. The third intervention was duty roster adjustments to finetune the balance of resources between the packers and dispensers.

**Results:**

Accuracy in drug picking improved with a 33% reduction of picking errors. Productivity and efficiency were improved by the simplified process. Staff satisfaction was improved due to a reduction of untimely interruptions.

**Discussion & Conclusion:**

A change in mindset is difficult; hence change management is essential in quality and safety improvement projects. Continuous improvement in the medication delivery system should be relentless to make it safe for every patient, every time and minimise the chances for errors.

**PP-AH-21**

**Understanding the Characteristics of Inpatient Admission for Individuals with Autism Spectrum Disorders**

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**Background & Hypothesis:**

Eleven percent of individuals diagnosed with autism spectrum disorder (ASD) accessed inpatient medical care in the United States. The hospitalisation burden is substantial with each admission incurring at least \$24,862 on average. The current review examines the characteristics and nature of admission of individuals with ASD. Limitations and areas of improvements are discussed with the aim of better meeting needs and improving treatment outcomes.

**Methods:**

A total of 159 articles were identified from PsycINFO and PubMed using the keywords: Inpatient, Hospitalisation, Admission, Autism, Asperger and PDD-NOS. Publication dates of the articles were limited from 2005 to 2014 (inclusive).

**Results:**

Ten articles were included with the following inclusion criteria: predictors of psychiatric admission, characteristics of inpatients or effectiveness of inpatient care. Only studies that provided information on descriptive analysis were included. Aggressive behaviour was the most common predictor for hospitalisation but the nature of aggression was not clearly defined. The length of stay (LOS) among ASD inpatients was at least 1.5 times longer than the typical population. Specialised ASD inpatient units with a multidisciplinary team and a high staff to patient ratio were correlated with reduced LOS and challenging behaviours.

**Discussion & Conclusion:**

The presence of challenging behaviours and higher LOS suggests that ASD inpatients may require a more intensive level of care provided by specialised inpatient units. Future research should define the nature and severity of aggressive behaviours that prompted admission. The types and outcome of treatment during and postadmission and rates of relapse can be explored.

**PP-AH-22**

**Reducing the Wait Time for Patients to See a Psychologist for Their First Psychotherapy Session at a Public Psychiatric Clinic in Singapore**

**LP ONG<sup>1</sup>, L LEOW<sup>1</sup>, D NITHIANANTHAM<sup>1</sup>, A CHONG<sup>1</sup>, S POH<sup>1</sup>, D KOH<sup>1</sup>, T CHNG<sup>1</sup>**

<sup>1</sup>*Institute of Mental Health, Singapore*

**Background & Hypothesis:**

This project, conducted by psychologists and clinic operations staff in April 2013 aimed to improve the wait time for patients to see a psychologist for their first psychotherapy session at the Specialist Outpatient Clinic B at the Institute of Mental Health from the monthly average wait time of 63 days to 28 days in the next 6 months.

**Methods:**

The team identified 12 root causes via a cause-and-effect fishbone chart and the “vital few” root causes voted by the team to intervene on based on Pareto Principles were: 1) No stratification of patients' need for face-to-face triage; 2) Difficulty freeing other staff for triage; and 3) Referring doctor not clear on the purpose of psychotherapy and triage. The first and second root causes resulted from a lack of manpower; therefore, it was proposed that the psychologists would share the workload of triaging with the lone psychotherapy coordinator. Thus, psychologists conducted phone triages for general psychotherapy referrals, while psychodynamic psychotherapy referrals were handled by the psychotherapy coordinator. Inappropriate referrals were also feedback directly to the referring doctors.

**Results:**

Monthly wait time, calculated based on the 95<sup>th</sup> percentile highest days between the doctor's referral date and first available psychotherapy appointment subsequently dropped to 50 days.

**Discussion & Conclusion:**

Shorter wait time and greater convenience were achieved for most patients as they no longer needed to make a separate trip to the clinic for a face-to-face triage. Therapeutic rapport established at the phone triage also led to patients being more likely to attend their first psychotherapy session.

**PP-AH-23**

**Performance Evaluation of MDCK and MDCK-SIAT1 Cells for the Isolation of Influenza Virus**

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**Background & Hypothesis:**

Madin-Darby canine kidney (MDCK) cells are commonly used for isolation of influenza virus as it is reliable and easy to use. However, MDCK is not a true representation of the human respiratory cells that the virus targets. The level of A-2, 6-linked sialic acid receptors (a2) is much lower on MDCK cells as compared to the human respiratory cells. A2 is important to ensure influenza virus binds strongly to cell. Therefore, MDCK-SIAT1, a transfected cell line of MDCK, is established with overexpression of A-2, 6-linked sialic acid receptors (a6) to give an ideal representation of human respiratory cell. We hypothesise that MDCK-SIAT1, with more a6, will have better isolation of influenza virus compared to traditional MDCK.

**Methods:**

MDCK and MDCK-SIAT1 are propagated and cultured onto shell vials via conventional cell culture techniques. Serial dilutions of influenza A virus are inoculated into shell vials in duplicates. The viruses are left to incubate for 5 days, after which the cells showing cytopathic effect are enumerated using immunofluorescence detection with FITC-conjugated monoclonal antibodies.

**Results:**

Based on results from different studies, the MDCK-SIAT1 cells have shown to be more sensitive, allowing the detection of influenza A viruses not detectable in MDCK. MDCK-SIAT1 was able to isolate more influenza A virus and also allow for higher level of virus growth than MDCK.

**Discussion & Conclusion:**

The use of MDCK-SIAT1 led to more strains being isolated and grown. We can therefore conclude that the use of this cell line is more reliable and accurate for isolation of human influenza virus as compared to its conventional counterpart.

PP-AH-24

## **A Study of the Experiences of Indian Migrant Care Home Staff Working With People With Dementia: A Cultural Perspective**

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<sup>1</sup>*Institute of Mental Health, Singapore*

### **Background & Hypothesis:**

Indian migrants form the second largest non-British dementia workforce in the UK but knowledge of their acculturation and its effect on dementia care is poor. Most studies appeared to have considered 'migrant' workers as a group and have not focused on different migration histories or ethnic groups. Most of previous studies had also recruited National Health Service (NHS) employees as participants than had focused on care home workers. This paper investigates the experiences of workplace acculturation of 12 Indian care workers.

### **Methods:**

Through a qualitative study, the sample was identified from 6 different care homes in London region. Interpretative phenomenological analysis was adopted to process the data gathered from in-depth interviews. The consolidated criteria for reporting qualitative research (COREA) were adapted for the reporting of this study.

### **Results:**

The analysis revealed 5 themes – Received Notions, Sense of Insecurity, Identity Evaluation, Sense of Competence and Hope – along an acculturation timeline. Analysis of the interview data showed that the participants seemed to go through a period of learning, unlearning and relearning of different sociocultural-technical knowledge between India and the UK. This process of “knowledge negotiation” contributed to the adjustment of their behaviours and belief systems of how interaction and social care should be performed in the UK.

### **Discussion & Conclusion:**

These findings reflect a need for responsive human resource management (HRM) practices that could address the social and professional relationships that the migrants come to develop at each phase of workplace acculturation.

**PP-AH-25**

**Utility of Screening Tools in Identifying Children at Risk of Autism Spectrum Disorder (ASD)**

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**Background & Hypothesis:**

The Social Responsiveness Scale (SRS), Social Communication Questionnaire (SCQ) and Child Behaviour Checklist (CBCL) are common screening tools used for early identification of autism spectrum disorder (ASD). Current review considers the properties and discusses the limitations of the aforementioned tools.

**Methods:**

Searches were conducted with keywords: Social Responsiveness Scale, Social Communication Questionnaire, Child Behaviour Checklist, autism and screening via PubMed and PsychINFO, between years 2004 and 2013. Only studies on the use of at least 1 of the tools with the children population were included. Fifty-one articles meeting the inclusion criteria were identified.

**Results:**

SCQ and SRS are ASD-specific tools while CBCL assesses presence of problem behaviours with broad-band scales. SRS and CBCL allow for reporting from multiple informants using age specific forms which enhance validity. SCQ allows for comparison of symptoms across 2 time frames but only provides a single cut-off score. While most studies reported evidence supporting the use of these tools, factors such as the age and level of functioning of the child assessed can limit the accuracy of the tools. Changes in symptoms presentation across time are under-investigated. Validity of the specific domains and subscales of the SRS and CBCL requires further examination.

**Discussion & Conclusion:**

Continuous revision and norming of the tools are important especially with recent changes to the Diagnostic and Statistical Manual of Mental Disorders (DSM). SRS has been updated recently and the utility of the SRS-2 in different populations awaits further analysis.

PP-AH-26

**Examining the Relationship Between Verbal Intelligence and Behavioural Problems in Children With Disruptive Behaviour Disorders**

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<sup>1</sup>*Institute of Mental Health, Singapore*

**Background & Hypothesis:**

Children with disruptive behaviour disorders (DBD) often present behavioural problems such as physical aggression and excessive argumentativeness. Studies have examined the deleterious effects of these antisocial behaviours and identified several risk factors, such as cognitive impairment, specifically the working memory and executive functioning. However, little has been examined how verbal intelligence (VI) is related to the overt antisocial behaviours of children with DBD. This study aims to examine the relationship between VI and behavioural problems in children with DBD. We hypothesise that children with lower VI will present more behavioural problems, as they are less able to express themselves verbally.

**Methods:**

Parent-reported Child Behaviour Checklist (CBCL) from 282 participants aged 6 to 18 years were collected as part of larger randomised controlled trial. VI was measured by the vocabulary subscale from Wechsler Intelligence Scale for Children Fourth Edition (WISC-IV). Behavioural problems were measured by the following subscales of the CBCL: Externalising, internalising problems, rule-breaking, aggressive behaviours, and anxious/depressed.

**Results:**

Controlling for gender and age, regression analysis indicated an inverse relationship between VI and all the subscales. This supports our hypothesis that children with lower VI present more behavioural problems.

**Discussion & Conclusion:**

Our results suggested a significant influence of VI over a child's externalising and internalising behaviours. One possible explanation is that with lower VI, these children may lack the ability to express themselves verbally, hence acted out through behaviours. Understanding the relationship between VI and behavioural problems can contribute to the existing knowledge about DBD. Interventions could focus less on verbal-related trainings and more on visual communication.

PP-AH-27

## What do Singaporeans Think of Primary Care? A Qualitative Exploration

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<sup>1</sup>*National University of Singapore, Singapore*

### **Background & Hypothesis:**

Patient's perspective is crucial to understanding and improving healthcare delivery. However, little research has been done in this area in Singapore. As we strive for high quality patient-centred care, how they view primary care is imperative.

### **Methods:**

In this study, we conducted 8 focus groups among a broad range of Singaporeans (n = 25) from May 2013 to February 2014. We asked patients about their perception of primary care; deciding factors behind their choice of care; their views on public versus private primary care and what they look for in terms of good primary care.

### **Results:**

Key themes that surfaced from the focus group discussion included: 1) how patients choose where they receive care, from GPs to specialists, 2) whether patients feel that the care received meet their expectations, 3) barriers to receiving and accessing care, 4) issues relating to cost and continuity of care, and 5) opinions on healthcare facilities and government policies.

### **Discussion & Conclusion:**

This study shows that patients value access and quality of care. Multiple dimensions of quality of care were discussed. Cost remains a leading concern in terms of deciding which type of care to select. The study demonstrates a need for a broader investigation of patient's perspective of the kind of healthcare they would prefer as we pursue individualised patient-centred care for Singaporeans.

PP-AH-28

### **The Effects of Patient Education on Psychiatric Illnesses and Postdischarge Compliance**

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#### **Background & Hypothesis:**

The need to ensure continuity of care and linkages with community services paved the way for case management in forensic psychiatry. Case managers (CM) would be in charge of providing psychoeducation to patients to improve insight in their psychiatric illness and encourage compliance to appointments upon discharge. As these individuals pass through the criminal legal system, it is essential for case management services to be engaged to reduce relapse or recidivism.

#### **Methods:**

Clinical information of eligible patients from July 2013 to December 2013 was accessed.

#### **Results:**

A total of 135 patients passed through the criminal legal system during this time period, out of which 73.33% was given outpatient appointments. Demographic profile indicated that there were 77% males and 23% females, with the majority aged from 21 to 40 years. Despite the majority of patients being further held in custodial setting postdischarge, the remaining 31% attended their first outpatient appointment faithfully. Caregivers of more than half of the population (58%) were also present at the appointment with patients.

#### **Discussion & Conclusion:**

Case management services ensured that at least one-third of the forensic population returned for their outpatient services. With regards to the remaining defaulters, CMs would track them in the custodial setting and link them up with community resources. The encouraging attendance of caregivers also provides CMs another source of support in building rapport with the patients.

**PP-AH-29**

**Comparison of Performance of CoaguChek XS With Standard Laboratory Test for International Normalised Ratio Above 3.5**

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**Background & Hypothesis:**

Anticoagulation clinics equipped with point-of-care (POC) international normalised ratio (INR) devices cater for more and more patients on warfarin. This study aimed to retrospectively correlate POC INR and laboratory INR (PT-INR) for POC INR >3.5 to allow us to review our current test repeat policies.

**Methods:**

Patients attending anticoagulation clinics (ACC) of Tan Tock Seng Hospital between 2010 to 2011 were initially tested for INR using CoaguChek XS Plus (Roche Diagnostics, GmbH). Those with INR >3.5 had a venous sample taken for PT-INR assay using STA-R Evolution<sup>®</sup> Series coagulation analyser (Stago Diagnostica).

**Results:**

A total of 752 specimens were analysed. Method agreement analysis showed positive bias of POC INR across the range from 3.6 to 8.0. The INR 3.6-4.0 group had a significant bias of 0.529. The bias increased with higher POC INRs. Of the 411 samples with POC-INR between 3.6 to 4.0, 20% were in therapeutic range (INR 2.0-3.0) by (PT-INR). Of the 341 samples with POC-INR >4.0, 0.3% were in therapeutic range by PT-INR.

**Discussion & Conclusion:**

POC INR offers a convenient and near real time monitoring of therapeutic status for our ACC patients on warfarin. However, our study shows a significant positive bias for POC INR >3.5. We suggest limiting repeat testing with PT-INR to patients with POC-INR between 3.6 to 4.0 only.

**PP-AH-30**

**Emotional and Behavioural Problems in Parents of Clinically-referred Youths With Mood and Anxiety Disorders**

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**Background & Hypothesis:**

Family history of psychopathology is a documented risk factor for mood and anxiety disorders, but little is known about parental psychopathology in the Singapore context. This study examined patterns of emotional/behavioural problems in parents of clinically-referred youths in Singapore. We hypothesised that parents of clinically-referred youths would show greater evidence of mental health problems compared to the national prevalence rate of 12%.

**Methods:**

Participants were recruited from a tertiary child psychiatry clinic. Families completed structured diagnostic interviews to screen for mood and anxiety conditions. Parents completed self- and spouse-report questionnaires to assess internalising and externalising symptoms and behavioural problems. Recruitment is ongoing.

**Results:**

Preliminary results were available for the first 10 families (4 complete and 6 partial families). Children's age ranged from 9 to 18 years (M = 14.9, SD = 2.81). The majority were Chinese (90%) and female (60%). Fathers' and mothers' age ranged from 37 to 62 (n = 7, M = 50.2, SD = 6.98) and 35 to 54 years (n = 7, M = 46.3, SD = 4.9) respectively. The sample was 10% Malay and 90% Chinese. Child diagnoses were major depression (40%), obsessive-compulsive disorder (40%), panic disorder (30%), post-traumatic stress disorder (10%), and generalised anxiety disorder (10%). A total number of 71% of mothers and 14% of fathers screened positive for mood or anxiety-related conditions. Questionnaire result indicated clinical levels of emotional/behavioural problems in 29% of mothers and fathers (including anxious/depressed, withdrawn, somatic complaints, aggressive behaviours, thought problems).

**Discussion & Conclusion:**

Emotional and behavioural problems are more common among parents of clinically-referred youths than the general population. Comprehensive family-based approaches to mental healthcare are warranted as they have the potential to improve outcomes for families.

**PP-AH-31**

**Validation of Severe Clostridium Difficile Diarrhoea Criteria in a Singapore Acute Care Hospital**

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**Background & Hypothesis:**

Criteria for severe clostridium difficile infection (CDI) differ among major guidelines and were based on CDI that had worse clinical outcomes. We aimed to validate and identify the most appropriate severe CDI criteria for our hospital.

**Methods:**

CDI episodes from January to December 2012 were classified as either severe or non-severe using criteria from the Society for Healthcare Epidemiology of America and the Infectious Diseases Society of America 2010 (SHEA/IDSA), European Society of Clinical Microbiology and Infectious Diseases 2014 (ESCMID), Department of Health and Health Protection Agency 2008 (DH/HPA) guidelines and Zar et al 2007 (Zar). Validation was performed by comparing clinical outcomes between severe and non-severe CDI. Outcomes used were 1) time to resolution of diarrhoea, 2) persistence of diarrhoea at day 6, 3) CDI complications, and 4) 30-day mortality.

**Results:**

A total of 126 CDI episodes were reviewed. Proportion of severe CDI was 33.3% (SHEA/IDSA), 64.3% (ESCMID), 42.1% (DH/HPA) and 49.2% (Zar). Treatment was with oral metronidazole (n = 120), oral vancomycin (n = 5) and oral metronidazole with oral vancomycin (n = 1). All 4 criteria groups showed that severe CDI had non-significant higher proportion of diarrhoea persistence at day 6, CDI complications, and 30-day mortality. Severe CDI episodes had a longer time to resolution of diarrhoea compared to non-severe CDI, but only significantly different in the SHEA/IDSA group (median (IQR), 6 (3-14) vs. 4 (2-9),  $P = 0.014$ ).

**Discussion & Conclusion:**

SHEA/IDSA severe CDI criteria identified patients with a significant longer time to resolution of diarrhoea in our hospital and should be used in our hospital.

**PP-AH-32**

**A 2013 Analysis of Outpatient Treatment Compliance in a Tertiary Psychiatric Hospital in Singapore**

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<sup>1</sup>*Institute of Mental Health, Singapore*

**Background & Hypothesis:**

Treatment compliance is a major challenge faced by case managers in their care of patients with psychiatric conditions. Past studies have found treatment compliance to be better in non-psychotic individuals than those with psychotic disorders. At IMH, patients who are discharged are case managed for a minimum 3 months during which they are provided with regular phone calls, psychoeducation and counselling. This paper shows the results of outpatient treatment compliance in discharged psychiatric patients.

**Methods:**

Analysis of telephonic case management data and appointment records of 532 outpatients from January 2013 to December 2013 was done with Microsoft Excel.

**Results:**

A total of 179 (33.65%) were diagnosed with non-schizophrenia conditions and 353 (66.35%) had schizophrenia. Among the patients with schizophrenia, 230(65.15%) actualised their appointments while 51 (14.45%) came within 2 weeks of their missed appointments and 44 (12.46%) defaulted with the remaining 28 (7.94%) being readmissions; 108 (60.3%) outpatients who did not have schizophrenia actualised their appointments while 12 (6.7%) came within 2 weeks of their missed follow-ups and only 35 (19.6%) defaulted with the remaining 24 (13.4%) being readmissions. Out of the 532 outpatients, 338 (63.54%) came for their appointments while 63 (11.84%) came within 2 weeks of their missed treatment and only 79 (14.85%) defaulted with the remaining 52 (9.77%) being readmissions.

**Discussion & Conclusion:**

The results of treatment compliance are encouraging as there have been reports of non-compliance rate of up to 80% in psychotic patients. Case management has been able to bring about a good degree of follow-up compliance. The importance of the continuity of care for patients in the form of case management is important.

**PP-AH-33**

**A Review of Cognitive Changes Associated With Postelectroconvulsive Therapy (ECT)**

**A TOH**<sup>1</sup>

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Electroconvulsive therapy (ECT) has been observed to be an effective treatment to provide relief for major depressive disorder, schizophrenia, mania and catatonia. The cognitive side effects of the treatment would often be on the list of considerations in the decision of administration of ECT. However, studies have not been consistent with the cognitive side effects experienced. This review aimed to summarise identified ECT-associated cognitive changes from the current literature.

**Methods:**

Literature searches were conducted on scientific databases EMBASE, MEDLINE, OvidSP, PsycArticles, PsychINFO, PsychLIT and PubMed, using the following keywords: electroconvulsive therapy, ECT, cognitive, function, deficits, effects, on all relevant published studies.

**Results:**

From the 8 relevant publication identified (consisting of 91 studies, involving 3895 patients) through literature searches, 10 areas of cognitive changes post-ECT were highlighted, with varying severity and persistency.

**Discussion & Conclusion:**

The current review identified several cognitive performances that were influenced by ECT. This included orientation, processing speed, attention, working memory, psychomotor speed, retrograde memory, anterograde memory (including verbal and visual episodic memory), spatial problem solving, executive functioning, and intellectual abilities. However, these cognitive changes, their severity and persistency appeared to vary between studies, and some of the influencing factors identified were the ECT technique used in the administration, age, gender, and the premorbid intellectual function. There is, hence, a need for further randomised, control trial with large participant numbers to demonstrate the cognitive changes, their severity and persistency of the therapy.

**PP-AH-34**

**Comparing the Daily Living Motor and Process Ability Skills of Older Adults With Dementia and Psychiatric Conditions in a Singapore Geriatric Psychiatric Setting**

**C TSO<sup>1</sup>**

<sup>1</sup>*Institute of Mental Health, Singapore*

**Background & Hypothesis:**

The purpose of this study is to compare the occupational performance of older adults diagnosed with dementia and older adults with psychiatric conditions in a geriatric psychiatric setting. Both these groups of patients participate in similar programmes and are admitted in the same inpatient wards in our hospital. Occupational therapists run groups with mixed diagnosis and provide individual sessions. Currently there is a lack of literature comparing their occupational performance and how different their needs are for occupational therapy (OT).

**Methods:**

The sample was taken from patients who were referred for functional assessments where Assessment of Motor and Process Skills (AMPS) was administered to determine their fitness for community living and the difficulties they face when carrying out familiar ADL/IADL. Sample size was 16 patients; 10 who were diagnosed with dementia and 6 who had psychiatric conditions. SPSS was used to compare the median of the motor and process ability scores between the 2 groups.

**Results:**

Mean age of psychiatric group is 74.4 years while dementia is 78.8 years. Although median motor and process ability scores were higher among the psychiatric population, such differences were not statistically significant. The median motor ability scores for the psychiatric group is 1.2350 and dementia group is 1.0450. The median process ability score for the psychiatric group is 0.9450 and dementia group is 0.9250.

**Discussion & Conclusion:**

The results indicated the dementia group in the study was older, more physically frail and less cognitively intact. The study would discuss how the OT programme could be adjusted to meet the respective groups' needs.

**PP-AH-35**

**Reduction in Radiation Dose in Cardiac Catheterisation by Changing the Record Detail From Normal to Low Dose: A Single Centre Experience**

**NK WILKINSON<sup>1</sup>, SP ARQUILLANO<sup>1</sup>, CP WONG<sup>1</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Radiation exposure from coronary procedures can be high to both patients and staff. We perform over 2500 procedures per year and most of our staff are young. Repeated X-ray exposure may be detrimental to our staff. We sought to reduce the dose to both staff and patients.

**Methods:**

Our angiographic systems were calibrated to emit equal amounts of radiation. The settings included fluoroscopy as “Low” and record settings “Normal”. We changed the record setting in Room 2 from “Normal” to “Low”. Room 1 was left as “Normal”. Data was collected over a 2-month period.

**Results:**

The total radiation dose and total dose area product (DAP) including both fluoroscopy and cine recording were significantly lower using the low dose protocol, with the percentage reduction of 30.2% and 33.4% respectively. There was no significant difference in the DAP of fluoroscopy in both rooms. However, the DAP of cine recording was significantly lower using low dose. Low dose protocol significantly reduced the radiation dose measured as DAP in both procedures of coronary angiogram and coronary angioplasty, with the percentage reduction of 40.0% and 36.6% respectively.

**Discussion & Conclusion:**

There is a significant reduction in radiation dose after the implementation of a simple change in the X-ray protocol, without any noticeable change in image quality. Customising X-ray protocol instead of using default settings does not incur extra cost. Any reduction in radiation dose without a compromise in image quality will benefit both the patients and staff.

**PP-AH-36**

**Using the E3 (Encourage, Educate and Empower) Framework to Improve Patients' Self-care**

**JL YANG<sup>1</sup>**

<sup>1</sup>*Institute of Mental Health, Singapore*

**Background & Hypothesis:**

The E3 programme framework aims at improving patients' ability to self-care through psychoeducation, and building relationships between patients and between patients and healthcare providers. It is hypothesised that through the programme, patients will have an increased self-awareness into their own condition. This will allow for any knowledge gaps pertaining to their recovery to be addressed and provide an additional avenue in which their questions can be explored. This should allow patients to have an increased self-efficacy in symptom management, hence empowering their own self-care.

**Methods:**

A support group for 15 patients was recruited, with the programme running from April to November 2013. In order to evaluate the outcome of the programme, self-reported questionnaires were administered preprogramme and postprogramme. Additionally, admissions and default rates were also examined as well.

**Results:**

At the end of the programme, participants self-reported increased levels of self-efficacy regarding illness management. At end 2013, there were also reduced admission rates and length of stay among the patients postprogramme. Furthermore, by the end of 2013, none of the participants had missed appointments at the outpatient clinic.

**Discussion & Conclusion:**

There is some preliminary evidence to support that the E3 framework is good at helping patients better manage their own sickness. It serves as a means for rapport to be built between patient and healthcare providers. This rapport may be helpful in encouraging patients to access care more regularly, and allows for targeted interventions based on the needs of the patient.

PP-AH-37

### Evaluation of p2PSA on Beckman Coulter Unicel DxI 800 Immunoassay Analyser

**AB YAP<sup>1</sup>, HM YEO<sup>1</sup>, RC HAWKINS<sup>1</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

#### **Background & Hypothesis:**

Several isoforms of free PSA have been identified as precursor forms of PSA (proPSA). One form, [-2] proPSA or p2PSA, has been determined to be the most specific for prostate cancer. The novel p2PSA test measures [-2] proPSA concentrations on the Beckman Coulter Unicel DxI 800 immunoassay analyser in conjunction with free PSA (fPSA) and total PSA (tPSA). All 3 results are used to calculate the Prostate Health Index ( $\phi = \text{p2PSA} \times (\text{tPSA}^{0.5}) / \text{fPSA}$ ). In prostate cancer, p2PSA and tPSA are elevated while fPSA is decreased, leading to an increased  $\phi$  value. This study evaluates the analytical performance of p2PSA measurement.

#### **Methods:**

A 2-site immunoenzymatic method was used to measure p2PSA. Three levels of manufacturer's supplied QC materials were analysed for 20 days to assess imprecision. Serum from a female patient was run in 20 replicates to determine analytical sensitivity. Linearity was assessed using the highest level of calibrator material diluted in zero calibrator.

#### **Results:**

Day-to-day CV was 4.9% (p2PSA 19.8 ng/L), 2.6% (175.3 ng/L) and 4.2% (953.4 ng/L). Analytical sensitivity was 0.1 ng/L (claim: 0.5). The assay was linear to at least 4556 ng/L (claim: 4865).

#### **Discussion & Conclusion:**

The p2PSA measurement on the Beckman Coulter DxI 800 analyser is precise, sensitive and has a wide measuring range. The performance of p2PSA showed that it is a reliable assay for use in the calculation of the Beckman Coulter  $\phi$ , which is intended to reduce unnecessary biopsies and provides individualised risk assessment for prostate cancer.

**PP-AH-38**

**Evaluation of Total BHCG (5<sup>th</sup> IS) on Beckman Coulter Unicel DxI 800 Immunoassay Analyser**

**AB YAP<sup>1</sup>, HM YEO<sup>1</sup>, RC HAWKINS<sup>1</sup>**

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**Background & Hypothesis:**

Total BHCG measurement can be used to diagnose pregnancy and as a marker for testicular carcinoma. We describe the laboratory evaluation of the new Beckman Coulter total BHCG assay which is standardised to WHO 5<sup>th</sup> International Standard (5<sup>th</sup> IS).

**Methods:**

Total BHCG (5<sup>th</sup> IS) was measured using a 2-step immunoenzymatic method on the Beckman Coulter DxI-800 immunoassay analyser. Imprecision was assessed at 3 levels for 20 days. Analytical sensitivity was determined using the Limit of Blank module of EP Evaluator. Linearity was assessed using dilutions of calibrator material in zero calibrator. Sera from 20 males were measured to validate the manufacturer's reference interval (RI). Results from 24 patients were compared between the current (3<sup>rd</sup> IS) and the new (5<sup>th</sup> IS) total BHCG assay.

**Results:**

Between-day imprecision ranged from 2.6% to 4.1%. Analytical sensitivity was 0.05 IU/L (claim: 0.5). The assay was linear to at least 1324 IU/L (claim: 1350). All 20 results fell within the manufacturer's RI of 0 to 5 IU/L. There was good agreement between methods up to 21 IU/L (Deming regression: BHCG (5<sup>th</sup> IS) = 0.99\* BHCG (3<sup>rd</sup> IS) – 0.20). A single high sample of 14436 IU/L (3<sup>rd</sup> IS) gave a result of 18,391 IU/L with 5<sup>th</sup> IS (27% higher).

**Discussion & Conclusion:**

The Beckman Coulter total BHCG (5<sup>th</sup> IS) shows good precision, sensitivity and linearity with a wide measuring range. The limited high sample comparison data is consistent with Beckman Coulter's claim of a 20% to 30% increase in assay results compared to the 3<sup>rd</sup> IS.

**PP-BSTR-01**

**Pharmacogenetics-guided Personalised Medicine: Neonatal Diabetes Mellitus Secondary to *KCNJ11* Mutation As a Model**

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**Background & Hypothesis:**

Diabetes, an aetiologically-complex disorder, is highly heterogeneous making individualised treatment a challenge. Pharmacogenetics may help to inform personalised therapy. We report a 27-year-old Chinese man referred for neonatal diabetes. There was no family history of diabetes or consanguinity. Despite insulin replacement, continuous glucose monitoring system (CGMS) revealed wide glycaemic excursion with frequent hypo and hyperglycaemia. Given the neonatal-onset and negative glutamate decarboxylase (GAD) auto-antibodies, we hypothesised the presence of *KCNJ11* mutation (that code for potassium channel subunits in pancreatic beta cells responsible for insulin secretion) known to cause neonatal diabetes. Accurate diagnosis is important because oral sulphonylureas that bind and act on the channel, in place of insulin injections, is the treatment of choice because it directly targets the underlying disease biology.

**Methods:**

DNA was extracted from peripheral blood cells and subjected to Sanger bi-directional sequencing. A R201C hotspot mutation in the *KCNJ11* gene was confirmed and the patient was initiated on a treatment conversion from insulin to the sulphonylurea, glibenclamide according to recommended guidelines.

**Results:**

Over a 2-month period, the patient was successfully converted from insulin to glibenclamide (~1 mg/kg) with improved glycaemic control (HbA1c reduced from 8.1% to 6.6%). Notably, there was no hypoglycaemia and premeal blood glucose was consistently between 4.5 to 6 mM.

**Discussion & Conclusion:**

The successful treatment conversion based on genotype exemplifies how pharmacogenetics can help stratify individuals as well as guide diagnosis and treatment which translates to improved clinical outcome and quality of life.

**PP-BSTR-02**

**Primary Localised Cutaneous Amyloidosis: Absence of Human Leukocyte Antigen Association**

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**Background & Hypothesis:**

Primary localised cutaneous amyloidosis (PLCA) is a chronic pruritic dermatological disease significantly more prevalent among the southern Chinese. Its pathogenesis is poorly understood. Genetic mutations were found in some families with familial PLCA and recent data suggest a deficiency in the innate immune system in clearing apoptotic keratinocytes. We aim to determine if the occurrence of PLCA is associated with human leukocyte antigen (HLA) alleles.

**Methods:**

DNA was extracted from whole blood of 20 unrelated patients with PLCA diagnosed clinically and histologically using QIAGEN Blood and Tissue kit. Amplification of *HLA-A* and *-B* genes were carried out with locus-specific primers and PCR products were purified with QIAquick Gel Extraction kit, labelled with BigDye Terminator v3.1 (Applied Biosystems) and analysed by sequencing. HLA genotypes were determined using SBT engine software (GenDx); thereafter allele and haplotype frequencies were estimated with Pypop (version 0.7). HLA genotypes of southern Chinese controls were obtained from 192 Singaporean Chinese and data was analysed by Fisher's exact test in GraphPad Prism software (version 6).

**Results:**

There was no significant difference between the allelic frequencies of PLCA patients and controls: *HLA-A\*11:01* (n = 20; 30% vs. n = 192; 30% in controls, *P* = 1.00), *HLA-A\*02:03* (15% vs. 8%, *P* = 0.14), *HLA-A\*33:03* (15% vs. 10%, *P* = 0.42), *HLA-B\*40:01* (23% vs. 16%, *P* = 0.16), *HLA-B\*58:01* (15% vs. 9%, *P* = 0.09), *HLA-B\*38:02* (10% vs. 5%, *P* = 0.28). Common haplotypes studied had no significant association: *HLA-A\*33:03-B\*58:01* (15% vs. 8%, *P* = 0.12), *HLA-A\*02:03-B\*38:02* (10% vs. 4%, *P* = 0.09) and *HLA-A\*11:01-B\*40:01* (10% vs. 5%, *P* = 0.28).

**Discussion & Conclusion:**

Analyses of single-*HLA*-loci and haplotypes did not reveal significant differences between Singapore Chinese PLCA patients and controls.

PP-BSTR-03

**Identification of Direct Target Genes of the Interferon Regulatory Factor 6 Transcription Factor**

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**Background & Hypothesis:**

The interferon regulatory factor (IRF) proteins are transcription factors that are involved in the regulation of host defense and oncogenesis, except for one member, *IRF6*. Heterozygous *IRF6* mutations are responsible for 2 inherited oral clefting syndromes. *IRF6* knockout mice display skeletal and skin defects with fetal lethality. Dominant-negative perturbation of *IRF6* leads to gastrulation-stage developmental arrest and embryo rupture in zebrafish and xenopus. These animal studies suggest that *IRF6* is critically required for both early and late embryonic development.

**Methods:**

Whole transcriptome profiling of zebrafish embryos subjected to morpholino-mediated dominant-negative *IRF6* perturbation was performed to identify target genes regulating early development. Binding of *IRF6* to candidate target gene promoter sequences was investigated using an electrophoretic mobility shift assay. Transcriptional activation of candidate target genes by *IRF6* was investigated using a luciferase assay.

**Results:**

*Cyr61* and *MAPKAPK3* were highly down-regulated in 40% epiboly *IRF6* knockdown morphant embryos. A canonical *IRF6* binding site was observed within their promoters, was demonstrated to bind physically to *IRF6*, and was shown to activate gene expression upon *IRF6* binding. Morpholino-mediated knockdown of *cyr61* caused gross developmental defects and cephalic tissue disorganisation, while *MAPKAPK3* knockdown resulted in a kinked notochord and aberrant skin epithelium reminiscent of the skin defect in *IRF6*-null mice.

**Discussion & Conclusion:**

*Cyr61* and *MAPKAPK3* are direct target genes of *IRF6*. The observed early and late developmental defects resulting from loss of *IRF6* function appear to be mediated in part through *cyr61* and *MAPKAPK3*, among other downstream target genes.

**PP-BSTR-04**

**Activity of Temocillin Against Multiresistant Enterobacteriaceae Isolated at Tan Tock Seng Hospital**

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**Background & Hypothesis:**

The rise in multiresistant enterobacteriaceae globally and the lack of new antimicrobials to treat these has been termed a global public health emergency. Temocillin is active against Gram-negative aerobes only (except *Pseudomonas spp.*, and *Acinetobacter spp.*). It does not select de-repressed mutants, is active against organisms producing extended-spectrum and ampC beta-lactamases, so it can be considered as a carbapenem-sparing agent.

**Methods:**

Enterobacteriaceae isolated from blood cultures resistant to ceftazidime and/or ceftipime by VITEK or by disc testing, or reported as ESBL producers phenotypically were tested by e-test.

**Results:**

A total of 66 isolates were tested (*Escherichia coli* 19, *Klebsiella pneumoniae* 19, *Enterobacter cloacae* 12, *Enterobacter aerogenes* 5, *Proteus vulgaris* 2, *Proteus mirabilis* 6, *Citrobacter freundii* 3).

**Discussion & Conclusion:**

The prevalence of primary resistance at 46.9% is surprising considering that temocillin has never been used in Singapore. There is no comparable data for temocillin from Singapore and this is a small sample size of isolates specifically selected for their resistance phenotype. Temocillin provides a potential therapeutic option as a carbapenem-sparing agent in the remaining 53.1% of isolates. It may have a role ahead of extended-spectrum cephalosporins and penicillin-inhibitor combinations in antimicrobial guidelines. Temocillin use is dependent upon susceptibility testing as its spectrum is too narrow for empirical use. This is currently difficult by disc testing as only BSAC has zone sizes for interpretation. However, our laboratory follows CLSI methodology and many others use CLSI or EUCAST and the differences in methodology make routine testing difficult, requiring use of MIC methods (e-test or automated systems).

**PP-BSTR-05**

**Susceptibility Testing of Enterobacteriaceae to Temocillin Using Proposed EUCAST Disk Diffusion Method at Tan Tock Seng Hospital**

**K PRABHA<sup>1</sup>, W LEE<sup>1</sup>, PP DE<sup>1</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

The rise in multidrug resistant organisms and the lack of new antimicrobials to treat these has prompted a return to “old” antibiotics. Temocillin was developed in the early 1980s and is a narrow-spectrum penicillin active against enterobacteriaceae producing extended-spectrum beta-lactamase and ampC enzymes. This study looked at the activity of temocillin against enterobacteriaceae using the proposed EUCAST zone sizes as this method is identical to CLSI.

**Methods:**

Temocillin disks (30 mg/L) were used in routine susceptibility testing by the CLSI method against enterobacteriaceae. Zone sizes were recorded for isolates from blood and urine. The number of blood culture isolates within 2 mm of the systemic cut-off for resistance was recorded.

**Results:**

A total of 86.6% blood and 98.3% urine isolates were sensitive to temocillin; 7.4% blood isolates had zone diameters within 2 mm of the resistant cut-off.

**Discussion & Conclusion:**

Temocillin has limited availability and limited susceptibility guidance. BSAC uses semi-confluent growth; EUCAST/CLSI uses confluent growth. The problem of interpreting BSAC zone sizes by EUCAST is when the zone diameter is close to the cut-off for resistance. According to BSAC isolates with zone sizes close to the cut-off should be retested with an MIC method. Twenty-four blood isolates were close to the cut-off for resistance and would require retesting by an MIC method. The proposed EUCAST zone sizes are the same as BSAC and adoption by EUCAST/CLSI extends the use of the method to more laboratories.

**PP-BSTR-06**

**Development of Molecular Targeted Therapeutic Strategy for Atopic Dermatitis**

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**Background & Hypothesis:**

Atopic dermatitis (AD) is a chronic relapsing inflammatory skin disorder with escalating incidence worldwide that affects 10-20% of children and 2-10% of adults. Chronic immune dysregulation is a hallmark of AD and is characterised by the predominance of Th2 inflammatory responses and activation. We hypothesise that an integrated, simultaneous approach to suppress key proinflammatory cytokines in AD will help normalise the Th2 milieu and thereby halt the immune polarisation seen in AD. This exploratory project in experimental therapeutics aims to design and validate novel antisense oligonucleotides (AONs) for their efficacy and efficiency in the inhibition of critical cytokines involved in the immunopathogenesis of AD namely, thymic stromal lymphopoietin (TSLP) and interleukin (IL)-13. These cytokines are involved in the initiation, polarisation and perpetuation of the Th2 inflammatory response in AD.

**Methods:**

Target sites were predicted by our proprietary computational high-throughput AON design platform. AONs complementary to the predicted sites were synthesised. Efficacy and efficiency of these AONs in suppressing their target gene expression were then validated in a cell culture model.

**Results:**

We have designed and tested 7 AONs targeting TSLP and 10 AONs targeting (IL)-13R. For each target, at least 3 AONs showed to be efficacious to downregulate their expression.

**Discussion & Conclusion:**

The exploratory study showed that AON through nonsense-mediated mRNA decay and/or RNaseH-mediated mRNA degradation can be used to modulate TSLP and (IL)-13R expression. The results have the potential to lead to a novel immune-modulatory therapeutic strategy for AD patients.

PP-BSTR-07

**Harlequin Ichthyosis in Two Siblings of a Malay Family**

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**Background & Hypothesis:**

Harlequin ichthyosis (HI) is a rare and extremely severe form of congenital ichthyosis. Most of affected neonates were used to die within a few weeks after birth, but the prognosis has been improved with better management. The skin of affected individuals shows hyperkeratosis and abnormal barrier function due to deficiency of the epidermal lipid transporter caused by mutations in the *ABCA12* gene. The pattern of inheritance is autosomal recessive. Prenatal diagnosis is possible. We report sibling patients with harlequin ichthyosis, born from non-consanguineous young Malay couple.

**Methods:**

To confirm the clinical diagnosis, genetic analysis was conducted on the DNA from the patients and both parents. PCR amplification followed by direct sequencing for all 53 exons of *ABCA12* gene, MLPA and qPCR were performed.

**Results:**

Heterozygous splice site mutation in intron 23 and heterozygous small insertion in exon 52 of the *ABCA12* gene were found in the patients. Both mutations seem to be on same allele passed down from the father. There was no mutation found in the mother. MLPA and real-time qPCR results did not detect any large deletion in all DNA samples from this family.

**Discussion & Conclusion:**

This is probably the first report on the *ABCA12* mutations and their association with HI in Malay family. With hospital care, both babies survived the first few weeks of critical condition. With improved skin conditions, they were discharged from hospital at the ages 3 and 2.5 months, respectively. Although most HI cases can be diagnosed clinically, accurate molecular diagnosis is very important to provide the family members with counselling and, if needed, prenatal diagnosis.

**PP-BSTR-08**

**Core-shell Structured Upconversion Nanoparticles for Near Infrared Mediated Photodynamic Therapy of Solid Tumours**

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**Background & Hypothesis:**

Photodynamic therapy (PDT) involves a photosensitiser that when activated by light of a specific wavelength leads to cancer cell kill. However, currently available photosensitisers absorb visible light that has limited penetration in tissues, which limits its clinical utility. Here, we developed a deep tissue penetrating near infrared (NIR) light excitable upconversion nanoparticle (UCN), uniformly coated with a thin layer of photosensitiser-titanium dioxide (TiO<sub>2</sub>-UCN). The UCNs act both as a “delivery agent” of TiO<sub>2</sub>, as well as NIR to ultraviolet (UV) light “upconverting nano-transducer” for indirect activation of TiO<sub>2</sub> by NIR light, to achieve deep penetration.

**Methods:**

TiO<sub>2</sub>-UCNs, synthesised by a solvent-thermal method, were further surface modified by poly-ethyleneglycol (PEG). Physical characteristics and dispersion stability of the synthesised nanoconstructs were thoroughly studied. In-vitro uptake, biocompatibility and PDT efficacy of the nanoconstructs following 980 nm NIR irradiation at 675 J/cm<sup>2</sup> was evaluated. Lastly, the in-vivo PDT efficacy in terms of tumour growth response and overall survival in oral squamous cell carcinoma xenograft mouse models were studied following NIR irradiation at 1000 J/cm<sup>2</sup>.

**Results:**

Grafting of PEG, improved the dispersion stability and stealth properties of TiO<sub>2</sub>-UCNs. PEG-TiO<sub>2</sub>-UCNs demonstrated excellent biocompatibility. In-vitro PDT using PEG-TiO<sub>2</sub>-UCNs induced 78% cell death compared to TiO<sub>2</sub>-UCNs (56%), mainly via necrotic pathway. PDT following intratumoural administration of PEG-TiO<sub>2</sub>-UCNs demonstrated significant delay in tumour growth and improved the overall survival compared to control groups.

**Discussion & Conclusion:**

Taken together, our results indicate potential of NIR excitable TiO<sub>2</sub>-UCNs in overcoming the current penetration depth limit of PDT, for the treatment of solid tumours.

**PP-BSTR-09**

**Analysis of Domain Interaction Between Autoimmune Regulator (AIRE) and Hexamethylene Bis-acetamide Inducible 1 (HEXIM1)**

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**Background and Hypothesis:**

Tropoblasts play important roles in induction of tolerance in maternal immune cells towards embryonic antigens. It has been suggested that tropoblasts induce regulatory T cells in decidua to maintain active immune tolerance during pregnancy. Our recent research has shown that HEXIM1, an inhibitor of positive transcription and elongation factor b (P-TEFb), interacts with AIRE in tropoblasts. AIRE activates P-TEFb and is essential for expression of periphery tissue specific antigens required for generation of central tolerance for T cells in thymus. Therefore it is possible that HEXIM1 and AIRE establish a transcriptional counter balance of fetal specific antigens through P-TEFb in tropoblasts. We decided to investigate the interaction between these 2 proteins through coimmunoprecipitation.

**Methods:**

Both HEXIM1 and AIRE contain multidomains. We generated series of domain deletion mutants of HEXIM1 and AIRE and cotransfected them in different combination into HEK293T cells. Flag-tagged HEXIM1 was then immunoprecipitated from cell lysate. By Western blot analysis of myc-tagged AIRE in the coimmunoprecipitated protein, we identified novel domains required for interaction.

**Results:**

We found that in addition to the nuclear localisation signal, subdomains of N- and C- termini of HEXIM1 were required for interaction with AIRE.

**Discussion & Conclusion:**

This study will facilitate further studies on clinical significance of interaction between these 2 proteins.

**PP-BSTR-10**

**Determinants of Physical Inactivity Among Adults in Peninsular Malaysia**

**KL TAN**<sup>1</sup>

<sup>1</sup>*International Medical University, Malaysia*

**Background & Hypothesis:**

The objectives of the study were to estimate the prevalence and identify factors associated with physical inactivity among adults aged between 18 and 64 years old in Negeri Sembilan district, Peninsular Malaysia.

**Methods:**

This was a community based cross-sectional study conducted in Negeri Sembilan district, Peninsular Malaysia in February 2012. A total of 291 respondents aged between 18 and 64 years were recruited for the study. Simple random sampling was used to select households in the area. Data was collected by face-to-face interview using a structured questionnaire. Data regarding age, gender, ethnicity, educational level, marital status, occupation, monthly household income, working hours and current behavioural stage of physical activity were collected. Physical activity was measured using the International Physical Activity Questionnaire (IPAQ) short version. Respondents with a metabolic equivalent of task (MET) score of less than 150 min/week were categorised as physically inactive.

**Results:**

The mean age of the respondent was  $40.5 \pm 15.6$  years with a mean monthly household income of  $2092.1 \pm 1522.9$  RM (Ringgit Malaysia). Majority of the respondents were female (57.3%), married (63.8%) and working (42.3%). The prevalence of physical inactivity was 36.1% (95% CI: 30.8 , 41.8). In multivariate analysis, working hours and current behavioural stage of physical activity were associated with physical inactivity.

**Discussion & Conclusion:**

Physical inactivity is high among the adult community in Negeri Sembilan district, Peninsular Malaysia and strongly associated with long working hours and low current behavioural stage of physical activity.

**PP-BSTR-11**

**Relationship Between Levels of Soluble ST2 in Patients Presenting to Emergency Department With Chest Pains and Their Admission/readmission Rates**

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**Background & Hypothesis:**

Soluble ST2 (sST2), is increased when the myocytes undergo mechanical stress in heart failure. Therefore we looked at sST2 levels in our patients with cardiorespiratory complaints at the emergency department (ED) and its association with admission from ED and mortality rates.

**Methods:**

We measured plasma sST2 levels retrospectively in patients who presented to National University Hospital ED with shortness of breath and/or chest pain, and in those without (controls). Critical Diagnostic ST2 Assay was used. Demographic data, past medical history, hospitalisation from ED, mortality during hospitalisation and any revisits at ED within 1 month were collated.

**Results:**

Fifty subjects were included, with 41 patients and 9 controls, 55% Chinese, 8% Indians, 27% Malays and 8% of other ethnic groups. Male: female ratio was the same in both groups, with mean age of 59 and 68 years old for controls and patients respectively. There were more patients with history of ischaemic heart disease and cerebrovascular accidents compared to controls. Mean plasma sST2 levels were higher in the patients ( $57.4 \pm 58.2$  ng/ml) compared to controls ( $26.7 \pm 13.8$ ); 95% of patients (versus 33% of controls) were admitted from ED, with 10% (against 0%) having repeated ED attendances within 1 month. More patients died during the hospitalisation leading from the first ED presentation (12.5% vs. 0%).

**Discussion & Conclusion:**

Higher plasma sST2 levels in patients with cardiorespiratory symptoms presenting to ED was associated with admission from ED, repeated ED attendances within 1 month and higher mortality during hospitalisation, which may be related to their higher cardiac risk factors.

**PP-BSTR-12**

**Subversion of the Host-pathogen Interaction Between Human Colorectal Cells and *Enterovirus 71* Using miRNA Profiling**

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**Background & Hypothesis:**

*EV71* is one of the main aetiological agents for HFMD that commonly affects infants and children. However, unlike other HFMD causing enteroviruses causing HFMD, *EV71* has been commonly associated with severe clinical manifestation leading to deaths. Many viruses have evolved to counteract with strategies by host cells to establish infection. One of the mediators for such regulation includes genes that encode for miRNAs. In this study, we aim to identify miRNAs which may potentially play a role during *EV71* pathogenesis.

**Methods:**

To identify the differentially transcribed miRNAs used by *EV71* during infection, we perform miRNAs profiling using Affymetrix GeneChip miRNA array. Specifically, comparative miRNAs expression between *EV71* infected cells and control non-infected cells were performed.

**Results:**

Microarray hybridisation identified 78 miRNAs being differentially expressed during *EV71* infection ( $P < 0.05$ ). To confirm the microarray results, relative abundance of the selected miRNAs were assayed using qPCR. The expression pattern from 10 selected miRNAs qPCR data showed similar direction of response in microarray analysis data with both methodologies showing similar trends.

**Discussion & Conclusion:**

Recent publications of investigations into the role of miRNA in enterovirus infection have reported that enterovirus-induced miRNAs such as miR-23b, miR-296-5p, miR-141 and miR-146a play a role in *EV71* replication. The use of miRNA inhibitors or mimics have demonstrated that miRNAs plays an important role in *EV71* pathogenesis. miRNA inhibitors or mimics on these miRNAs either inhibited or enhanced *EV71* replication during infection. As such, miRNAs we identified may potentially play a role during *EV71* pathogenesis.

PP-BSTR-13

**Circulating Vascular Cell Adhesion Molecule 1, but Not Intercellular Adhesion Molecule 1, is Associated With Renal Impairment in Patients With Type 2 Diabetes Mellitus**

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**Background & Hypothesis:**

Inflammation plays a critical role in the progression of nephropathy in patients with type 2 diabetes mellitus (T2DM). Vascular cell adhesion molecule 1 (VCAM-1) and intercellular adhesion molecule 1 (ICAM-1) are expressed on endothelial cells in response to inflammation. Although they are well known as biomarkers for endothelial dysfunction, their roles in renal impairment among Asians with T2DM are not adequately studied.

**Methods:**

In this cross-sectional study, 1915 T2DM patients were recruited (50.7% male; mean age, 57 ± 11 years). Plasma VCAM-1 and ICAM-1 were quantified by multiplex immunoassay (Affymetrix).

**Results:**

Estimated glomerular filtration rate (eGFR) decreased while urine albumin-to-creatinine ratio (UACR) increased progressively with the increase (lowest to highest quartile) of VCAM-1: eGFR 95.8 ± 30.2 to 73.0 ± 35.8 mL/min/1.73 m<sup>2</sup> and UACR 18 (5-66) to 38.5 (10-289.5) µg/mg, both *P* < 0.001). In contrast, no significant differences were observed in eGFR and UACR in patients across different ICAM-1 quartiles (lowest to highest quartile of ICAM-1: eGFR 86.3 ± 32.2 to 84.6 ± 35.3 mL/min/1.73m<sup>2</sup>, *P* = 0.185 and UACR 22 (5-89) to 29 (8-137) µg/mg, *P* = 0.152). Bivariate correlation analysis revealed that plasma VCAM-1 (but not ICAM-1) was significantly correlated with eGFR (*r* = -0.242, *P* < 0.001) and UACR (*r* = 0.156, *P* < 0.001). Multivariable regression model indicated that VCAM-1 was independently associated with eGFR (*B* = -0.155, *P* < 0.001) after adjustment for multiple other covariates including age, diabetes duration, HbA1c, blood pressure, etc.

**Discussion & Conclusion:**

Circulating VCAM-1 (but not ICAM-1) is independently associated with renal impairment in patients with T2DM, suggesting selective activation of the “inflammasome-space” thereby revealing specific targets for intervention. Clinical implication of our findings deserves further investigation.

**PP-CR-01**

**Assessing Reticulocyte Haemoglobin Equivalent As a Stable Haematological Parameter**

**A FAHMI<sup>1</sup>, AH HANNAN<sup>2</sup>**

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**Background & Hypothesis:**

By definition, reticulocyte haemoglobin equivalent (Ret-He) is the measurement the haemoglobin (Hb) content of reticulocytes. It may be used as parameter for iron status of a patient for the diagnosis of iron deficient related conditions. In this study, our aim was to assess the stability of Ret-He as a hematological parameter. Other parameters such as Hb, mean corpuscular volume (MCV), red blood cells (RBC), haematocrit (HCT) and other standard hematological parameters were also studied and their stabilities were then compared.

**Methods:**

In this research, 32 samples were studied within a span of 48 hours. Stored in an EDTA tube, the Sysmex XE-5000 was utilised to analyse the samples' Ret-He, amongst other parameters, upon arrival, 6 hours after, 24 hours after and 48 hours after. In between testing, the samples were stored at 4°C.

**Results:**

Ret-He was stable throughout the span of the experiment. Through descriptive statistics, the various timings did not vary significantly, having mean values of 25.6, 25.1, 25.7 and 25.7 respectively. Utilising T-statistics, only the difference between 0h and 6h was significant, with  $P < 0.05$  (0.008). Variance between various timings in Ret-He was comparable to that of the other parameters, with coefficient of variation (CV) of 0.023, showing the second highest CV, although within its range of 0.06 to 0.026.

**Discussion & Conclusion:**

It is apparent that through this study, Ret-He is a stable hematological parameter and can be used as a reliable parameter in clinical laboratory.

**PP-CR-02**

**The Steroidal Na<sup>+</sup>/K<sup>+</sup> ATPase Inhibitor 3-[(R)-3-pyrrolidinyl]oxime Derivative (3-R-POD) Induces Potent Proapoptotic Responses in Colon Tumour Cells**

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**Background & Hypothesis:**

Recently we have reported potent anticancer actions of the steroidal Na<sup>+</sup>/K<sup>+</sup> ATPase inhibitor 3-[(R)-3-pyrrolidinyl] oxime derivative (3-R-POD) in multiple cell lines including prostate and lung cancer cells. In the present study, the anticancer actions of 3-R-POD have been addressed in colon tumour cells.

**Methods:**

Cell growth measured by the MTT assay. In addition, apopercentage apoptosis assay revealed significant proapoptotic responses of this compound in Caco-2 cells. Immunoprecipitation and Westen blotting were applied to measure actin reorganisation and late Akt de-phosphorylation.

**Results:**

Apopercentage apoptosis assay revealed significant proapoptotic responses of this compound in Caco-2 cells, indicating that the anticancer activity of this steroidal cardiac inhibitor in colon tumours is mainly attributed to the induction of strong proapoptotic effects. Focussing on the molecular mechanism that may regulate these interactions, 3-R-POD was shown to induce significant early actin reorganisation and late Akt de-phosphorylation. Finally, the 3-R-POD-induced inhibition of cell growth and early actin reorganisation in colon cancer cells remained unchanged when cells were pretreated with pertussis toxin, excluding thus possible interactions of the steroid cardiac inhibitor with G-coupled receptors.

**Discussion & Conclusion:**

The results presented here demonstrate for the first time potent antitumour responses of 3-R-POD-inhibitor in colon tumour cells. These effects are governed by rapid and significant actin reorganisation and inhibition of the signaling kinase Akt, implicated in cell survival control. Taken together, the present results and the recently presented in vitro and in vivo studies with 3-R-POD signify that this steroidal Na<sup>+</sup>/K<sup>+</sup> ATPase inhibitor may represent a pharmacological candidate for colon tumour drug development.

PP-CR-03

### Upper Limb Edema Postcerebellar Stroke: A Case Report

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#### **Background & Hypothesis:**

Cerebellar infarction represents approximately 2% to 3% of acute strokes. Upper limb oedema often appears early after stroke but there is no evidence for a specific treatment for poststroke-induced upper limb oedema though several methods have been used in clinical practice such as arm elevation, encouraging active and passive movements, electric stimulation, pneumatic compressions. If not recognised, upper limb edema can slow down the rehabilitation process of the patient by causing discomfort, rigidity, decreased active movements and disuse.

#### **Methods:**

We report a case of a 73-year-old man admitted to our institution with 2 weeks history of dizziness and functional decline. Examination was normal with no focal neurological deficits. Brain imaging showed acute left cerebellar infarct. Patient was noted to have left upper limb swelling (non-erythematous, non-tender, non-pitting) on second day of admission. Ultrasound doppler done of left upper limb was normal with no signs of deep vein thrombosis. Patient underwent regular physiotherapy inpatient along with elevation of arm and encouraging active + passive movements of his arm.

#### **Results:**

His left arm swelling gradually improved and was fully resolved after 2 weeks of admission.

#### **Discussion & Conclusion:**

Upper limb edema is commonly seen with hemiplegic strokes but is less recognised in cerebellar stroke. Although the patient does not demonstrate classical limb weakness in cerebellar stroke, physiotherapy is essential to prevent edema which may hinder the general patient recovery after the stroke. From our review of available information, we found that postcerebellar stroke edema has received insufficient attention and more research studies need to be done on this subject.

**PP-CR-04**

**An Uncommon Cause of Raised Serum Carcinoembryonic Antigen: A Non-gastrointestinal Malignancy**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Raised serum carcinoembryonic antigen (CEA) is usually associated with gastrointestinal (GI) malignancies but can be raised in non-GI malignancies. Associations with gynaecological malignancies have infrequently been reported.

**Methods:**

We report a case of a middle aged, non-smoking lady with stage 3 primary biliary cirrhosis/autoimmune hepatitis overlap syndrome who was initially evaluated for a hypoechoic liver lesion and found to have rising CEA levels.

**Results:**

Oesophagoastroduodenoscopy and colonoscopy were unremarkable. Initial magnetic resonance imaging (MRI) abdomen showed no liver or pelvic malignancy, only mild lymphadenopathy thought to be related to primary biliary cirrhosis. Serum CEA levels rose gradually over 2 years from 9 to 35 mg/l. During this period, repeat endoscopy and scans of the thorax and abdomen were done with no cause found. Mammogram was unremarkable. Finally, pelvic ultrasound revealed a cervical vascular lesion which MRI pelvis detailed a lobulated enhancing cervical mass with adjacent parametrial stranding. Histology confirmed stage 2/3 cervical adenocarcinoma with positive stains for CEA. After completing cisplatin chemotherapy for 6 weeks, the serum CEA normalised to 3 mg/l indicating response to treatment and confirming the cervical cancer as the cause of her raised CEA.

**Discussion & Conclusion:**

Our case highlights the importance of considering non-GI malignant causes of raised serum CEA with negative GI investigations, in which early detection of these cancers are imperative for early intervention and improved prognosis and survival. Initial scans may not show up early gynaecological malignancies but continued rise in CEA trend should prompt repeat investigations.

PP-CR-05

**The Use of Postanaesthesia Discharge Scoring System (PADSS) for Patients Who Underwent Procedural Sedation in Emergency Department**

**WH CHAN<sup>1</sup>, CK OOI<sup>1</sup>, M PHUAH<sup>1</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Postanaesthesia Discharge Scoring System (PADSS) has been used by postanesthesia care unit (PACU) to determine the readiness of patient for discharge after anaesthesia. Before the introduction of PADSS in ED, time-based discharge criteria was used. This study attempts to ascertain if PADSS reduces the turnaround time for patients after procedural sedation (PS), compared to time-based discharge criteria.

**Methods:**

This was a retrospective, before-and-after cohort study, for the period of 1 July 2012 to 30 September 2012 and 1 July 2013 to 30 September 2013 respectively. The inclusion criteria were: 1) patients requiring PS, 2) patients who were more than 21 years old, and 3) patients who were not admitted. The following variables were collected: 1) indications for PS, 2) type of PS agents used, 3) turnaround time after PS, 4) immediate complications of PS, and 5) reattendance for complications of PS. The primary outcome was turnaround time after PS. The mean turnaround time between the 2 cohorts were computed and compared using student's t-test.

**Results:**

A total of 60 patients were included in the study, with 30 patients in each cohort. PADSS cohort showed a shorter mean turnaround time (mean = 130 min, SD = 56) compared to time-based cohort (mean = 338 min, SD = 60) with a mean difference of 208 min ( $P < 0.001$ ). There was no immediate complications or reattendance for complications of PS in either cohort.

**Discussion & Conclusion:**

Preliminary results show PADSS to be a promising tool to facilitate safe and timely discharge of patients who underwent procedural sedation in ED.

PP-CR-06

### Chronic Viral Hepatitis in Asian Patients With Inflammatory Bowel Disease

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#### Background & Hypothesis:

Hepatitis B (HBV) reactivation can occur with use of immunomodulators and biologics. Interferon-based hepatitis C (HCV) therapy may exacerbate inflammatory bowel disease (IBD). The prevalence of HBV/HCV in Singapore is 4.1/0.37% respectively. We aim to evaluate the prevalence of HBV/HCV infection among Asian IBD patients in Singapore.

#### Methods:

Records of patients with ulcerative colitis (UC) or Crohn's disease (CD) treated at our centre from 2002 to 2013 were reviewed. Data was analysed using student's t-test or chi-square test.

#### Results:

Twenty-five (16%) of 152 IBD patients (96UC, 56CD), were not screened for HBV/HCV infection and excluded. Of 127 included patients (77UC, 50CD), 78 (61%) were male with median age of 48 (range 17-90); there were 78 (61%) Chinese, 32 (25%) Indians, 14 (11%) Malays and 3% of other Asian ethnicity. Past/present HBV infection was found in 13.4% (anti-HBc+:10UC, 7CD); 4.7% were chronic HBV carriers (HBsAg+:4 UC, 2CD; 5 carriers, 1 HBeAg-ve chronic HBV) and only 1 CD patient (0.79%) had type 1 HCV/HIV coinfection. These were not significantly different from the population prevalence of 4.1% ( $P = 0.6$ ) and 0.37% ( $P = 0.4$ ). Anti-HBc+ patients were older (mean age 58 vs. 46,  $P < 0.01$ ), age >40 (18% vs. 5%) and more common among Chinese (21% vs. 7% Malay, 0% Indian,  $P = 0.02$ ). Among anti-HBc-ve patients, only 43 (39%) were anti-HBs+ (vaccinated). A significantly greater proportion of female patients (73% vs. 53%,  $P = 0.03$ ) and a trend for those age >40 (67% vs. 51%,  $P = 0.1$ ) were not vaccinated.

#### Discussion & Conclusion:

The prevalence of HBV/HCV infection among Asian IBD patients in Singapore is similar to the general population. Physicians should be mindful regarding HBV screening for Chinese aged >40.

PP-CR-07

## Physician and Patient Factors Associated With Counselling and Uptake of Breast Cancer Screening by Mammography in Private Sector General Practice Clinics in Singapore

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### Background & Hypothesis:

Screening mammography rates and the barriers preventing uptake of breast cancer screening by mammography in private sector primary healthcare in Singapore are understudied. We describe potential barriers to promoting screening mammography amongst doctors, patient factors associated with and barriers to mammography attendance in the private primary care setting.

### Methods:

Using 2 separate questionnaires, we surveyed general practitioners (GP) as well as eligible women from participating clinics. Factors associated with recent mammography, defined as having had a mammogram within the last 2 years in women aged 50 to 69 years, and within the last year in women aged 40 to 49 years (as per Singapore's screening guidelines) were analysed using multivariate logistic regression.

### Results:

Seeing  $\geq 50$  patients per day was the only factor associated with less mammography counselling among the 36 GP respondents ( $P = 0.024$ ). Amongst 850 patients surveyed, 258 (30%) had never had, and 282 (33%) had not had a recent mammogram. Recent mammography was associated with older age (OR: 2.58, 95% CI, 1.78-3.73), tertiary education (OR: 1.81, 95% CI, 1.02-3.20), and higher income (OR: 1.66, 95% CI, 1.02-2.70). Healthier lifestyle choices such as not smoking ( $P = 0.040$ ) and regular exercise ( $P = 0.006$ ), and other health screening behaviours such as previous attendance of PAP smears ( $P < 0.001$ ) were also associated with mammography attendance. The top barriers in women who did not have regular mammography were: currently feeling healthy (70.5%), no family history of breast cancer (56.7%), and lacking time for mammography (56.2%).

### Discussion & Conclusion:

Our study reveals poor mammography uptake. Key barriers were poor risk perception and misconceptions about the role of screening mammography.

PP-CR-08

## **A Randomised Control Trial of the Use of Collagen Dressing For the Improvement of Skin Condition in Patients With Mild Facial Acne Vulgaris**

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### **Background & Hypothesis:**

Acne vulgaris is one of the most common cutaneous diseases. It should be treated early to prevent progression to hyperpigmentation and scarring which are hard to treat. One of the reasons leading up to acne vulgaris is due to the hypersensitivity of the skin caused the loss of the skin barrier functions. Collagen dressing has not been investigated as a monotherapy, and hence precluding us from understanding its role in treatment. This study is used to evaluate the effectiveness and safety of using collagen dressing as a monotherapy to improve the skin condition of patients with mild facial acne.

### **Methods:**

Patients were graded with the Pillsbury acne scale one were included into the study. This randomised controlled, split-face study where subjects applied a specially designed collagen dressing. Non-invasive instruments were used to obtain the stratum corneum water content, transepidermal water loss (TEWL), skin tone and sebum excretion at the start (W0), week 1(W1) and week 4 (W4) after treatment. The number of inflammatory lesions was analysed to quantify effectiveness.

### **Results:**

Independently, the intervention side had a significant increase in stratum corneum water content, decrease in TEWL. The erythema index and inflammatory papules also decreased. However, compared with the placebo side, changes was not significant. No adverse events occurred during the study.

### **Discussion & Conclusion:**

Collagen dressing when used as monotherapy is not more effective on improving the skin barrier and treating mild facial acne vulgris when compared to placebo.

PP-CR-09

### **Rethinking Depression: Is There a Role for Aetiology of Depression?**

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#### **Background & Hypothesis:**

Major depression (MDD) is a mental disorder characterised by a pervasive and persistent low mood that is accompanied by low self-esteem and by a loss of interest or pleasure in normally enjoyable activities. Since DSM III, MDD has been atheoretical and ubiquitous and this means that an avenue for optimisation of management has not been utilised. We believe that the aetiology of depression should be considered when treating depression.

#### **Methods:**

We carried out a review of studies which looked at the utility of management of MDD with the use of aetiology.

#### **Results:**

Most of the research and discussion on depression focuses mainly on pharmacotherapy or drug treatment, supported by pharmaceuticals, based on understanding of neuroreceptors and neurotransmitters involved. There is little mention on psychosocial management or a holistic approach towards the management of major depression.

#### **Discussion & Conclusion:**

The biopsychosocial model emphasises on the inter-relation, interaction and integration between the individual and the environment, the body and the mind, mental functions and neurocircuits and the past and present life experience. To optimise the management of patients with MDD, there is room for consideration of the aetiology of a patient's MDD.

**PP-CR-10**

**Effective Replacement Dosing of Vitamin D in Patients with Type 2 Diabetes Mellitus and Vitamin D Insufficiency: The DIMENSION Study**

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**Background and Hypothesis:**

Although vitamin D (vit-D) insufficiency has been increasingly reported, there is no consensus on the ideal replacement regimen for vit-D. This analysis of a subset of trial participants aims to evaluate our vit-D replacement regimen in patients with type 2 diabetes mellitus (T2DM) with vit-D insufficiency.

**Methods:**

Data of 33 patients with T2DM and serum 25(OH)D <30 ng/mL were analysed: 21 patients with 25(OH)D <20ng/mL (VLVD) and 12 with 25(OH)D = 20-29 ng/mL (LVD). VLVD was given cholecalciferol 4000 IU daily; LVD was given 2000 IU daily and reviewed at 8-weeks. If at 8-weeks serum 25(OH)D was >30 ng/mL, the dose was down-titrated by 50%. Two sample t-test and Wilcoxon signed-ranked test were used to evaluate the change of outcome over time.

**Results:**

The mean values at baseline were: 25(OH)D: 17.3 ± 5.2 ng/mL, adjusted Calcium (Ca): 2.41 ± 0.10 mmol/L and parathyroid hormone (PTH): 4.6 ± 1.9 mmol/L. At 8-weeks, the mean 25(OH)D: 31.3 ± 9.0 ng/mL (change: 14.0 ng/mL; *P* <0.0001). No patient developed hypercalcemia (Ca >2.60 mmol/L). About 48% (16/33) patients (7 in Group 1 and 9 in Group 2) had a dose reduction to half their initial dose at 8-weeks. At 16-weeks, the mean 25(OH)D: 31.6 ± 9.5 ng/mL (change: 14.3 ng/mL; *P* <0.0001), mean adjusted Ca: 2.41 ± 0.10 mmol/L and PTH: 4.5 ± 2.1 mmol/L. At 16-weeks 23 (71.9%) achieved 25(OH)D >30 ng/ml.

**Discussion & Conclusion:**

The replacement regime of 4000 IU of cholecalciferol for VLVD and 2000 IU for LVD with adjustment at 8-weeks resulted in repletion of vit-D in 72% of the patients. No significant hypercalcemia or adverse effect was seen with this regime.

PP-CR-11

**Serum 25-hydroxyvitamin D Levels in 87 Asian Patients With Cutaneous Lupus Erythematosus – A Case-control Study**

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**Background & Hypothesis:**

Serum vitamin D is known to play a role in autoimmunity. Cutaneous lupus erythematosus (CLE) is an autoimmune disease often exacerbated by sun exposure. Patients are encouraged to avoid sun exposure, therefore predisposing them to low vitamin D levels. The main aim of this cross-sectional study was to investigate the prevalence and risk factors for vitamin D deficiency in patients with CLE.

**Methods:**

Eighty-seven consecutive CLE cases and 83 healthy or non-photodermatoses-related controls were recruited. Total serum 25-hydroxy vitamin D was measured using electrochemiluminescence immunoassay. Concentrations <20 ng/ml were defined as deficient and <30 ng/ml as relative insufficiency. Sun exposure was recorded in hours/day.

**Results:**

A total of 51.4% of the CLE cases were vitamin D-deficient compared to 73.5 % of the controls ( $P = 0.004$ ). Mean serum vitamin D values were significantly higher in the CLE group compared with the control group (20.2 ng/ml vs. 17.2 ng/ml,  $P = 0.005$ ). No significant differences were found between vitamin D levels and CLE subtype, CLASI, disease duration, concomitant SLE, renal disease or systemic therapy. There was a significant positive correlation between sun exposure and vitamin D levels for both CLE cases and controls.

**Discussion & Conclusion:**

To our knowledge, this is so far the largest case-control study of vitamin D levels in CLE subjects and the first study to be conducted in an Asian population without seasonal variations in sun exposure. Interestingly, very low vitamin D levels were found in both cases and controls, stressing the importance of checking vitamin D levels in both healthy Asian subjects and CLE patients.

**PP-CR-12**

**Outcomes of Venous Thromboembolism in Very Elderly Patients**

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**Background & Hypothesis:**

Venous thromboembolism (VTE) in elderly patients poses special challenges in diagnosis and management. There are no robust studies to highlight these factors in the very elderly (>90 years) population.

**Methods:**

All patients referred to the Vascular Medicine Service at Tan Tock Seng Hospital, Singapore from January 1 2012 to December 31 2013 were identified and retrospectively analysed for the presentation, aetiology and outcomes of VTE.

**Results:**

There were 175 patients above the age of 65 years. Seventeen were over the age of 90 years. Two had upper limb thrombosis, 9 had lower limb thrombosis (LL DVT), 3 had PE and 3 had both LL DVT and PE. For PE, shortness of breath was the most common symptom while unilateral leg swelling was the one for DVT. Only 3 out of 6 patients of PE were found to have concomitant asymptomatic DVT. Decreased mobility and recent hospitalisation were amongst the most common risk factors. Of the 17 patients of VTE, 14 were put on anticoagulants, 3 were placed on inferior vena cava (IVC) filter due to high bleeding risk. Amongst the 14 patients, 2 developed major haemorrhage and had their anticoagulant treatment withdrawn and substituted with IVC filter placement. One patient died on the second day of admission while the remaining 11 went on to complete 3 months of anticoagulation.

**Discussion & Conclusion:**

In our study, decreased mobility is the most important risk factor for VTE in the very elderly age group. Elderly patients receiving anticoagulants for VTE should be closely watched for the risk of bleeding.

**PP-CR-13**

**More Cost-effective Hepatitis Testing – A New Approach**

**RCW HAWKINS**<sup>1</sup>

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Antibodies against the core of the hepatitis B virus (anti-HBc) appear shortly after the onset of infection and persist for life. Laboratories have historically rerun initial positive samples in duplicate after recentrifugation before deciding on the final result. This study examined the utility of this practise for the Roche Cobas Anti-HBc assay.

**Methods:**

Anonymised records of all repeat testing of anti-HBc analysis performed on a Roche Diagnostics e601 immunoassay analyser between March 2012 and April 2014 were examined in Microsoft Excel and Access. Repeat testing in duplicate of initial positive samples (cut-off-index COI <1.0) was performed as per the manufacturer's instructions. Any changes in result classification due to duplicate retesting were noted. Paired t-testing between initial COI1, repeat COI2 and repeat COI3 values was performed.

**Results:**

A total of 570 requests were received of which 33% were non-reactive. Of the remaining 841 which underwent duplicate retesting after recentrifugation, only 1 was reclassified as non-reactive (COI1 1.000, COI2 1.001, COI3 1.010). There was no significant difference ( $P < 0.05$ ) between COI1, COI2 and COI3.

**Discussion & Conclusion:**

Duplicate retesting of initially reactive anti-HBc samples is not a useful practice. It is costly in terms of staff resources and analytical reagents, and delays result reporting unnecessarily. A no-repeat testing strategy gives sensitivity of 100% and specificity of 99.88% with a 57% reduction in tests performed. Singleton repeat testing with additional testing for samples with discordant results gives 100% sensitivity and specificity with 29% reduction in tests performed. Either approach is preferable to the present practice of triplicate testing.

**PP-CR-14**

**An Update on Fixed Drug Eruptions in Singapore**

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**Background & Hypothesis:**

Fixed drug eruptions (FDE) are characterised by cutaneous lesions which recur in the same sites each time the drug is administered. Occasionally extensive involvement may mimic severe drug eruptions such as toxic epidermal necrolysis. The list of drugs that cause FDE changes with time and prescribing pattern. The aim of this study was to evaluate the epidemiology, clinical features and causative drugs in patients with FDE in Singapore .

**Methods:**

We performed a retrospective chart review of all patients seen with suspected FDE in the National Skin Centre, Singapore between 2008 and 2012. Patients were classified into the following categories of probability based on criteria adapted from the WHO-UMC causality assessment criteria. Definite: characteristic skin lesions with causative drug confirmed by oral drug provocation test or drug patch test. Probable: characteristic skin lesions with single causative drug identified based on history of drug exposure. Possible: characteristic skin lesions but without clearly identified causative drug or other diagnoses could not be excluded. Unlikely: skin lesions were poorly-defined or other diagnosis was made.

**Results:**

A total of 126 patients were seen for suspected FDE. Of the 62 patients with definite or probable FDE, etoricoxib was the commonest causative drug (24 patients, 38.7%) identified. Other common causes included non-steroidal anti-inflammatory drugs (NSAIDs) and doxycycline. Antihistamines caused FDE in 3 patients.

**Discussion & Conclusion:**

Etoricoxib has emerged as the commonest cause of FDE in Singapore. Other causative drugs include NSAIDs, doxycycline and antihistamines. Drugs which are commonly considered “safe”, such as etoricoxib and antihistamines, may cause FDE.

PP-CR-15

**Clinical Manifestations and Outcomes of Patients from the Singapore Sjogren's Syndrome Study**

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**Background & Hypothesis:**

To study the clinical manifestations and outcomes of Sjogren's Syndrome (SS) in a Singapore cohort from an outpatient rheumatology clinic.

**Methods:**

Computerised Physician Order entry records of patients with physician-diagnosed SS between 1993 and 2013 were retrospectively analysed.

**Results:**

There were 355 patients, comprising 94.6% females and 84.5% Chinese. Mean age at diagnosis was 49 ± 13 years, mean disease duration was 8 ± 4 years. While 135 (38.0%) fulfilled American European Consensus Group (AECG) criteria, only 24 (6.8%) fulfilled Sjogren's International Collaborative Clinical Alliance (SICCA) criteria for SS. Primary-SS comprised 76.9%, secondary-SS 23.1%; with rheumatoid arthritis (11.8%), and systemic lupus erythematosus (11.3%) most commonly associated. Other than keratoconjunctivitis sicca (91.0%) and xerostomia (84.5%), the most common clinical manifestations were musculoskeletal (75.2%), lymphoreticular (47.6%) and constitutional (41.7%). Arthralgias (63.1%), arthritis (36.9%), fatigue (33.8%), myalgias (28.5%) and weight loss (15.2%) were the most common symptoms. The nervous system was the most commonly affected end-organ (12.7%), predominantly comprising sensory neuropathy (35.6%), stroke (20.0%) and transverse myelopathy (17.8%). Renal tubular acidosis (0.8%), autoimmune hepatitis (0.6%), and primary biliary cirrhosis (0.6%) were uncommon. Leukopaenia (27.0%) and thrombocytopenia (14.6%) were the most common haematological abnormalities. Hypergammaglobulinaemia occurred in 144/239 (60.3%) tested, with paraproteins found in 5 (1.4%). Non-Hodgkins' lymphoma occurred in 4 (1.1%) patients. ANA tested positive in 298/343 (86.9%) with titre ≥1:320 in 193/298 (64.8%), RF 191/280 (68.2%), anti-Ro 241/350 (68.9%), and anti-La 90/314 (28.7%) tested. Hydroxychloroquine (83.4%), methotrexate (14.4%) and azathioprine (12.4%) were the most commonly used therapies.

**Discussion & Conclusion:**

SS is generally mild with musculoskeletal manifestations being the most common.

PP-CR-16

**Safety and Efficacy of a Hybrid Dual Antiplatelet Therapy Regimen for ST-Elevation Myocardial Infarction Patients: A Single Centre Experience**

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**Background & Hypothesis:**

Prasugrel is a component of contemporary dual antiplatelet therapy in patients with ST-elevation myocardial infarction undergoing primary percutaneous coronary intervention. The cost and higher risk of bleeding have limited its use. We evaluated the safety and efficacy of a hybrid DAPT regimen in STEMI patients.

**Methods:**

From January to August 2012, 141 STEMI patients were preloaded with 60 mg of prasugrel and 300 mg of aspirin prior to PPCI. Patients with history of stroke, aged >75 years and weight <60 kg were excluded. Patients received maintenance doses of 10 mg of prasugrel for the first 30 days, after which prasugrel was stopped and patients were loaded with 300 mg of clopidogrel followed by 75 mg as maintenance dose for 11 months. The primary efficacy endpoint was a composite of death from cardiovascular causes, non-fatal MI, or non-fatal stroke at 1-year follow-up. The key safety endpoint was thrombolysis in myocardial infarction (TIMI) major bleeding at 1-year follow-up.

**Results:**

The primary endpoint occurred in 6 patients (4.3%) with 4 events (2.8%) occurring within the first 30 days of MI. Cardiovascular deaths occurred in 3 patients (2.1%). Non-fatal MI occurred in 2 patients (1.4%) with 1 patient (0.7%) developing a non-fatal stroke. TIMI major bleeding episode occurred in 3 patients (2.1%).

**Discussion & Conclusion:**

Our preliminary experience showed that a hybrid DAPT regimen in a selected group of STEMI patients is efficacious and safe. The long-term clinical outcomes were good with a low incidence of ischaemic and bleeding events.

PP-CR-17

## Outpatient Prescribing Trends of Antidepressants in a General Hospital, Singapore, 2005 to 2013

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

### **Background & Hypothesis:**

There is paucity of local data on prescribing trends of antidepressants. It would be meaningful to observe local trends. Aims: To describe: 1) outpatient prescribing trends of antidepressants in a general hospital in Singapore, and 2) gender and age differences in prescription patterns.

### **Methods:**

Electronic records of prescribed drugs are maintained from 2005 to date at Tan Tock Seng Hospital (TTSH). A predefined list of psychotropic drugs of interest was obtained. All outpatient prescriptions containing at least 1 of the predefined drugs for at least 1 day were extracted for alternate years between 2005 and 2013. Prescription trends, age, and gender, were examined over time.

### **Results:**

A total of 45,631 (100%) antidepressant prescriptions were examined, comprising of 6611 (14.5%) prescriptions in 2005, 11,973 (26.2%) in 2007, 9756 (21.4%) in 2009, 10,073 (22.1%) in 2011 and 7218 (15.8%) in 2013. Females comprised of 60.8% (n = 27,750) of the sample, and 34.1% (n = 15,540) of all prescriptions were dispensed to those  $\geq 65$  years. The most commonly prescribed antidepressant subtypes were tricyclic antidepressants (TCA) (n = 21,847, 47.9%), followed by selective serotonin reuptake inhibitors (SSRI) (n = 19,432, 42.6%) and Others (n = 4352, 9.5%). There was a general increase in prescription of TCAs from 39.2% (n = 2590) in 2005 to 52.2% (n = 3771) in 2013, while number of SSRI prescriptions dropped from 54.7% (n = 3616) to 42.7% (n = 3079).

### **Discussion & Conclusion:**

Although total antidepressant prescriptions remained stable across time, there was an increasing pattern in TCA use, and decreasing trend for SSRIs.

**PP-CR-18**

**Predictors of Orthopaedic Surgery in an Asian Rheumatoid Arthritis Cohort**

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**Background and Hypothesis:**

We aimed to identify risk factors associated with orthopaedic surgery from a rheumatoid arthritis (RA) registry.

**Methods:**

All patients fulfilled the 1987 ACR criteria for RA. The clinical, extraarticular features (EAF), disease activity score (DAS 28), functional status (Health Assessment Questionnaire, HAQ) were prospectively collected since 2001. Comparison between those with and without orthopaedic surgery (Group I and II respectively) at entry to the registry till 2013 or death was done. Risk factors for surgery at study entry were determined using logistic regression (STATA SE 10), adjusted for age and disease duration.

**Results:**

The study comprised 1049 patients, and they are predominately Chinese (77.9%); 190 patients (18.1%) had surgery (synovectomy 6.4 %, arthroplasty 17.5%, arthrodesis 1.1%). The mean age of Groups I and II were similar (49.2 vs. 48.2 years,  $P = 0.35$ ), mean duration from onset of RA to first joint surgery was 136.2 months. Group I had significantly longer symptoms before seeking rheumatologists (mean 63.5 vs. 32.0 months,  $P < 0.0001$ ), duration from onset of RA to first disease modifying drug (74.2 vs. 39.3 months,  $P < 0.0001$ ) and disease duration (243.1 vs. 151.6 months,  $P < 0.0001$ ). Higher deformed joint count (mean 4.8 vs. 1.7, OR: 1.13,  $P < 0.001$ ), presence of radiographic erosions (70.4 vs. 52.3%, OR: 1.46,  $P < 0.05$ ), EAF (36.3 vs. 24.1 %, OR: 1.67,  $P = 0.004$ ), HAQ score  $> 1.5$  (15.4 vs. 7.5%, OR: 3.08,  $P < 0.001$ ) and not DAS28 or RF positivity were predictive of orthopaedic surgery.

**Discussion & Conclusion:**

Early diagnosis and treatment of RA reduced risk of orthopaedic surgery.

PP-CR-19

**Epidemiology and Risk Factors of Early Orthopaedic Implant-related Infections**

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**Background & Hypothesis:**

Surgical site infections (SSIs) are the most common complications after surgery. This results in an increase in both length of hospital stay and healthcare costs. We aim to identify the efficiency of current preoperative antibiotic prophylaxis regimens and the significant risk factors of early implant-related infections.

**Methods:**

We retrospectively reviewed a population of 256 patients who developed surgical site infections after undergoing an orthopaedic implant surgery between January 2000 and December 2008. We examined the bacterial isolates and resistance patterns. A multivariate logistic regression model was used to identify independent risk factors for early orthopaedic implant-related infections.

**Results:**

A total of 167 out of 193 infections were culture positive. A total of 18 bacterial strains were isolated, among which, 129 (77%) were gram positive isolates, and 37 (22.2%) were gram negative bacteria. Deep incisional surgical site infections occurred in 66% of implant related infections. Additionally, we found that an American Society of Anesthesiology score that was >2 (OR 4.362, CI95 1.838-10.355,  $P = 0.001$ ), diabetes mellitus (OR 2.710, 95% CI, 1.176-6.244,  $P = 0.019$ ), patients who did not receive prophylactic antibiotics (OR 2.559, 95% CI, 0.998-6.560,  $P = 0.05$ ) and emergency procedures (OR 2.170, 95% CI, 1.077-4.238,  $P = 0.03$ ) were crucial risk factors associated with a significant increase in development of early SSIs following orthopaedic implant procedures.

**Discussion & Conclusion:**

Our data suggest that appropriate modifications to antibiotics prophylaxis regimens should be considered. Furthermore, providing proper antibiotic prophylaxis are promising approaches to reduce the rate of early implant-related infections. It is also important to cross-check ASA scoring with comorbidities like diabetes mellitus to reduce early SSIs.

PP-CR-20

## **Risk Factors for Developing Depression in Children and Adolescents With Attention Deficit Hyperactivity Disorder With Conduct Disorder or Oppositional Defiant Disorder**

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### **Background & Hypothesis:**

Attention deficit hyperactivity disorder (ADHD), conduct disorder (CD) and oppositional defiant disorder (ODD) have an estimated prevalence of more than 5% of the population. Previous studies suggest that combinations of ADHD with CD or ODD may be comorbid with emotional disorders and increase the risk of developing depression. This present study aims to investigate the relationship between depression with ADHD and comorbid CD and ODD. We would like to test the following hypotheses: 1) Children and adolescents with ADHD and CD/ODD have a higher prevalence of positive symptoms for depression than those with only ADHD, and 2) Age, IQ and gender are significant factors that affect depression scores.

### **Methods:**

A total of 282 participants between the ages of 6 to 16 with a diagnosis of ADHD and/or CD/ODD were recruited. Diagnosis was made on a structured clinical interview and IQ scores were obtained from the Wechsler Intelligence Scale for Children-Fourth Edition (WISC-IV). Anxious/Depressed and Withdrawn/Depressed Scales were drawn from the Child Behaviour Checklist.

### **Results:**

The comorbid group of ADHD with CD/ODD did not exhibit significantly more depressive symptoms than the ADHD-alone group. Age, IQ and gender were not found to be statistically significant moderators between comorbidity and depressive symptoms.

### **Discussion & Conclusion:**

The results suggest that comorbidity alone does not lead to depressive symptoms. It is likely that personality traits, genetic and environmental factors have an additive effect which may not manifest immediately but over time. There is a need for longitudinal studies on the emotional outcomes of ADHD, CD and ODD.

PP-CR-21

**Changing Trends in Vancomycin-resistant-enterococci (VRE) in a 1500-bed Tertiary Care Hospital in Singapore, 2005 to 2013**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

While *vanA* is the most common genotype of vancomycin resistance in Europe and the USA, the vast majority of VRE isolates in Australia and Singapore have been found to be the *vanB* genotype. In this hospital the *vanB* genotype has been predominant since 2005 and *vanA* genotype was detected only in the occasional “imported” case.

**Methods:**

Non-duplicate VRE isolates obtained from routine screening of high-risk patients and clinical VRE isolates from 2005 to 2013 were included in this analysis. Standard microbiological techniques were used for screening and confirmation of VRE.

**Results:**

Of the total of 668 VRE isolates, *Enterococcus faecium* was the most prevalent, with <3% being *Enterococcus faecalis*. During the period 2005 to 2010, the average number of VRE isolated was less than 20 per year; the numbers started increasing in 2011 with a dramatic increase to 319 isolates in 2012. From 2005 to 2009, *vanA* VRE ranged between 0 to 3.8% of the total VRE isolated; from 2010 to 2012 *vanA* VRE comprised 40% to 50% and in 2013, *vanA* VRE made up 78% of the total number of VRE isolated.

**Discussion & Conclusion:**

Although there has been no change in the surveillance criteria for VRE since 2012, the disproportionate increase in VRE isolates that year is disturbing. In addition the sudden change in the proportion of *vanA* VRE is a real cause for concern and may portend a significant change in the epidemiology of this pathogen in Singapore as has occurred in other countries like the USA.

PP-CR-22

### Measurement Properties of the Mental Health First Aid Singapore Quiz

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#### **Background & Hypothesis:**

Mental health literacy is measured via questionnaires. Mental Health First Aid Singapore (MHFA Singapore), a mental health literacy training course, has an evaluative quiz administered to participants precourse and postcourse. The measurement properties of the MHFA Singapore quiz were assessed. Firstly, a scale was derived from the MHFA Singapore quiz. Secondly, measurement properties of the scale were assessed against quality criteria. Thirdly, methodology of this study was evaluated using the COSMIN checklist. Hypotheses included: 1) the component structure of the scale approximates the mental health literacy definition, 2) there is a statistically significant difference in scores between persons who had contact with the mentally ill and persons who had no contact with the mentally ill, and 3) contact with the mentally ill is the main factor affecting scores.

#### **Methods:**

A 12-month retrospective study of the MHFA Singapore precourse quiz responses was conducted. Scale development was done using principle components analysis, parallel analysis and reliability analysis. Unpaired t-test and multiple linear regression were also done.

#### **Results:**

From 571 participants, a scale of 6 items was obtained. The component structure of the scale poorly approximated the mental health literacy definition. There was a statistically significant difference in scores between persons who had contact with the mentally ill and persons who had no contact with the mentally ill. Contact with the mentally ill was the main factor affecting scores.

#### **Discussion & Conclusion:**

Quality of measurement properties and methodology were variable. Recommendations included improving the items, testing reproducibility and reliability, and determining normative values of mental health literacy.

**PP-CR-23**

**Fluid Management for Shock in the First 24 Hours of Intensive Care Unit Stay: Impact of a Simple Clinical Protocol**

**SCX LAU<sup>1</sup>, SMY TAN<sup>1</sup>, KC SEE<sup>1</sup>**

<sup>1</sup>*National University of Singapore, Singapore*

**Background & Hypothesis:**

Accurate fluid delivery during haemodynamic optimisation for shock is critical for patient survival. However, guiding fluid therapy and assessing fluid responsiveness is challenging. This study assesses the clinical impact of a simple medical intensive care unit (MICU) fluid management protocol.

**Methods:**

Cohort study of mechanically ventilated patients admitted to MICU from the emergency department, from 2010 to 2013, in shock on first admission (systolic blood pressure <90 mmHg, vasopressor requirement within 24 hrs of MICU admission). Conditional logistic regression was performed, controlling for age, gender, APACHE-II score, and diagnosis (sepsis vs. non-sepsis).

**Results:**

A total of 813 patients were analysed, with mean (standard deviation,  $\pm$ ) age 62 years  $\pm$  16.6, and 332 (40.8%) females. Mean APACHE-II score was 28.4  $\pm$  8.9. ICU mortality and hospital mortality were 34.7% and 40.2% respectively. Median ICU length of stay (LOS) was 4 days (IQR, 2-7), and hospital LOS 8 days (IQR, 4-16). Sepsis was diagnosed in 477 (58.7%) patients on admission. Patients with protocol-use differed significantly from "no protocol-use" for APACHE-II score and sepsis diagnosis. The protocol was used for 223 patients (27.4%) 455 times, with 244 (53.6%) fluid-responsive episodes. The protocol reduced both ICU (OR: 0.57, 95% CI, 0.40-0.82,  $P = 0.002$ ) and hospital mortality (OR: 0.65, 95% CI, 0.46-0.91;  $P = 0.012$ ). This remained significant on subgroup analysis of ICU mortality for septic and non-septic patients. Comparing protocol and non-protocol use, net fluid balance showed no significant difference at baseline, but increased at 6, 12, and 24 hours after admission.

**Discussion & Conclusion:**

Protocol use was associated with significantly improved ICU and hospital survival, possibly owing to appropriate fluid resuscitation.

PP-CR-24

## **Internalised Stigma Amongst Psychiatric Patients Receiving Outpatient Treatment in a Restructured Hospital**

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### **Background & Hypothesis:**

Internalised stigma amongst psychiatric patients impedes recovery and discourages treatment-seeking. It is the negative stereotype applied to oneself leading to devaluation, secrecy and withdrawal. We hypothesise that psychiatric patients would suffer from high levels of internalised stigma and this has a negative impact on functioning and adherence to medication. In addition to testing our hypothesis, this study also aims to describe possible sociodemographic and treatment-related factors that are associated with high levels of internalised stigma. It is important for clinicians to recognise these to manage patients more effectively.

### **Methods:**

This is a cross-sectional study involving 65 psychiatric outpatients from TTSH. A questionnaire comprising mainly of the Internalised Stigma of Mental Illness scale (ISMI), sociodemographic data and clinically-related variables was administered. Information on patients' current Global Assessment of Functioning (GAF), diagnoses and medications were provided by their attending physicians.

### **Results:**

A total of 69.2% of surveyed patients reported experiencing some degree of internalised stigma. "Alienation" and "Social Withdrawal" were the 2 most common aspects of internalised stigma reported. Although not statistically significant, a general trend of higher levels in all subcategories of stigma was observed amongst those with more regular follow-ups (<3 monthly) and those less than 50 years old. The mean GAF score was 70 and 76 amongst those with high and low levels of internalised stigma respectively.

### **Discussion & Conclusion:**

Internalised stigma is a common problem faced by psychiatric outpatients globally and likewise in Singapore as shown by this study. Locally, a further study with a larger sample size should be implemented to investigate this phenomenon.

PP-CR-25

**MRI Evaluation of Suspected Lower Limb Necrotising Fasciitis: The Tan Tock Seng Hospital, Singapore Experience**

**WY LIM<sup>1</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Necrotising fasciitis is an uncommon potentially fatal infection characterised by rapidly progressing necrosis of the fascia and subcutaneous soft tissues. The clinical symptoms are often non-specific and as such advanced cross sectional imaging such as MRI with the excellent soft tissue contrast plays a very crucial role in the evaluation of necrotising fasciitis as well as aid in surgical planning.

**Methods:**

Retrospective review performed on all MRI examinations performed in 2011 for suspected lower limb necrotizing fasciitis. Imaging features of patients with positive findings were reviewed. Imaging findings were also correlated with positive or negative surgical findings (if any) as well as white cell count.

**Results:**

Majority of patients with positive findings had thickened fascial fluid and an elevated white cell count. None of the surgically proven positive necrotising fasciitis patients had the combination of thin fascial fluid of less than 3 mm with a normal white cell count. Presence of gas within the fluid collection is specific for necrotising infection.

**Discussion & Conclusion:**

The combination of thickness of fascial fluid with an elevated white cell count may be useful to determine infectious fasciitis from non-infectious causes of fasciitis. Presence of gas within the fluid collection is specific for necrotising infection. This information can be valuable to radiologists and surgeons in evaluation of necrotising fasciitis.

PP-CR-26

**Warfarin is Effective and Safe in Heart Failure Patients With Atrial Fibrillation**

**C LIM<sup>1</sup>, C GOH<sup>1</sup>, HJ ZHOU<sup>2</sup>, CY HO<sup>1</sup>, PSD YEO<sup>1</sup>**

<sup>1</sup>Tan Tock Seng Hospital, Singapore, <sup>2</sup>National University of Singapore, Singapore

**Background & Hypothesis:**

Warfarin is the anticoagulant most widely used to prevent stroke in atrial fibrillation (AF) patients. However, maintaining warfarin within the narrow therapeutic range is challenging in heart failure (HF) patients due to polypharmacy. Our hospital receives about 1500 HF admissions annually. We studied the safety and efficacy of warfarin in AF and (HF) patients stratified by time-in-therapeutic-range (TTR) and HAS-BLED score bleeding risk.

**Methods:**

Patients were managed in a multidisciplinary HF clinic. Dose titration was performed by pharmacists. We included HF patients who were admitted during January 2011 to December 2012 and had AF, on warfarin, and attended follow-up for at least 10 weeks.

**Results:**

We recruited 40 patients. Demographics are: age  $69 \pm 9$  years, 62.5% male, LVEF  $38 \pm 16\%$ . Most had hypertension (77.5%), 30% had type II diabetes, 25% had previous stroke, and 30% had previous bleeding; 32.5% were on concomitant antiplatelet agents. The mean CHADS<sub>2</sub>-VASc score was 4, HAS-BLED score was 2. Mean TTR was  $58 \pm 57\%$ , with 42.5% achieving an acceptable TTR  $\geq 60\%$ . During follow-up (mean 460 days), there was no stroke, thromboembolism or major bleeding. There was a trend to less non-major bleeding events per year in those with acceptable TTR ( $0.65 \pm 0.87$  vs.  $1.09 \pm 2.16$ ,  $P = 0.434$ ). Antiplatelet use did not increase the risk of bleeding. Monthly cost of care was significantly less in those with acceptable TTR ( $\$35.50$  vs.  $\$46.66$ ,  $P = 0.047$ ).

**Discussion & Conclusion:**

Warfarin is effective in preventing stroke in HF patients with AF, and safety is associated with acceptable TTR. Novel oral anticoagulants (NOAC) may be considered as an alternative for patients with poor TTR.

PP-CR-27

## **Multihance (Gadobenate Dimeglumine) in Imaging Focal Liver Lesions: A Trustworthy Tool**

**KS LIM**<sup>1</sup>

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

### **Background & Hypothesis:**

Due to the increasing popularity of the other biphasic agent, primovist (gadoxetic acid), multihance (gadobenate dimeglumine) has slowly been losing its appeal in imaging focal liver lesion (FLL). Multihance however is a far cheaper option and its relative strong distribution phase and late acquisition of hepatobiliary phased images may potentially offer some advantages over primovist for detecting and characterising FLL.

### **Methods:**

Upon intravenous injection of multihance (0.05-0.1 mmol/kg), dynamic multiphasic scanning using fat-suppressed 3D volumetric spoiled-gradient echo technique (LAVA on GE, VIDE on Siemens) with 25 seconds (arterial phase), 60 seconds (venous phase) and 300 seconds (equilibrium phase) delays. The HBP images are obtained using the same scanning technique about 1 hour later. Standard unenhanced sequences are also obtained.

### **Results:**

After reading the poster, the reader should: 1) be aware of potential uses of multihance in detection and characterisation of focal liver lesions, both cirrhotic and non-cirrhotic; 2) gain understanding of the basis of the biphasic (blood pool and hepatobiliary) action of multihance; 3) familiarise with typical imaging features of different focal hepatic entities on the multihance-enhanced blood pool and hepatobiliary images; and 4) familiarise with the pitfalls and weaknesses of using multihance in characterising focal liver lesions.

### **Discussion & Conclusion:**

MR imaging for FLL using multihance produces additional diagnostic information which improves lesion detection and characterisation. It should be used for these purposes instead of pure extracellular agents and is a trustworthy alternative to the far more expensive primovist.

PP-CR-28

**Association of Aspirin and Non-steroidal Anti-inflammatory Drugs (NSAIDs) Consumption With Prostate Cancer Survival in Singapore**

**SC LIM<sup>1</sup>, LJ SHEN<sup>1</sup>, KT CHONG<sup>1</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Long-term epidemiological studies suggested consumption of aspirin and NSAIDs, namely cyclooxygenase I inhibitors (COX-1) and cyclooxygenase II inhibitors (COX-2), improved survival of prostate cancer patients.

**Methods:**

We conducted a retrospective cohort analysis on 592 prostate cancer patients from 2000 to 2009. Survival outcomes analysed included biochemical recurrence (BCR), progression-free survival (PFS), cancer-specific survival (CSS) and overall survival (OS). Multivariate and univariate analysis using Cox regression model was used to adjust the effect of potential confounding factors like demographics, drug duration, drug dosage, cancer staging and treatment.

**Results:**

Patients taking aspirin for 5 to 10 years were 49% less likely to develop BCR ( $P = 0.05$ ; hazard ratio [HR] 0.51; 95% confidence interval 0.26, 1.00), 64% less likely to develop PFS ( $P = 0.05$ ; HR 0.36 (0.13, 1.00)), and 91% less likely to develop OS ( $P = 0.023$ ; HR 0.09 (0.010, 0.71)). Patients on COX-1 inhibitors were 1.67 to 1.87 times more likely to develop BCR ( $P = 0.027$ ; HR 1.67 (1.06, 2.63)), and those taking 2 months or less were 1.67 times more likely to develop BCR. Patients on COX-2 inhibitors were 2.43 times more likely to develop BCR ( $P = 0.015$ ; HR 2.43 (1.19, 4.97)), and those taking 2 months or less were 3 times more likely to develop BCR.

**Discussion & Conclusion:**

In Singapore prostate cancer patients, aspirin consumption for 5 to 10 years is associated with better survival for BCR, PFS and OS. Conversely, patients who consumed COX-1 and COX-2 had higher BCR. These results require further prospective studies for clinical validation.

PP-CR-29

**Therapeutic Drug Monitoring of L-asparaginase Using Indo-oxine Method: Is the Method Robust?**

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**Background & Hypothesis:**

L-asparaginase is efficacious for treating acute lymphoblastic leukaemia (ALL) in children, however there are risks of adverse reactions such as hypersensitivity, thrombosis and pancreatitis, making asparaginase activity monitoring important. We evaluated the indo-oxine method, a newer method increasingly being used and compared it to traditional nesslerisation method.

**Methods:**

The indo-oxine method was evaluated using plasma samples of ALL patients on L-asparaginase, with correlation with nesslerisation (n = 40), and assessment of intraday (n = 4) and interday (n = 10) precision, limit of detection, linearity and interferences to hemolysis and lipaemia. L-aspartic B-hydroxamate (AHA) is metabolised by L-asparaginase to form hydroxylamine, which reacts with 8-hydroxyquinoline to form indo-oxine, with measurement of its absorbance at 690 nm. Using a calibration curve with fixed calibrator concentrations, the asparaginase activity of unknown samples can be determined. Asparaginase activity levels were also compared to ammonia and albumin levels as hyperammonemia and hypoalbuminemia were associated with good asparaginase activity. Statistical analysis was performed using Microsoft Excel.

**Results:**

The indo-oxine method correlated well with nesslerisation with Pearson correlation coefficient  $R = 0.93$ . Total imprecision defined in coefficient of variation (CV) was between 4.6% to 17.1% for asparaginase activity of 5-713 U/L. The limit of blank and detection were 5 U/L and 14 U/L respectively. The assay was linear between 20-1000 U/L and was free from interference from hemolysis and lipaemia. Asparaginase activity correlated well with ammonia concentration ( $R = 0.64$ ) but not with albumin concentration.

**Discussion & Conclusion:**

The indo-oxine method provided reliable results with better sensitivity than nesslerisation. However, instability of reagent 8-hydroxyquinoline resulted in frequent preparation and risk of increased imprecision.

**PP-CR-30**

**Clinical Outcomes of Patients Discharged from a Medical Intensive Care Unit: Association With the Need for Nasogastric Feeding**

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**Background & Hypothesis:**

Dysphagia has been shown to be associated with poor clinical outcomes in intensive care unit (ICU) survivors. However, it is uncertain if nasogastric feeding on ICU discharge is associated with poor outcomes as well. We thus aim to assess the association between the need for nasogastric feeding on ICU discharge and clinical outcomes.

**Methods:**

Cohort study of patients discharged alive during office hours from the medical ICU in a university hospital from March 2013 to March 2014.

**Results:**

We studied 299 patients. The median hospital length of stay was 11 days (interquartile range, 7-21). Seventeen (5.7%) patients died in hospital and 33 (11.0%) patients were readmitted to ICU within 28 days following ICU discharge. Poor clinical outcome, which included ICU readmission within 28 days and hospital mortality, was seen in 44 (14.7%) patients. Sixty (20%) patients were discharged with nasogastric feeding. In multivariate analysis, after controlling for age and APACHE II severity score, the need for nasogastric feeding increased hospital length of stay by 63% (95% CI, 31-103%,  $P < 0.001$ ). However, the need for nasogastric feeding did not increase the risk for ICU readmission or hospital mortality.

**Discussion & Conclusion:**

Nasogastric feeding in patients post-ICU discharge independently increases length of stay. Further studies may be useful in identifying the causes of continued nasogastric feeding and to safely transit patients more quickly to oral feeding.

PP-CR-31

**Early Lactate Measurement Triggers Early Treatment and Improves Outcomes in Critically Ill Patients**

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<sup>1</sup>*National University Hospital, Singapore*

**Background & Hypothesis:**

Lactate is a biomarker of tissue hypoxia and hypoperfusion. Point-of-care test (POCT)-lactate readings are readily available and easily interpreted, yet are not routinely used as a tool to direct early therapy in the ED. Because early therapy improves outcomes in septic patients, we hypothesise that obtaining an early POCT-lactate reading is associated with early appropriate treatment, thus decreasing mortality for critically ill patients.

**Methods:**

Cohort study of mechanically ventilated patients in shock and presented first time to emergency department (ED) of a tertiary hospital from 2010 to 2013 was conducted. Subjects were analysed according to those who had early POCT-lactate (POCT-lactate before treatment), versus those who did not have it. The time to treatment (fluids and antibiotics) and outcomes (ICU and hospital mortality) were compared. Conditional logistic regression was used to adjust for potential confounders (age, sex, APACHE II score, sepsis diagnosis).

**Results:**

Of the 865 patients, 514 (59.4%) were male, 503 (58.2%) were septic, mean age was 62.5 and mean APACHE II was 29. A total of 363 patients (42.0%) had an early POCT-lactate performed, that was associated with decreased mortality, in ICU (OR: 0.65, 95% CI, 0.49-0.87,  $P = 0.004$ ) and in hospital (OR: 0.60, 95% CI, 0.46-0.80,  $P = 0.001$ ). The same group also received treatment earlier. Within 1 hour of triage, 48.8% had received fluids (vs. 34.5%,  $P = 0.001$ ) and 25.0% of septic patients antibiotics (vs. 15.1%,  $P = 0.007$ ).

**Discussion & Conclusion:**

Early ED POCT-lactate for mechanically ventilated patients in shock was associated with improved ICU and hospital mortality, adjusted for confounders, and could be linked to earlier fluid and antibiotic administration.

PP-CR-32

**Ethnic Disparity in the Relationship of Insulin Resistance and Body Mass Index With Serum Alanine Aminotransferase Among a Multiethnic Asian Population With Type 2 Diabetes**

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**Background & Hypothesis:**

The global prevalence of non-alcoholic fatty liver disease (NAFLD) is rapidly rising, in parallel with the escalating rates of type 2 diabetes (T2DM) and obesity. However, studies of NAFLD in Asia remain limited. Given that insulin resistance and obesity are major risk factors of NAFLD, we evaluated in a multiethnic Asian T2DM cohort the association of homeostatic model assessment of insulin resistance (HOMA-IR) and body mass index (BMI) with alanine aminotransferase (ALT), the surrogate measure of NAFLD.

**Methods:**

This cross-sectional study included 1894 T2DM adults (age: 57 ± 11 years; male: 51.4%) consisting of 1003 Chinese, 440 Malays and 451 Indians. Fasting serum ALT, plasma glucose and insulin were measured. HOMA-IR was estimated using the HOMA2 calculator,

**Results:**

ALT levels were elevated in 14.7% of the cohort. Univariate analysis revealed a significant correlation of ALT with HOMA-IR ( $r = 0.150$ ,  $P < 0.001$ ) and BMI ( $r = 0.099$ ,  $P < 0.001$ ). In logistic regression models, both HOMA-IR (OR: 1.244, 95% CI, 1.116-1.387) and BMI (OR: 1.040, 95% CI, 1.012-1.069) independently predicted elevated ALT after controlling for gender, ethnicity, usage of insulin and statins, blood pressure, HbA1c, and cholesterol. Stratified by ethnicity, HOMA-IR (OR: 1.393, 95% CI, 1.176-1.650) and BMI (OR: 1.070, 95% CI, 1.026-1.116) remained as predictors of elevated ALT in Chinese, but not in Malays and Indians.

**Discussion & Conclusion:**

Ethnic disparity exists in the association of high ALT with HOMA-IR and BMI among Asian T2DM individuals. Interestingly, HOMA-IR and BMI significantly predicted abnormal liver function only in Chinese, but not in Malays and Indians.

**PP-CR-33**

**Breast Elastography**

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**Background & Hypothesis:**

Breast elastography is a sonographic technique that provides information in addition to conventional sonography and mammography. Elastography evaluates the strain and hardness of a lesion.

**Methods:**

Two techniques are now available for clinical use: strain elastography and shear wave elastography. We review the basic principles of elastography, how the examination is performed, image interpretation and common pitfalls.

**Results:**

Elastography has been demonstrated to be useful for the differentiation of benign from malignant breast lesions.

**Discussion & Conclusion:**

Although elastography is easy to perform, training and technical knowledge are required in order to obtain adequate images for accurate interpretation.

PP-CR-34

**The Devil's In the Details: Use of MR Imaging in Evaluation of Neoplasms of the Larynx and Hypopharynx**

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**Background & Hypothesis:**

Poor soft tissue contrast and identification of laryngeal cartilage erosion limit CT in the evaluation of laryngeal and hypopharyngeal neoplasms. Dedicated small field of view (SFOV) MR imaging using surface coils is now possible with improved coil and MR software technology, providing superior anatomic depiction and disease delineation. Purpose: To highlight the utility of SFOV MR imaging in the evaluation of laryngeal and hypopharyngeal neoplasms.

**Methods:**

MRI of neck with small field of view (using surface coils) performed in our department in the past 4 years (2009 to 2012) was reviewed. The cases performed for laryngeal and hypopharyngeal neoplasms were included in our exhibit.

**Results:**

This exhibit demonstrates how SFOV MR: 1) Provides improved anatomic depiction of soft tissues and cartilage in the laryngopharyngeal region, compared to CT and large field of view (LFOV) MR; and 2) Better demonstrates locoregional invasion by neoplasms of the larynx and hypopharynx compared to LFOV MR and improves treatment planning.

**Discussion & Conclusion:**

SFOV MR is superior to CT in the detailed evaluation of locoregional invasion by laryngeal and hypopharyngeal neoplasms.

PP-CR-35

**Trial Usage of Two Systems of Viscoelastic Haemostatic Assay: the Tan Tock Seng Hospital Experience**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Viscoelastic haemostatic assay (VHA) is useful at point-of-care to assess haemostatic function and guide blood product therapy in cardiac, transplant and trauma surgery. Our institution evaluated 2 such systems, TEG<sup>®</sup> and ROTEM<sup>®</sup> prior to acquisition. We share our experience during these trials, specifically comparing differences between the 2 systems and their clinical significances, and highlighting 2 cases in which VHA impacted clinical management.

**Methods:**

TEG<sup>®</sup> and ROTEM<sup>®</sup> systems were made available on trial in the operating theatre complex. Each system had full vendor support. Doctors from the Department of Anaesthesia, Intensive Care and Pain Medicine, and Trauma Service of the Department of General Surgery were encouraged to analyse samples of suitable cases to help guide blood component therapy. During the evaluation period, samples were taken from a variety of cases for VHA, including cases with major trauma, intracranial haemorrhage and renal dysfunction.

**Results:**

The value of VHA in management of blood component therapy in a range of cases was demonstrated. The opportunity to trial 2 systems further highlighted some important features of each system compared to the other.

**Discussion & Conclusion:**

The trial period demonstrated the utility of VHA in a spectrum of cases, giving clinicians valuable practical experience with both systems. Trials of both systems allowed comparison prior to acquisition, and formed an invaluable part of our institution's evaluation.

PP-CR-36

**Dermatiaceous Fungi: A 3-year Review of Skin and Nail Infections**

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**Background & Hypothesis:**

Nondermatophytic moulds, such as dematiaceous fungi, from the skin and nails are frequently thought to be harmless contaminants or secondary invaders. This study aims to investigate the prevalent types of dematiaceous fungi found in dermatological specimens and whether treatment had any impact on their outcome.

**Methods:**

Fungal cultures from 2007 to 2009 with dematiaceous fungi were retrieved from microbiology. Patient demographics, comorbidities such as diabetes mellitus, underlying human immunodeficiency virus (HIV), the type and duration of treatments and outcome were reviewed.

**Results:**

Ninety-eight samples were taken from the skin and 93 samples were taken from the nails. The age range was 7 to 95 years of age (mean 37 years). The most commonly isolated genera were *Cladosporium* (24.6%), followed by *Curvularia* (14.1%), then *Ochroconis* (12.6%). *Ochroconis* was initially the most commonly isolated type in 2007 but in 2008 and 2009 *Cladosporium* became the most commonly isolated type. Out of 85 samples that had only dematiaceous fungus isolated, 72 (84.71%) had positive microscopy. Only 19 samples (26.4%) improved with treatment and 11 samples (15.3%) had complete resolution; 11 of those with isolated dematiaceous fungi were treated with oral antifungals and there was no significant difference compared to topical antifungals (Chi square = 3.806,  $P = 0.433$ ). Being a diabetic did not affect treatment outcome (Chi square = 4.6,  $P = 0.329$ ). The follow-up period ranged from 0 to 13 years (median 9 months).

**Discussion & Conclusion:**

Dematiaceous fungi have been increasing in our fungal cultures. However, a high default rate makes follow-up of response to treatment difficult to ascertain the value of its treatment.

PP-CR-37

**A Prospective Study on the Use Of Teledermatology in Psychiatric Patients with Chronic Skin Diseases**

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**Background & Hypothesis:**

To compare the use of “live interactive” teledermatology versus face-to-face consultation in long-term, institutionalised psychiatric patients with chronic skin diseases.

**Methods:**

All long-term institutionalised psychiatric patients at the Institute of Mental Health with follow-up appointments at the National Skin Centre, Singapore (NSC) were assessed for eligibility and invited to participate. Recruited patients were first seen by a dermatologist via videoconferencing, and then by another dermatologist in person at NSC, within 1 week. Outcome measures were assessed by a third independent dermatologist. Outcome measures assessed for each paired patient visits were: interphysician clinical assessment, diagnosis, management plan, adverse events and total-turnaround-time (TAT) of each consultation.

**Results:**

There were a total of 13 subjects with 27 patient visits. The mean age was 64.6 years (range, 44-80) and all were male schizophrenic patients. The predominant skin condition was chronic eczema and its variants (61.6%), followed by psoriasis (15.4%) and chronic cutaneous amyloidosis (15.4%). The level of complete and partial agreement between teledermatology and face-to-face consultation was 100% for history-taking and physical examination and 96.3% for the investigations, diagnosis, management plan and treatment prescribed. The mean TAT for teledermatology was 23 minutes, compared to 240 minutes for face-to-face consultation. No adverse events were reported.

**Discussion & Conclusion:**

Teledermatology was as effective as face-to-face consultation and reduced the TAT by 90.3%, resulting in increased patient convenience and operational efficiency, with reduced manpower need. Our study provides support for the safe and cost-effective use of teledermatology for the follow-up of chronic skin conditions in psychiatric patients.

**PP-CR-38**

**Atopic Dirty Neck or Acquired Atopic Hyperpigmentation? – An Epidemiological and Clinical Study From the National Skin Centre Singapore**

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**Background & Hypothesis:**

“Atopic dirty neck” (ADN) is a poorly understood acquired hyperpigmentation seen in patients with atopic dermatitis (AD). The aim of this study was to determine the epidemiology, clinical features and pathological findings of ADN.

**Methods:**

All AD patients with a clinical diagnosis of ADN seen at the paediatric and adult eczema clinics at our centre during a 5-month period were invited to participate in a questionnaire-based and clinical study. In addition, some patients underwent histopathological analysis.

**Results:**

Out of 544 AD patients examined, 78 (14.3%) had ADN. There was a male:female ratio of 7:1. The onset of the pigmentation was most commonly reported between 13 and 20 years of age. There was no racial predilection. The majority of cases had moderate to severe AD. Key histopathological features were increased epidermal melanin and dermal melanophages, thickened basement membrane and a dense superficial perivascular infiltrate. Patients were emotionally most disturbed by the appearance (81.9%), and felt frustrated (70.8%), embarrassed (68.1%) and unattractive (59.7%) because of the appearance.

**Discussion & Conclusion:**

ADN has a high prevalence amongst Asians with AD, in particular, in adolescent males with underlying moderate to severe eczema. Clinicopathological correlation suggests that it results from both frictional melanosis and postinflammatory hyperpigmentation. The rippled appearance and the onset in adolescence is likely due to accentuation of the juxtaclavicular beaded lines. Optimal control of eczema may improve and potentially prevent the development. This study also reveals that physicians must consider the psychosocial impact of the pigmentation. We propose the name ‘acquired atopic hyperpigmentation’ as a less stigmatising name.

**PP-CR-39**

**Accuracy of Cuff Versus Arterial Blood Pressure Measurements for Fluid Challenge**

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**Background & Hypothesis:**

Fluid challenge is the gold standard for assessing if patients in shock would benefit from more fluids. Ideally, this entails invasive haemodynamic monitoring. However, non-invasive measurements are often necessary on the general floor or in resource-limited settings, and little data exist to validate this latter practice. We hypothesise that non-invasive blood pressure (BP) measurements may be good surrogates for arterial BP measurements in reflecting fluid response.

**Methods:**

Hypotensive, mechanically ventilated, non-paralysed patients with Richmond Agitation Sedation Scale scores of 0 to -2 were included in our cohort study from 2011 to 2012. We tested cuff measurements of pulse pressure (NPP) and systolic blood pressure (NSBP) against a reference standard of APP measurement after 500 ml infusion of Hartmann's solution. A positive response to fluid challenge was defined as  $\geq 10\%$  increase in APP after 500 ml infusion over 25 minutes. We analysed correlation, sensitivities and specificities of non-invasive parameters in detecting fluid responders.

**Results:**

We analysed 232 patients (639 fluid challenges); the Pearson correlation r-values were 0.300 between NPP and APP change ( $P < 0.001$ ) and 0.645 between NSBP and arterial SBP (ASBP) change ( $P < 0.001$ ). A  $\geq 10\%$  increase in NSBP after a 500 ml bolus provided the best specificity of 79.7%. A  $\geq 10\%$  increase in NPP or NSBP measurements after either of two consecutive 250 ml boluses provided the best sensitivity of 83.3%.

**Discussion & Conclusion:**

Various non-invasive BP measurements achieved moderate sensitivities and specificities in detecting fluid challenge responders. These may play an important role when invasive BP monitoring is not available.

**PP-CR-40**

**Imaging of Gallbladder Cancer: Challenges in Practice**

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**Background & Hypothesis:**

Gallbladder cancer (GBC) is the most common biliary tract carcinoma but it is often diagnosed late due to the overlap in morphology with benign inflammatory conditions. Teaching points: 1) Can we diagnose GBC accurately at an early stage?; 2) Can we stage GBC accurately by imaging after it is diagnosed?; and 3) What additional imaging techniques can we use to improve diagnostic accuracy?

**Methods:**

1) Imaging diagnosis based on morphology is challenging due to overlap with benign inflammatory conditions such as xanthogranulomatous cholecystitis. In this poster, we present the imaging features of GBC on ultrasound, computed tomography and magnetic resonance imaging, highlighting strengths and limitations of each modality; and 2) We discuss morphologic staging of GBC based on the TNM system.

**Results:**

We shall discuss: 1) the evolving roles of various functional imaging modalities including PET-CT, diffusion weighted MRI and ultrasound elastography (ARFI) that can be used to improve early diagnosis of GBC; and 2) the use of adjunct techniques such as PET-CT, DW MRI, hepatobiliary contrast MRI and high resolution ultrasound to overcome current difficulties of morphologic staging for TNM staging of GBC.

**Discussion & Conclusion:**

Diagnosis and staging assessment of GBC by morphologic imaging has limitations. High resolution ultrasound as well as functional imaging with MRI and PET-CT hold promise to address some of the difficulties.

**PP-CR-41**

**Prevalence of Symptoms in the Last 48 Hours of Life**

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**Background & Hypothesis:**

An awareness of common symptoms at the end-of-life enables physicians to screen for them which will improve the holistic care of dying patients. The primary objective of this study is to identify the symptoms experienced by dying patients in the last 48 hours of life. Secondary aims were to assess the severity of symptoms, and effectiveness of symptom management.

**Methods:**

This prospective study looked at symptom scores in the last 48 hours of life using the Edmonton Symptom Assessment System (ESAS) was evaluated for 90 patients in a period of 2 months.

**Results:**

The 3 most prevalent symptoms in the last 48 hours of life were dyspnoea (42%), tiredness (40%) and drowsiness (31%), and this was similar in the last 24 hours of life. Others included pain, loss of appetite and throat secretions. The more prevalent symptoms also scored higher in severity (NRS  $\geq 6$ ). Within the first palliative review, there was clinically significant improvement in tiredness ( $P < 0.05$ ). Improvement in dyspnoea ( $P < 0.05$ ) and drowsiness ( $P < 0.05$ ) was seen on second review.

**Discussion & Conclusion:**

Dyspnoea was one of the most prevalent symptoms as the majority of patients (33%) had a primary lung pathology. As most patients were drowsy at the end-of-life, most symptoms were scored by healthcare professionals (75%). Dying patients suffer burdensome symptoms at the end-of-life. Physicians should actively screen for these symptoms and families should be reassured that even though dyspnoea, tiredness and drowsiness were commonly faced at the end-of-life by their loved ones, interventions can be used to effectively palliate their suffering.

PP-CR-42

### Evaluating Beta Lactam Allergy With Skin Testing and Drug Provocation

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<sup>1</sup>Tan Tock Seng Hospital, Singapore

#### Background & Hypothesis:

Evaluating beta lactam allergy with skin testing and drug provocation.

#### Methods:

The aim of this study is to describe the outcomes of skin testing (ST) using skin prick test (SPT) and intradermal test (IDT); and drug provocation test (DPT) in the assessment of patients with suspected beta lactam allergy.

#### Results:

A total of 140 patients (mean age  $45.86 \pm 16.5$  years; 61% female) were enrolled. Nineteen patients (13.6%) had positive ST (2 SPT and 17 IDT). Of the positive cases, 16 had suspected penicillin and 3 cephalosporin allergy. Most ST positive cases ( $n = 13$ , 68.4%) reacted to penicilloyl-polylysine (PPL) and/or minor determinant mixture (MDM). Positive ST rates for history of anaphylaxis, urticaria and/or angioedema; and other rash were 31.5%, 17.2% and 3.5% respectively ( $P = 0.004$ ). All patients with maculopapular rash, erythema and pruritus were tested negative. Positive ST rate was only slightly lower in patients with longer intervals between reaction and skin testing ( $\leq 5$  years: 15.3% vs.  $> 5$  years: 11.8%,  $P = 0.544$ ). Clinician's assessment correlated with ST positive rates (probable: 26.3%, possible: 24.3%, indeterminate: 9.6%, unlikely: 0%,  $P = 0.007$ ). DPTs were performed in 120 patients. Ten patients had positive DPT (6 patients developed immediate reactions and 4 had delayed reactions). Of the patients with immediate reactions, 2 reacted to ceftriaxone, 2 cloxacillin, 1 amoxicillin and 1 cefazolin. All reactions were mild. The specificity of skin testing was 90.7%.

#### Discussion & Conclusion:

The specificity of skin test is 90.7%. Pretest clinical assessments correlated with skin test outcomes. Skin testing and drug provocation are safe and valuable in the evaluation of beta lactam allergy.

**PP-CR-43**

**Clinical Audit of Ustekinumab (Stelara) in the Treatment of Moderate-Severe Psoriasis Vulgaris**

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**Background & Hypothesis:**

Ustekinumab is a human monoclonal antibody targeting the common p40 subunit of IL-12, IL 23, and suppresses Th17-driven inflammation. It has been FDA-approved for the treatment of moderate-severe psoriasis and psoriatic arthritis.

**Methods:**

This was a clinical audit to investigate clinicians' adherence to National Skin Centre's biologic therapeutic guidelines. The electronic medical records of all patients who received ustekinumab for the treatment of psoriasis and psoriatic arthritis from 1 January 2010 to 1 May 2014 were examined.

**Results:**

Ustekinumab was administered to 79 patients. The mean age was 43.1 years (range: 14-71). All patients had chronic plaque psoriasis, 25 (31.6%) had joint symptoms, 51 (64.6%) had nail involvement. Seventy-five (94.9%) patients fulfilled the clinical criteria for its administration. Adherence to the recommended baseline investigations was as follows: full blood count (100%), liver and renal function (100%), hepatitis B/C serology (98.7%), tuberculosis screening (100%). Twenty-three (29.1%) patients had PASI scores documented at baseline and 16 weeks. The mean baseline PASI score was 18.2, and the mean baseline body surface area affected was 27.7%. Ten (43.5%) patients achieved PASI 75 response, while 16 (69.6%) achieved PASI 50 response. The mean body surface area affected at 16 weeks was 13.7%. Seventy-two (91.1%) patients had blood investigations repeated appropriately at follow-up.

**Discussion & Conclusion:**

This clinical audit highlights that selection criteria for the use of biologics in psoriasis, baseline screening and follow up investigations were well adhered to. The conscientious scoring of PASI and DLQI at baseline and follow-up visits remains a gap.

PP-CR-44

### **Effectiveness of Omega-3 Fatty Acids Supplementation on Sleep in Children and Adolescents With Attention Deficit Hyperactivity Disorder**

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<sup>1</sup>*Institute of Mental Health, Singapore*

#### **Background & Hypothesis:**

Previous studies suggest that omega-3 fatty acids supplementation could reduce sleep difficulties in children with attention deficit hyperactivity disorder (ADHD). This study aims to investigate the effectiveness of this supplementation on sleep difficulties in children and adolescents with ADHD.

#### **Methods:**

A total of 107 participants, aged 6 to 16 years old, diagnosed with ADHD, were included in this analysis. These participants were recruited as part of a larger randomised controlled trial examining the effects of supplements and social skills on children with disruptive behaviour disorders. Dropouts and those with missing data were excluded from the analysis. Sleep difficulties were measured using the School Sleep Habits Survey, particularly the Sleepiness Scale and the Sleep-wake Behaviour Problems Scale, which was administered at baseline and at 6 months. Participants were placed into either the active or placebo group.

#### **Results:**

The active group did not exhibit significantly reduced sleep difficulties than the placebo group. In fact, the placebo group showed a greater trend of reductions in daytime sleepiness and sleep-wake behaviour problems as compared to the active group. Results did not differ greatly when controlled for medication or age group.

#### **Discussion & Conclusion:**

The results suggest that omega-3 fatty acids supplementation is not any more effective in treating sleep problems in ADHD children and adolescents compared to a placebo. This may suggest that the belief in the positive effects of the supplementation has a similar, if not stronger, effect on sleep-related problems. However, this could be due to the small sample size. Larger scale studies would be required to obtain more significant trends.

PP-CR-45

### Literature Review: Clozapine-associated Thrombocytopenia

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#### **Background & Hypothesis:**

Clozapine is an inexpensive yet effective medication used for treatment resistant schizophrenia. While agranulocytosis is a well known adverse effect of clozapine therapy, clozapine induced thrombocytopenia is not often reported. This literature review highlights thrombocytopenia as a potential adverse effect of clozapine therapy, and aims to discuss a possible framework for the management of patients with clozapine-induced thrombocytopenia.

#### **Methods:**

We conducted a literature review by doing a structured search of PubMed and Google Scholar looking for studies containing both the terms “clozapine” and “thrombocytopenia”.

#### **Results:**

There were 25 studies found on PubMed while the search on Google Scholar yielded 2460 results. Of these, data from 16 studies were included in this review. There were 2 review papers, 3 prevalence studies and 1 case series while the remaining 10 studies were all single case reports.

#### **Discussion & Conclusion:**

Although uncommon, clozapine therapy can lead to thrombocytopenia. It may also interact with other drugs known to cause thrombocytopenia such as valproate in reducing the platelet count. Therefore it is recommended that the platelet count of patients on clozapine should be monitored regularly. A set of guidelines for management of clozapine-related thrombocytopenia is suggested according to the level of severity after reviewing the available literature. It might be useful for the clozapine service to take these guidelines into consideration to avoid unnecessary dose reduction or stoppage of clozapine which might lead to relapse in this treatment-resistant patient population.

**PP-CR-46**

**Forensic Age Estimation – Experience of Tan Tock Seng Hospital, Singapore**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

We routinely receive requests for age estimation. As an adult general hospital, a significant proportion of these requests are for age estimation in judicial cases. We review our experience for forensic age estimation in our hospital from 2008 to 2012.

**Methods:**

We review the cases for age estimation from 2008 to 2012. We determine the number of cases, reasons for the requests and how our reports impact the cases.

**Results:**

We reviewed the cases for bone age determination from 1 January 2008 to 31 December 2012. There were a total of 58 cases for bone age determination. Of these, 29 cases (50%) were for medical reasons, such as endocrine abnormalities, and 28 (48.3%) were judicial cases. The indication for 1 case was unknown. The judicial cases were cases involving suspected illegal immigrants and criminals. We performed an average of 5.6 (approximately 6) cases per year for forensic age estimation.

**Discussion & Conclusion:**

There are different scientific methods to determine the age of a person. We discuss some of these methods. The Greulich and Pyle method is discussed in depth. We discuss how to approach a hand X-ray film and construct a rational report. Through the use of examples, we show how our reports impact the management of judicial cases. Forensic age estimation is often part of the work of a radiologist in a general hospital. It is important to understand the methods used, the limitations of these methods and the medico-legal impact.

PP-CR-47

## Hypersensitivity Reactions to Biologic Agents: Experience From the TTSH Singapore Biologics Registry

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### Background & Hypothesis:

To describe the prevalence and risk factors for hypersensitivity reactions (HSR) to biologic agents from the TTSH Singapore Biologics Registry.

### Methods:

Consecutive patients who had ever received a biologic agent were followed up during the study period from 1 January 2001 to 31 May 2014.

### Results:

There were 228 patients of Asian ethnicity who had ever received a biologic agent including rituximab (81, 35.2%), infliximab (61, 26.5%), and adalimumab (48, 20.9%). HSR occurred in 6 (2.6%) patients, all of whom were female. Among the 3/152 (2.0%) patients who had ever received an antitumour necrosis factor inhibitor (TNFi) and who developed HSR, 1 patient with Adult Onset Still's Disease developed anaphylaxis (following second dose of infliximab, after tolerating 60 weeks then 2 years without anti-TNFi), the second with rheumatoid arthritis developed fever, hypotension (following second dose of infliximab), and the third with psoriatic arthritis developed optic neuritis (following third dose of adalimumab) respectively. Among the 3/81 (3.7%) who had ever received rituximab and developed HSR, all had systemic lupus erythematosus (SLE). One developed acute urticaria (following second dose, third course), and the remaining 2 anaphylaxis (following second dose, second course 5 years later; and second dose, second course 28 months later) respectively. None of the patients with immediate HSR agreed to skin testing, with a view to subsequent desensitisation.

### Discussion & Conclusion:

HSR to biologic agents was uncommon in our cohort. Risk factors included repeated dosing, but not exposure to more than 1 biologic within/across different classes. There were no deaths from HSR.

**PP-CR-48**

**The TTSH Singapore Biologics Registry: A 14-Year Review of Outcomes and Adverse Reactions**

**BY THONG<sup>1</sup>, EL NG<sup>1</sup>, WJ CHOY<sup>1</sup>, XB CHUA<sup>1</sup>, HS HOWE<sup>1</sup>, HH CHNG<sup>1</sup>, KO KONG<sup>1</sup>, ET KOH<sup>1</sup>, TY LIAN<sup>1</sup>, KP LEONG<sup>1</sup>, WG LAW<sup>1</sup>**

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**Background & Hypothesis:**

To describe the pattern of use and outcomes of biologic agents from the TTSH Singapore Biologics Registry.

**Methods:**

Consecutive patients who had ever received a biologic agent were followed up during the study period 1 January 2001 to 31 May 2014.

**Results:**

There were 230 patients of Asian ethnicity who had ever received a biologic agent, of whom 37 (16.1%) had received more than 1 biologic agent. These comprised rituximab (35.2%), infliximab (26.5%), etanercept (23.0%), adalimumab (20.9%), golimumab (6.1%), anakinra (1.8%), abatacept and tocilizumab (1.3% each). The distribution of rheumatic diseases were: rheumatoid arthritis (RA) (53.0%), ankylosing spondylitis (24.3%), systemic lupus erythematosus (SLE) (17.0%), and psoriatic arthritis (PsA) (5.7%). There were 13 episodes of major infections requiring hospitalisation in 10 patients. Mortality related to bDMARD occurred in 2/10 (20.0%) from necrotising fasciitis in a neutropenic patient with SLE (rituximab); and pneumonia, *Escherichia coli* bacteremia in a refractory RA patient (adalimumab). There were no cases of tuberculosis. Malignancy occurred in 2 patients with PsA: metastatic adenocarcinoma in a 72-year-old female after 15 months of infliximab who subsequently died, basal cell and squamous cell carcinoma in a 53-year-old male after 5 months of adalimumab; and breast cancer in a 42-year-old with RA after 17 months of adalimumab. Hypersensitivity reactions (HSR) were non-fatal and occurred in 6 female patients following previous exposure to an antitumour necrosis factor inhibitor (TNFi) (3) and rituximab (3) respectively.

**Discussion & Conclusion:**

Biologic agents were generally well tolerated with low incidence of major infections, malignancy and hypersensitivity reactions.

PP-CR-49

**Neurological Manifestations Among Patients from The Singapore Sjogren's Syndrome Study**

**BY THONG<sup>1</sup>, JK KAM<sup>1</sup>, N CHARAN<sup>1</sup>, RW LEONG<sup>1</sup>, ZW LOH<sup>1</sup>, ET KOH<sup>1</sup>, HS HOWE<sup>1</sup>, KO KONG<sup>1</sup>, TY LIAN<sup>1</sup>, HH CHNG<sup>1</sup>**

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**Background & Hypothesis:**

To describe the clinical manifestations of neurological-Sjogren's syndrome (N-SS) from the Singapore Sjogren's Syndrome (SS) Study.

**Methods:**

Computerised Physician Order entry records of patients with physician-diagnosed SS between 1993 and 2013 were retrospectively analysed for those with neurological involvement.

**Results:**

N-SS occurred in 45/355 (12.7%) patients, of whom 80% were primary-SS. Central nervous system (CNS) involvement occurred in 24 (53.3%), peripheral nervous system (PNS) in 22 (48.9%), and autonomic nervous system (ANS) dysfunction in 3 (6.7%) patients with N-SS. Neurological-SS occurred within an average of 2+/-218 weeks from the diagnosis of SS (11 years before to 10 years after). Both CNS and PNS involvement occurred in 11.1%. Among all SS patients, the most common CNS manifestations were stroke (20%) and transverse myelopathy (TM, 17.8%). Cognitive dysfunction (13.3%), cranial neuropathy (11.1%), psychosis (4.4%), seizures (4.4%) and aseptic meningitis (4.4%) were less common. The most common PNS manifestations were sensory neuropathy (35.6%), mixed sensory/motor neuropathy (8.9%) and mononeuritis multiplex (6.7%). Neuromyelitis optica (NMO) occurred in 4/8 (50%) patients with TM, of whom only 1 developed optic neuropathy. Oral cyclophosphamide (4) over 5+/-3 months, monthly intravenous pulse cyclophosphamide (3) over 4+/-2 months, and intravenous immunoglobulins 2 g/kg (2) were the most common treatment modalities for remission induction. There were no clinical or serological factors predictive of patients developing N-SS.

**Discussion & Conclusion:**

Neurological-SS predates/antedates the diagnosis of SS by up to a decade. N-SS affects the CNS slightly more often than PNS. NMO was more commonly associated with TM than optic neuropathy in our cohort.

PP-CR-50

**Polyuria and Obstructive Sleep Apnoea After Spinal Cord Injury, Coincidence or Correlation. Case Series and Review of Literature**

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**Background & Hypothesis:**

Introduction: Spinal cord injured (SCI) patients are at increased risk of cardiovascular and pulmonary dysfunction. There are reports of polyuria and nocturia among SCI individuals, especially so among those who have sustained high cervical cord injury but no conclusive explanation of the cause. Further investigations are currently considered unwarranted as the patients are asymptomatic. However, postural hypotension, a common problem among these patients, may be further potentiated by polyuria and has a negative impact on effective rehabilitation. Objective: To report prevalence of polyuria and/or nocturia in SCI patients who had significant postural hypotension and possible explanations.

**Methods:**

We looked at clinical data including level of spinal injury, associated symptoms, changes in postural blood pressure, intake-output charts as well as laboratory data of 5 consecutive patients admitted to our rehabilitation centre.

**Results:**

All patients were tetra paretic from cervical spinal cord injury, had autonomic dysfunction and unexplained polyuria. Two of them were incidentally diagnosed with obstructive sleep apnea (OSA).

**Discussion & Conclusion:**

Polyuria may be due to changes in antidiuretic hormone release related to postural hypotension leading to a relative diabetes insipidus state or secondary to OSA. These are also known to coexist, especially in high tetraplegics. Whether this is a coincidence or is there a correlation? Possible mechanisms need to be further studied, as there are long-term mortality and morbidity benefits with appropriate treatment if diagnosed early.

**PP-CR-51**

**Are Our Non-doctor, Non-nursing Healthcare Workers Trained and Prepared to Respond to a Cardiac Arrest?**

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**Background & Hypothesis:**

Our aims were to determine the perceptions of non-doctor, non-nursing (NDNN) healthcare workers with regards to a cardiac arrest resuscitation.

**Methods:**

We conducted a survey among our NDNN colleagues that investigated their perception on 5 domains: 1) adequacy of training; 2) preparedness; 3) supervision and feedback; 4) ranking of training tools; and 5) “real-life” resuscitation. Our primary outcomes were proportions of participants who perceived adequacy in 1) training; 2) preparedness; and 3) supervision and feedback in resuscitation. Secondary outcomes were the ranking of various training tools, the factors predictive of a sense of confidence and the proportion of participants who had experienced real life resuscitation. Data was analysed using descriptive statistics. Logistic regression was performed to determine these predictive factors. We reported proportions, percentages, odds ratios with their 95% CIs.

**Results:**

We surveyed 223 participants; 89 (39.9%) respondents perceived themselves as having adequate training. Fifty-one (22.9%) and 139 (62.3%) respondents perceived a sense of preparedness in leading or assisting resuscitation respectively; 147 (65.9%) and 118 (52.9%) respondents agreed that medical staff had/could adequately supervise and provide feedback in resuscitation respectively; 16 (7.2%) participants had experienced real life resuscitation in the preceding year. The tools perceived as most effective were simulation laboratory training, BCLS refresher course, debriefing sessions and workplace practice drill. No factors were predictive of a sense of confidence.

**Discussion & Conclusion:**

There was a weak sense of adequacy in training and preparedness among NDNN colleagues. We can explore using the training tools perceived to be effective by them to improve overall performance.

**PP-CR-52**

**Predictors of Severe Bleeding in Hospitalised Dengue Patients**

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**Background & Hypothesis:**

Bleeding is common but mostly mild in adult dengue. Severe bleeding as per World Health Organisation (WHO) 2009 guidelines is clinically important. We aim to develop predictors of admission for severe bleeding during hospitalisation.

**Methods:**

Hospitalised adult dengue patients with positive dengue PCR or serology and those who fulfilled WHO 1997/2009 probable dengue criteria were studied. Cases had severe bleeding comprising gastrointestinal bleeding, menorrhagia or need for blood transfusion. Non-cases were randomly split into 4 subsets of 450 patients each. Decision trees and logistic regression models were performed on the 4 datasets. Validation was done between these datasets and the full data. The model with the best performance was selected as the final model.

**Results:**

Of 4383 patients with no bleeding prior to admission, 148 (3.4%) of them subsequently developed severe bleeding. Male patients comprised 67% of the patients. Median age was 34 years (5<sup>th</sup>-95<sup>th</sup> percentile, 18-60 years). Dengue haemorrhagic fever occurred in 22%, and severe dengue in 13% of the patients. In the selected final logistic model, fever on admission (aOR: 2.1 [1.4-3.2]), neutrophilia (aOR:1.02 [1.01-1.03]), female gender (aOR: 0.3 [0.2-0.45]), elevated aspartate transaminase (aOR: 1.001 [1.0003-1.0013]) after adjusting for age, haematocrit and Charlson's score were predictive of severe bleeding. Using a cut-off of -2.2413, the model achieved a sensitivity of 0.95 and specificity of 0.27 with AUC of 0.74.

**Discussion & Conclusion:**

We identified predictors that may guide doctors in closer monitoring of adult dengue patients for severe bleeding. Prospective validation is needed.

PP-CR-53

## What Attracts Participants? Factors Affecting Recruitment in Clinical Research Studies

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### **Background and Hypothesis:**

Unsuccessful participant recruitment is often the reality of clinical research studies. Hence, examining the factors of recruitment can provide invaluable information. More compensation, lesser visits, lesser hours and interventional studies are potential motivators for recruitment. However, few studies have investigated them in Singapore and compared them across completed studies. Hence, this study serves to look at factors affecting the rate of recruitment in completed studies locally.

### **Methods:**

Studies were shortlisted through a search of research study files in the Child Guidance Clinic and the study of ethical applications on NHG DSRB online portal. Studies with expired, withdrawn and ongoing statuses and retrospective and archival study designs were excluded. Information was then extracted into a database. Variables of interest were (a) recruitment target, (b) number of recruited participants, (c) amount of compensation, (d) number of hours, (e) number of visits, and (f) type of research study. The variable “rate of recruitment” was calculated from  $[(b)/(a) \times 100\%]$  for a fairer comparison across studies.

### **Results:**

The search yielded 19 studies that involved recruitment of participants over 11 years, from 2003 to 2014. Interestingly, amount of compensation, type of study, number of visits and hours have no statistically significant relationship with the rate of recruitment.

### **Discussion & Conclusion:**

These findings suggest that recruitment may not be dependant on the various variables of interest. It is possible that other variables like altruism and trust with the referring clinician could be more significant. In terms of clinical relevance, understanding the relationships among these variables can serve as a heuristic for future study design conceptualisation and grant utilisations.

PP-CR-54

## Identifying Direct and Indirect Effects of MRSA Acquisition: A Structural Equation Approach

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### Background & Hypothesis:

Methicillin resistant *Staphylococcus aureus* (MRSA) is a major cause of infection in hospitals and nursing homes, and is becoming increasingly established in Asian hospitals. This study aims to investigate the risk factors for MRSA using generalised structural equation modelling (GSEM), which is a statistical tool that can analyse the interacting risk factors, and elucidate the potential pathways for infection by MRSA.

### Methods:

A case-control study was conducted in Tan Tock Seng Hospital. Six-hundred randomly selected MRSA infections were compared with 600 non-*Staphylococcus aureus* infections. Clinical data relating to the patient's admission were obtained via medical record review. Hospital-acquired MRSA was defined as positive culture 2 days after admission and were included in the analysis (n = 337). Generalised structural equation model was used to address the presence of intermediate variables and take into account indirect effects.

### Results:

The median age was 69 years, 56% of them being male. Length of stay (aOR:11.3 [6.3-17.2]), immunosuppression (aOR:2 [1.06-3.73]), and cumulative antibiotic exposure (aOR:2.4 [1.8-3.1]), directly affected MRSA acquisition. In contrast, surgery (aOR:910 [187-4416]), alcohol/drug abuse (aOR:2.5 [1.02-6.05]), being male (aOR:1.16 [1.01-1.34]), and age (aOR:1.03 [1.01-1.035]) were found to be indirectly associated with MRSA acquisition. Antibiotic exposure had both direct and indirect effects on MRSA acquisition. Vancomycin had the largest indirect effect (aOR:21 [7-69]).

### Discussion & Conclusion:

The GSEM model enabled us to identify factors that directly and indirectly affected MRSA acquisition. The effects of surgery and age would have been missed in conventional regression models.

PP-CR-55

**Effects of Radiation-related Complications and Impact on Quality of Life in Nasopharyngeal Carcinoma Patients**

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**Background & Hypothesis:**

Nasopharyngeal carcinoma (NPC) is a potentially curable cancer. The emphasis has shifted towards optimising quality of life (QoL) and minimising complications in NPC patients, in addition to achieving equivalent oncologic outcome. This study aims at assessing the prognostic factors of radiation-related complications and QoL in NPC patients after definitive radiation therapy.

**Methods:**

This is a prospective cross-sectional interviewer administered questionnaire study of 59 patients with stage I to IV NPC who were at least 6 month postdefinitive radiotherapy treatment. European Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30) and the Head and Neck module (QLQ-H&N35) were used to assess the QoL and radiation-related complications of patients postradiotherapy.

**Results:**

The most common complaints for postirradiated NPC patients were xerostomia, sticky saliva, trismus and dental problems. Cancer stage, treatment modalities and time since completion of treatment were not significantly associated with patients' QoL after RT treatment. Patients treated with IMRT were less likely to develop dysphagia ( $P = 0.063$ ) and dental problems ( $P < 0.001$ ) than those who were treated by conventional radiation techniques. Dysphagia ( $P = 0.029$ ), dental problem ( $P = 0.055$ ) and trismus ( $P = 0.026$ ) were more likely to occur in patients who were at least 1 year postradiotherapy than those under 1 year post-treatment.

**Discussion & Conclusion:**

Our study shows that dental problems, dysphagia, trismus and xerostomia are common complications following radiotherapy in NPC patients and these are more common following 1 year post-treatment. Patients treated with IMRT are less likely to develop dysphagia and dental problems than those treated with conventional radiotherapy techniques.

PP-CR-56

**Papular Angiolymphoid Hyperplasia: A Report of Three Cases from Singapore and a Literature Review**

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**Background & Hypothesis:**

Acral pseudolymphomatous angiokeratoma of children (APACHE) is a rare form of cutaneous pseudolymphoma characterised by angiomatous papules with a predilection for the acral regions of children. Classically, a dense dermal lymphocytic infiltrate composed of both T and B cells is found on histology, together with prominent vessels lined by plump endothelial cells. Its aetiology remains unknown but it is postulated to arise from mechanical trauma or a hypersensitivity to insect bites. Increasing evidence suggests that this condition is neither necessarily acral, pseudolymphomatous, angiokeratomatous nor a paediatric disease. As such, its nomenclature has been contentious.

**Methods:**

A retrospective review of clinical notes and histological slides was performed for 3 known cases of APACHE seen at a single institution in Singapore.

**Results:**

Here, we report a series of 3 patients aged 6, 10 and 22 years old who presented with asymptomatic angiomatous papules or plaques over right ankle, left elbow and left forearm, respectively. Clinical and histological features were consistent with the diagnosis of APACHE.

**Discussion & Conclusion:**

To our knowledge, this is the first case report of APACHE from Southeast Asia. We also present a literature review and discussion on why we believe the name to be a misnomer. Considering its histological similarities to angiolymphoid hyperplasia with eosinophilia, we would like to support the change of its title “APACHE” to a more accurate and encompassing one of “papular angiolymphoid hyperplasia”.

PP-CR-57

### Experiences and Challenges in the Use of Methadone for Cancer Pain in Singapore

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#### **Background & Hypothesis:**

Methadone is recognised to be as useful as morphine in relieving cancer pain. It is also commonly used as an alternative opioid for patients suffering from opioid toxicity or suboptimally managed cancer pain. The primary aim of this study is to evaluate the method of use of methadone in our setting, with a secondary aim to understand its impact in cancer pain relief.

#### **Methods:**

A retrospective chart review of patients suffering with advanced cancer who were started on methadone between January 2007 to December 2013 was done. Baseline demographic data, functional and pain characteristics, indications and method of opioid rotation were reviewed.

#### **Results:**

The mean age of the group analysed was 60 years (n = 35), with two-thirds of the group being male; 82.9% of patients had a palliative performance scale between 50% to 80%; 68.6% of patients were rotated to methadone for suboptimal pain control whilst 28.6% had opioid toxicity, necessitating a change in opioid. More than 90% of patients had mixed or neuropathic pain. The 3-day Edmonton rotation schedule was the most commonly (74.3%) used method of rotation. The morphine equivalent daily dose was 228 mg/day prior to rotation with a mean pre-methadone pain score of 7 with a significant ( $P < 0.001$ ) reduction after rotation.

#### **Discussion & Conclusion:**

In our study, using a 3-day rotation method for methadone was effective in relieving cancer pain. Further controlled studies are necessary to explore use of methadone for complex pain syndromes.

PP-CR-58

**Validation of a Novel Asian Dietary Questionnaire in Assessing Nutritional Risk Factors for Urinary Stone Formation**

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**Background & Hypothesis:**

Nutritional risk factors for lithogenesis can be identified using a detailed 3-day food diary, which is analysed and interpreted by a registered dietician. An individually-tailored dietary advice can be given based on the food diary. However, some individuals may find completing a food diary to be cumbersome. A novel dietary questionnaire, tailored to local food and beverages in Singapore was developed to identify dietary lithogenic risk factors.

**Methods:**

A dietary questionnaire was developed, which quantified intake of stone inhibitors (citrate and fluids), stone promoters (animal protein and oxalate) and calcium. Twenty healthy volunteers were recruited to complete the questionnaire. They were then asked to complete a 3-day food diary. Using the food diary, a dietician conducted a telephone interview for 24-hour diet recall. The responses to the questionnaire were compared with the nutrient analysis of 24-hour diet recall.

**Results:**

Amount of fluid intake was well captured on the questionnaire ( $r = 0.55$ ; moderate positive linear relationship,  $P = 0.01$ ). Strong positive linear relationship was observed for calcium intake ( $r = 0.87$ ,  $P < 0.01$ ). No linear relationship noted for animal protein intake on the questionnaire ( $r = 0.08$ ,  $P = 0.73$ ). From the questionnaire, subjects responded average consumption of citrate-rich food (orange, lime, pineapple) of 1-2 times/month. Oxalate-rich food (bai-cai, tofu, tempeh) was consumed on a weekly basis. Both of these corresponded well with the 24-hour diet recall.

**Discussion & Conclusion:**

The dietary questionnaire provides a simpler tool in identifying stone-related nutrition factors compared to a 3-day food diary and 24-hour food recall. Validation of this tool will allow future studies on dietary patterns of stone-formers to be conducted.

**PP-HPE-01**

**Teaching Residents Extent of Care Discussions**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

We describe a novel method for teaching 'Extent of Care' discussions to first-year residents and rated its effectiveness. We also surveyed the communication topics which residents felt most deficient in and preferred to learn most.

**Methods:**

The module was 90 minutes long. The first 30 minutes was a didactic lecture based on the 'SPIKES Protocol'. The next 30 minutes was a positive demonstration and the last 30 minutes was a role play between 2 residents for 10 minutes each followed by critique by a skilled facilitator. We ran this module for 49 residents who were divided into 3 groups with around 3 to 4 facilitators in each session. Residents were asked to evaluate the usefulness of each teaching component using the Likert scale. They also ranked difficult communications topics (Breaking bad news, Extent of care, Collusion, Angry relative, Medical error, Discontinuing treatment and Advance care planning) according to which they felt most deficient in and preferred to learn the most.

**Results:**

A total of 95.3% of residents found didactic lecture helpful/very helpful; 93.9% of the residents felt expert role modelling was helpful/very helpful; 89.8% of residents graded role playing as helpful/very helpful; 91.7% of residents graded tutor's critique as helpful/very helpful. Residents felt most deficient in discussing medical errors and preferred to learn about how to deal with an angry relative the most.

**Discussion & Conclusion:**

A concise teaching method of 90 minutes was effective in teaching extent of care discussions. We should focus on discussing medical errors and dealing with angry relatives in future communication modules.

**PP-HPE-02**

**Designing the NHG Interprofessional Leadership Programme**

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**Background & Hypothesis:**

The National Healthcare Group (NHG) has conducted leadership training since its inception in 1999. The need to undertake comprehensive review in 2013 arose because 1) new role as Central Regional Health System that brings new partners, 2) rapid increase in NHG workforce, and 3) changing demographics of workforce.

**Methods:**

NHG senior management and a core group using modified Delphi method, overhauled leadership framework and introduced new elements: 1) broad-based Interprofessional Leadership Programme for young/new leaders (IPLP) as foundation, 2) followed by Workplace Based Leadership Programme (WBLP) to embed leaders, 3) complemented by 3-part programme for selected high-potentials, 4) curriculum development teams for each programme, 5) independent programme evaluation team, and 6) common faculty development programme. To inform IPLP design, a 1-day retreat was held using modified Delphi method to gather learning needs from staff and ground managers. Pre-existing NHG leadership and core/operational competencies/areas helped to focus consensus building.

**Results:**

Thirty-eight participants representing different professions and member-institutions attended the retreat. Two NHG competencies 'Embrace Change' and 'Think Strategically' were in high need for development, translating into 8 out of 10 (80%) leadership and 4 out of 16 (25%) core/operational areas to be addressed in IPLP curriculum. There was consensus interprofessional competencies needed to be built-in deliberately. Findings from retreat were compared with American College of Healthcare Executives and National Center for Healthcare Leadership competencies for external validation, with good alignment.

**Discussion & Conclusion:**

Adopting top-down and ground-up approaches, learning needs are articulated clearly for NHG interprofessional leadership programme curriculum development team to design a programme fit-for-purpose.

**PP-HPE-03**

**Online E-learning for Undergraduates in Health Professions: A Systematic Review of the Impact on Knowledge, Skills, Attitudes and Satisfaction**

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**Background & Hypothesis:**

Health systems worldwide are facing shortages in their professional workforce. To address this rising shortage, medical schools and training institutes has started to use e-learning. This paper reviews evidence on the effectiveness of online e-learning for health professional education.

**Methods:**

We performed a systematic review of literature on the effectiveness of online e-learning through a comprehensive search of the major bibliographic databases for randomised controlled trials that compared online e-learning to traditional learning from January 2000 to August 2013. We included articles on e-learning which focused on students' knowledge, skills, satisfaction and attitudes. Two reviewers independently extracted data from the included studies. Due to considerable heterogeneity, we presented our results as a narrative synthesis.

**Results:**

Fifty-nine studies met the inclusion criteria, of which 50 studies compared e-learning to traditional learning. Twelve of the 50 studies testing knowledge gains found significantly higher gains in the e-learning intervention groups. Six studies detected significantly higher skill gains in the e-learning intervention groups. Twelve studies tested students' attitudes, of which 8 studies showed no differences in attitudes or preference of e-learning over traditional learning. Students' satisfaction was measured in 29 studies, 4 studies showed higher satisfaction for online e-learning. Risk of bias was high for several of the included studies.

**Discussion & Conclusion:**

The evidence from the studies with high and low risk of bias indicate that Internet-based e-learning is equivalent to traditional learning. The findings present a potential incentive for policymakers to encourage the development of online e-learning programmes for health professions.

**PP-HPE-04**

**A Pilot Study of an Interprofessional Geriatric E-learning Module: Will it Change the Attitudes of Nursing students Towards Care of the Older Adults?**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

The rise in the ageing population demands an increase in geriatric medicine-trained healthcare providers. Geriatric nursing is not a popular choice. Many cite it as boring, unglamorous, tedious and draining. This negative attitude can affect the older adult's quality of care. We hypothesise that an interprofessional geriatric e-learning module focusing on the essence of geriatric medicine can change attitudes with a resultant career choice in geriatric nursing.

**Methods:**

A cohort study of 9 second year nursing students was done. An e-learning module concentrating on multidisciplinary interprofessional collaboration was created. Baseline demographics and the University of California, Los Angeles (UCLA) attitudes scale pre and post e-learning module were collected. Responses as to whether they would consider geriatric nursing upon graduation were collected. Paired t-test compared the change in scores pre and post e-learning module. Statistical significance was taken as  $P \leq 0.05$ .

**Results:**

A total of 77.8% of our cohort was female and 88.9% single. Their pre e-learning UCLA score was 3.35 +/- 0.41 and their post UCLA score was 3.63 +/- 0.46. Unfortunately, this difference was not statistically significant ( $P = 0.20$ ). In spite of this improvement in their attitudes towards older adults, 77.8% of them did not intend to go into geriatric nursing giving reasons like indecisiveness and inadequate exposure.

**Discussion & Conclusion:**

The e-learning module improved nursing students' attitudes towards older adults. However, this does not translate into them wanting to do geriatric nursing. Future studies should incorporate the e-learning module into their geriatric practicum to study the effect on attitudinal change.

**PP-HPE-05**

**Using Psychometric Analysis to Improve Radiology Teaching Files and Objective Structured Clinical Examinations (OSCEs)**

**GJS TAN**<sup>1</sup>

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Part of the continual assessment programme in our residency programme includes an objective structured clinical examination (OSCE) conducted by an external agency. The department has a collection of sample exam sets, but there is variation in the standard of difficulty between the sets. This has led to confusion amongst the trainees.

**Methods:**

Although subjective analysis was performed, we wanted obtain objective post-test feedback as well. We collected anonymised answer sheets from trainees, and captured the overall score together with that of individual questions. We then measured a few metrics: Cronbach's alpha to measure test set reliability, and 2 metrics for individual questions: Item facility (percentage of correct answers), and Item discrimination (correlation between performance on an individual question against performance on the overall examination).

**Results:**

A total of 15 test sets (450 questions) were analysed, with 4 to 8 respondents per set (mean 6.6). The median Cronbach's alpha ranged was 0.73 (an alpha of above 0.7 is generally accepted as demonstrating good internal validity. Facility for all questions except one ranged from 0.57 to 1.0. Review of the outlier question (facility 0.14) revealed an error in answer key coding. Item discrimination was measured using point biserial correlation coefficient (PBS), and ranged from -0.02 to 0.63. We reviewed low scoring questions for errors or ambiguity.

**Discussion & Conclusion:**

Psychometric analysis of our teaching sets yielded easily understood metrics which we used to identify questions for review. We were able to detect errors in answer key coding, modify ambiguous questions, and standardise the difficulty level across various sets.

**PP-HPE-06**

**The Impact of Trauma Orientation Programme: A Multidisciplinary, Interprofessional Educational Initiative to Improve Trauma Care at a Tertiary Institution**

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**Background & Hypothesis:**

Beyond medical knowledge and skills, trauma management requires multidisciplinary, interprofessional (MD-IP), time-sensitive teamwork, and systems knowledge. Traditional trauma training does not address these capabilities. Our institution addressed this shortcoming by introducing the Trauma Orientation Programme (TOP) in 2008. TOP, a trauma management induction programme, employs mixed pedagogy including didactics, problem-based small group discussions and simulations in a MD-IP learning environment, focusing on initial trauma management, decision-making, and teamwork concepts. Newly posted junior residents and nurses from departments involved in trauma care participate. Two sessions conducted every 6 months (4 annually) facilitate staff participation. This study examined the length of stay (LOS) of trauma patients in the emergency department (ED), following introduction of TOP, as a surrogate measure of TOP's effectiveness on MD-IP initial management of trauma and teamwork.

**Methods:**

Trauma admissions from 2008 to 2013 were evaluated. Patients not admitted to general surgery or dead-on-arrival were excluded. Data (n = 941) was analysed using SPSS Statistics 22. ED LOS (MD-IP teamwork time), in minutes, was defined as the time taken from ED arrival to disposition for inpatient care. Pre-TOP (2007) and post-TOP (2009, 2011, 2013) ED LOS, stratified by the Injury Severity Score (ISS), were compared.

**Results:**

From 2008-2013, 24 TOP sessions were conducted. TOP improved participants' teamwork knowledge. ED LOS and mortality rate improved progressively after TOP's introduction.

**Discussion & Conclusion:**

Our study shows that appropriately designed educational initiatives in developing capability in MD-IP knowledge and teamwork contribute to improving trauma ED LOS and patient outcomes.

**PP-HPE-07**

**Phlebotomy Training: Are We There Yet?**

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**Background & Hypothesis:**

Phlebotomy, the procedure for obtaining blood samples for laboratory analysis, is a common technique mainly performed by allied healthcare professionals in Singapore. Often, these professionals include the medical technologists, nurses, trained clinical trial associates and cross-trained personnel in some charity organisations. Venous blood specimens are collected via venipunctures or capillary punctures while arterial blood samples are exclusively collected by physicians. Blood test results are deemed an accurate reflection of the physiological and biochemical status of the patient and contribute towards the formulation of a diagnosis and/or treatment. Therefore, there is a need for quality blood specimen to avoid preanalytical errors. To this end, phlebotomy training and certifications may contribute in part towards a healthcare organisation's quality assurance in laboratory medicine.

**Methods:**

A variety of phlebotomy training resources is available in Singapore. Local institutes of higher learning like Singapore Polytechnic offers a comprehensive phlebotomy course with certification which is widely subscribed to by various healthcare establishments. This study reviewed some of the common challenges and mistakes faced by the participants who attended the course at Singapore Polytechnic.

**Results:**

Based on course feedback and first-person observations, we noted some specific mistakes and procedural challenges encountered by both adult learners and student learners respectively.

**Discussion & Conclusion:**

This study highlighted the need for continuing education and training to upkeep the quality of healthcare services offered by various healthcare establishments in Singapore. With a clear link between the cognitive and practical aspects of phlebotomy, it enhances the good practice of quality blood collection procedures.

**PP-HSR-01**

**Factors Associated With Waiting Time for Patients Undergoing Emergency Surgery in a Tertiary Care Centre in Nepal**

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**Background & Hypothesis:**

The availability of timely emergency surgical care reflects efficiency of the healthcare system. Emergency surgeries demand earlier surgical times. In developing countries like Nepal, many preventable factors influence the waiting time for the surgical intervention. The study was conducted to find out the waiting time for patients undergoing emergency surgery and to identify the factors influencing it.

**Methods:**

A prospective observational study was conducted over a period of 45 days on all patients presenting at the emergency room with general surgical or orthopaedic emergency and were followed till they were operated. The factors influencing waiting time at different intervals from presentation to start of surgery were analysed.

**Results:**

Ninety-two patients with mean age 29.7 years, 76.1% being male, were studied. The average waiting time from arrival at emergency room to the start of surgery was 11 hours 57 minutes, with mean waiting time of 8 hours 39 minutes from decision of surgery to the start of incision. The major factors for delay were preoccupation of operation theatre (59.8%), special preoperative procedures or investigations (33.7%), consultations (23.9%), arrangement of money and logistics (13%), arrangement of blood products (10.9%) and arrangement of operation theatre (OT) supplies (9.8%).

**Discussion & Conclusion:**

The average waiting time for emergency surgery in this study was comparable with several other studies. Hospital- and disease-related factors contributed more to the longer waiting time than patient-related factors. By addressing these factors appropriately, the waiting time for emergency surgery may be reduced, thereby increasing the efficiency of emergency healthcare services.

**PP-HSR-02**

**Does Longer Duration of Community Psychosocial Rehabilitation Lead to a Better Outcome?**

**B GUPTA<sup>1</sup>, C LEE<sup>1</sup>, KX EWE<sup>1</sup>**

<sup>1</sup>*Institute of Mental Health, Singapore*

**Background & Hypothesis:**

To evaluate the effectiveness of the psychosocial rehabilitation in the community for patients referred to Community Mental Health Team at IMH. The CMHT programme focusses on the psychosocial rehabilitation of referred patients in the community. Unlike UK and several other countries, acceptance of patients into CMHT is completely voluntary. CMHT does not primarily focus on risk management.

**Methods:**

Our study included patients recruited in 2011 to 2013. A subset of patients who had baseline and subsequent CGI-S scores were analysed. Number of admissions (NOA) and length of stay (LOS) were calculated as outcome measures using historical control.

**Results:**

For the 74 patients analysed for 2011, 97 % achieved a reduction in severity of their symptoms (CGI-S) by an average of 36%. For 2012, 54 patients were analysed and 85% of patients achieved a reduction by an average of 29%; for 2013, 37 patients were analysed, 95% achieved reduction in their severity of symptoms by average of 21%. LOS and NOA were reduced following referral to the CMHT. A subset analysis was carried out for subsidised versus partial and non-subsidised patients, which revealed a better outcome for partial/non-subsidised patients in terms of improvement in symptoms, number of admissions and length of stay (statistically significant for length of stay).

**Discussion & Conclusion:**

It would appear that the longer the patients were enrolled in the CMHT psychosocial rehabilitation programme, the better was the improvement in the severity of symptoms and other outcome measures. Patients who pay for the CMHT programme seem to fare better than fully subsidised patients.

**PP-HSR-03**

**Evaluation of Cases of Blunt Ocular Trauma Presenting to a Tertiary Hospital in Singapore**

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**Background & Hypothesis:**

Traumatic eye injuries make up a large number of patients presenting at the emergency department. Local data estimates that orbital fractures encompass 27.5% of all orbital conditions. It is crucial to diagnose orbital wall fractures, due to medical and medico-legal implications. We seek to review the evaluation of blunt ocular trauma locally.

**Methods:**

Retrospective review of all patients with blunt ocular trauma who attended the outpatient emergency ophthalmology service (Jan 2010-Dec 2011). Case records of 329 cases were reviewed. Exclusion criteria were patients with no CT scan, and patients with concomitant globe disruption/foreign body (FB). A total of 68 cases were included and analysed. Demographics, symptoms/signs at presentation and follow-up, investigation, and management, were obtained.

**Results:**

There is no significant relationship of fractures with age ( $P = 0.393$ ), gender ( $0.95$ ), ethnicity ( $P = 0.111$ ), laterality ( $0.803$ ), and mechanism of trauma ( $0.251$ ). Fracture patients were more likely to have extraocular muscle restriction (EOMR) at day 1 ( $P = 0.045$ ) and week 1 ( $P = 0.007$ ), and Infraorbital paraesthesia (IP) at week 1 ( $P = 0.008$ ). Clinical features such as blurring of vision, diplopia, and step deformity were not significantly associated. X-rays have poor predictability for fracture ( $P > 0.999$ ), using the CT scan as gold standard. The positive and negative predictive value of X-rays is 66.7% and 37.3%, respectively. The sensitivity (SN) and specificity (SP) are 5.13% and 95.7%, respectively.

**Discussion & Conclusion:**

Clinical translation of this knowledge would be to abolish the use of X-rays in evaluation for orbital wall fracture. CT scans will be ordered based on clinical suspicion alone, eliminating unnecessary costs and time wastage.

**PP-HSR-04**

**Improving Adherence – Pilot Supervision Programme for High-risk Patients in the Community**

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**Background & Hypothesis:**

Adherence problems are an inherent issue with any bio-psycho-social-spiritual prescription for any disease or behavioural entity. In several countries, various interventions have been studied to address adherence problems in psychosis such as compliance therapy, family and psychoeducational interventions, telephonic prompting and also legislative measures like community treatment orders have shown inconsistent and only modest benefits. Incentives-based interventions have been tested for both preventive measures and also for adherence problems in chronic diseases. IMH has implemented the Pilot Supervision Programme that incentivises patient engagement through quarterly vouchers as well as minimising barriers to accessing service by waiving off certain treatment fees whilst also offering them intensive intervention for 1 year.

**Methods:**

Our pilot programme focused on high-risk patients with diagnosis of severe mental illness needing involuntary admission with history of either prolonged or repeated admissions, and began recruiting patients since October 2012. The comparison was done between pre and postintervention phase. Fifty-eight patients (95% suffering from schizophrenia or schizoaffective disorder) were accepted into the programme and half of them completed 6 months interventions.

**Results:**

An average reduction of 50% in number of admission, length of stay and emergency room admission, is observed. There is an improvement in clinical adherence, from 70% to 85% actualisation of planned appointments. Improvement, ranging from 20% to 50%, in CGI, BPRS, GAF scores has been observed.

**Discussion & Conclusion:**

The results are promising with more than 50% improvement in length of stay, number of admissions and psychiatric emergency room visits, making significant impact on our high-risk patients with severe mental illness.

**PP-HSR-05**

**Evaluating the Impact of Inpatient Accelerated Palliative Radiation Treatment Programme on Hospital Readmissions in Oncology Wards**

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<sup>1</sup>*National University Hospital, Singapore*

**Background & Hypothesis:**

Fast-track palliative services are rarely reported locally. The Inpatient Accelerated Palliative Radiation Treatment Programme implemented in 2011 had been reported to shorten palliative radiation treatment waiting time and length of stay (LOS). Despite such initiatives to shorten LOS, other studies had found that shorter LOS can potentially increase readmission rates. The main objective of this study is to evaluate the impact of the programme on hospital readmissions.

**Methods:**

We conducted a retrospective single centre study in Radiotherapy Centre, National University Hospital. The inclusion criteria was all inpatients who had received palliative radiation treatments from August 2009 to July 2012.

**Results:**

Among 108 inpatients studied, there were 39 (49.4%) and 16 (55.2%) readmissions preprogramme and postprogramme, respectively; 15-day and 30-day readmission was higher postprogramme (23.1% vs. 37.5% ; 38.5% vs. 68.8%). However, there were significantly less patients readmitted due to the same radiation oncology related medical issues postprogramme in <15-day (33.3% vs. 0.0%) and <30-day (20.0% vs. 9.1%) readmission. Lower >30-day readmissions postprogramme compared to preprogramme were also reported (59.0% vs. 31.3%). .

**Discussion & Conclusion:**

The data have shown that fast-track palliative care services can reduce preventable readmissions of patients who required palliative treatments. We approach these results as encouraging but preliminary. It takes multifaceted and multidisciplinary approach towards reducing readmission especially for cancer patients who require palliative care. As the demands of palliative services grow, the programme could serve as a model for other hospitals to look into the possible provision of fast-track palliative services that is currently lacking in Singapore.

**PP-HSR-06**

**Evaluation of an In-Hospital Disaster Preparedness Awareness Workshop for Healthcare Administrators**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Introduction: During a disaster, many plans may be invoked simultaneously. The same responder may have different roles and there is likely to be interdependencies. Disaster preparedness training is an opportunity to create awareness and familiarise participants with these plans and concepts. Aim: The objective of this study was to evaluate an in-hospital disaster preparedness awareness workshop attended by hospital administrators.

**Methods:**

A mixed-method approach incorporating both questionnaire and interview was used. A 23-item questionnaire which included Likert type items and open-ended questions was designed for the evaluation focusing on a range of issues including perceived impact of workshop, knowledge and attitudes of disaster management issues and overall satisfaction with the workshop.

**Results:**

Twenty-seven out of 28 participants completed the questionnaire, giving a response rate of 96.4%. The majority of participants was satisfied with its content, found the workshop useful and reported that the workshop had been effective in improving their knowledge, skills, understanding, and attitudes towards disaster management. A total of 13 participants were involved in the individual interviews. Many interviewees felt that the workshop gave them a time for personal reflection about their disaster role, instilling a sense of personal responsibility. Many interviewees provided examples of how they were able to translate the knowledge learned from the workshop into their disaster roles.

**Discussion & Conclusion:**

Conclusion: Participants with poor, fair or good knowledge experienced perceived knowledge gain after attending the workshop. This perceived knowledge gain was not experienced by participants with very good or excellent knowledge of disaster preparedness.

**PP-HSR-07**

**Diabetes Screening by Nursing and Optometry Students in a Local Community**

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**Background & Hypothesis:**

Diabetes mellitus (DM), a chronic disease affecting 11.3% of the population in Singapore can cause many other ailments such as heart failure, blindness and other complications. The health screening was conducted in a central community estate in Singapore with 58 residents from 14 to 89 years old participating. Twenty-seven optometry and 8 nursing students from the school of Health Sciences (Nursing) and (Optometry), 3 lecturers and an advance practice nurse conducted the various stations in health and eye screening to identify the complications. Referrals were made to polyclinics and Ngee Ann Polytechnic Optometry Centre. Nursing students who are part of the Diabetes Mellitus Outreach Group will conduct home visits to willing residents.

**Methods:**

Eye screening stations including assessment of vision, eye pressure, anterior and posterior ocular health was set up. The screening also included foot care examination, blood glucose monitoring, BP monitoring and eye check.

**Results:**

Findings showed that 37% of them were referred to NP Optometry Centre, due to poor vision, cataract and unequal eye pressure in both eyes. One resident had diabetes-related retinopathy and was referred to the polyclinic for follow-up checks. Thirty-two percent of the residents had diabetes; 57% of residents above 45 years had hypertension; 32.8% had hyperlipidaemia and 31% had diabetes.

**Discussion & Conclusion:**

Referral and follow-up care is a necessity to ensure that residents received optimal care. This will prevent chronic conditions from worsening and medical and/or nursing care will be rendered to patients.

**PP-HSR-08**

**Diagnosis and Resource Utilisation in Emergency Department: A Descriptive and Quantitative Study**

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**Background & Hypothesis:**

Clinical management of patients in emergency department (ED) is complex due to differences in patients' urgency, changing conditions of patients and uncertainty of patient's diagnoses. The objective of this paper is to study the impact on ED workload due to changes in ED, presenting diagnosis using administrative data from a public acute hospital in Singapore.

**Methods:**

We identified patient flow pathways across key functional areas in ED and assessed area utilisation and diagnosis distribution. Using a deterministic mathematical model, we estimated the changes on area utilisation if the portion of a particular diagnosis changes. We also used the network graph to demonstrate the complex patient pathways in ED.

**Results:**

We examined 41,070 patients with 250 identified patient pathways and grouped the total of 1602 associated diagnoses to 107 groups. The diagnosis groups were shown to have different utilisation patterns. As top 1 grouped diagnosis, patients with “symptoms, signs and ill-defined conditions” made up about 20% of the total ED visits. Among this group, 58% of patients had trolley consults. Impact analysis showed the changes on area utilisations were nonlinear with respect to different areas with the changes in ED presenting diagnosis. In particular, if patients with “acute respiratory infections”, one of top grouped diagnoses, increase by 10%, the utilisations at fever consult and the associated fever observation room would increase by 3.7% and 1.4%, respectively.

**Discussion & Conclusion:**

Our study could help physicians and hospital managers to better understand the complexity of ED patient flows and the relation between ED utilisation and diagnoses.

**PP-HSR-09**

**Analysis of Unscheduled “Walk-in” Patients at Outpatient Clinic B, Institute of Mental Health, Singapore**

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**Background & Hypothesis:**

At mixed registration type outpatient clinic at the Institute of Mental Health (IMH), managing walk-in patients, who constitute about 10% of the patients in the clinic, poses significant challenge to the health service providers for reasons such as long waiting time, loss of continuity of care and patient safety issues. Identifying the various causes of patients walking into the clinics would help to manage them better.

**Methods:**

This study intends to identify and analyse the various reasons for which patients walk-in in a mixed registration type clinic at IMH, and to formulate recommendations based on the data available, to improve the overall effectiveness of clinical care provided to the patients.

**Results:**

In this study, data for 313 (n) walk-in patients at IMH outpatient was collected retrospectively from patients' electronic medical records and the walk-in patients were then classified as defaulters, unwell patients, unwell and admitted patients, patients with history of drug abuse, patients who walked-in for medical certification and patients who came on wrong date/time. Unclear or absent triage documentation was also analysed.

**Discussion & Conclusion:**

Out of 313 patients, 89 had defaulted their scheduled appointments and 86 were unwell out of which 16 required inpatient admission.; 46 patients came on wrong date/time, 30 had history of drug abuse and 19 came for medical certification for financial assistance. For 40 patients, there was no triage documentation or the documentation was unclear. The findings of this study have important implication in managing walk-in patients and planning appointment schedules.

**PP-HSR-10**

**The 'Eye Gallery App' (EGA): An Innovative Application to Manage Digital Ophthalmic Images of the Slit Lamp Bio-microscope Taken With a Smartphone**

**PC TAN<sup>1</sup>, J CHENG<sup>1</sup>, HT CHIA<sup>1</sup>, A THOMAS<sup>1</sup>, GH ONG<sup>1</sup>, CC YIP<sup>1</sup>**

<sup>1</sup>*Khoo Teck Puat Hospital, Singapore*

**Background & Hypothesis:**

Clinical ophthalmic images (COI) are conventionally taken with expensive anterior segment cameras and managed with the manufacturer's software that is often not conducive for telemedicine. We report a new EGA that allows secured storage, archival and transfer of clinical ophthalmic images (COI) taken on a Smart Phone (SP) for tele-Ophthalmology.

**Methods:**

The EGA was designed and jointly created by Ophthalmology Department and Innovations Department at Khoo Teck Puat Hospital to run on both IOS and Android platforms. It utilised the SP camera optics to capture COI of the external eye, anterior segment, (using a slit-lamp adapter) and fundus (using a retinal adapter). The SP also functioned as an optical reader to automatically register the barcode on the patient's identity label as a named patient folder. The EGA then seamlessly uploaded the named file (with COI) to the hospital server via a secured Wi-Fi network using Wireless Protected Access 2 (WPA2).

**Results:**

The COI taken on the SP were time-stamped and automatically archived into designated folders in the hospital server. The folders were accessible via the hospital secured local area network (Intranet) for telemedicine usage. Data security is of utmost importance to protect patient confidentiality. All access to the patients' folders and images are protected through regular password resets; controlled, authorised access; and removing all patient identifiers on the COI during tele-Ophthalmology interactions.

**Discussion & Conclusion:**

The EGA facilitated the archival and remote access of COI taken on a SP in a user friendly, seamless, accurate and secured manner for tele-Ophthalmology.

**PP-HSR-11**

**Factors Affecting the Length of Stay for Patients With Total Knee Replacement (TKR) in a Local Acute Hospital**

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**Background & Hypothesis:**

The current length of postoperation stay (LOS), for TKR patients in Tan Tock Seng Hospital, Singapore is 6 days, with about 40% of these patients staying beyond 6 days. Increased length of stay is associated with longer turnaround time for bed days, increased medical and rehabilitation costs as well as increased patient risk of infections. The aim of the study is to evaluate the factors that may affect the LOS of TKR patients in an acute setting.

**Methods:**

A retrospective analysis was done for 96 TKR patients discharged between September 2013 and October 2013. Factors such as type of TKR, gender, age, postoperation ambulatory status and availability of caregiver upon discharge, were analysed for their effect on LOS and discharge destinations.

**Results:**

The availability of caregiver upon discharge was shown to be correlated to the LOS ( $P = 0.0079$ ). The other factors did not affect the LOS. Compared to patients without caregivers, patients with carer spent a mean of 2.5 days less before discharge ( $P = 0.001$ ), and are less likely to be discharged to community hospitals ( $P < 0.001$ ); odd ratio (OR) was 0.021.

**Discussion & Conclusion:**

The results seemed to suggest that preoperative discharge counselling and planning to identify a caregiver may be useful to facilitate shorter LOS for TKR patients. Cases with no caregiver can be flagged to case managers, and if indicated, an early referral to community hospitals can be initiated. A transdisciplinary TKR preoperation group education which includes discharge planning will be conducted in the future to evaluate the effectiveness in LOS reduction.

**PP-HSR-12**

**Undifferentiated Abdominal Pain in the Elderly: What Happened To Them After the ED Consult?**

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**Background & Hypothesis:**

Undifferentiated abdominal pain in the elderly is a diagnostic challenge for the emergency physician. This paper attempts to elucidate the outcome of these patients after the emergency consult.

**Methods:**

This is a retrospective case review from 22 January 2011 to 21 January 2012. Patients >65 years old who presented with an emergency department (ED) diagnosis of 'undifferentiated abdominal pain' were included. The following variables were collected: 1) Age; 2) Abnormal vital signs; 3) Admitted or discharged; 3) Imaging performed; 4) Endoscopy performed; and 5) Final diagnosis.

**Results:**

A total of 925 patients aged >65 years old presented with the complaint of abdominal pain during the study period; 381 (41.2%) patients had an ED diagnosis of 'undifferentiated abdominal pain'. The mean age was 76.7 years old; 290 (76.1%) patients were admitted; 66 (17.2%) had at least 1 abnormal vital sign. Of the admitted patients, 256 (88.3%) had X-rays done; 142 (49%) underwent CT abdomen/pelvis (CTAP); 66 (22.8%) underwent oesogastroduodenoscopy (OGD) and 7 (0.02%) underwent colonoscopy. The cause of abdominal pain in 30 (10.3%) patients remained unknown. Seventy-four (25.5%) patients had a diagnosis not related to the gastrointestinal tract. Of the discharged patients, 66 (72.5%) had X-rays done, 14 (15.4%) underwent CTAP; 7 (7.69%) and 6 (6.59%) underwent OGD and colonoscopy respectively. Thirteen (14.2%) patients had no definite diagnosis even after investigations.

**Discussion & Conclusion:**

A significant number of elderly patients has undifferentiated abdominal pain in ED. Admitted patients had CTAP done more frequently.

**PP-HSR-13**

**Five Moments of Hand Hygiene – What it Means to the Anaesthetist**

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**Background & Hypothesis:**

The 5 moments of hand hygiene has been one of the key practices in reducing hospital acquired infection. We did an audit of handwashing rates among anaesthetists in operating theatre (OT). A total of 60 % to 70% of anaesthetists wash their hands after they have handed over their patients to the recovery room. We carried out a survey among anaesthetists to determine their hand hygiene practice to derive agreed practices for our department.

**Methods:**

A survey form was given out to our department. This covered practices of anaesthetist in the OT before and after touching patients, before and after a clean procedure, after body fluid exposure risk and after touching patient surroundings.

**Results:**

We had 25 responses out of 40 questionnaires given out; 68% of anaesthetists will wash their hands (HW) or use alcohol rub (AR) before the start of the OT list; 84% to 88% of anaesthetists will wear gloves, wash their hands or use alcohol rub before or after handling patients; 40% will not wash their hands before giving medication; 75% will use full barrier for sterile procedures like giving spinal, epidurals and peripheral catheter insertion while the rest will hand wash and use sterile gloves only. Surprisingly, 75% will not wash their hands either before or after touching computers or case notes.

**Discussion & Conclusion:**

This survey helped us understand individual practices of hand hygiene. While an understanding of hand hygiene practices were high, there were a few ambiguous areas. With this survey, we were able to formulate agreed practices for our department.

PP-NR-01

**Widespread Use of Chlorhexidine and Octenidine for Methicillin Resistant *Staphylococcus Aureus* Decolonisation Does Not Lead to Development of Resistance**

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**Background & Hypothesis:**

Methicillin resistant *Staphylococcus aureus* (MRSA) is highly prevalent in hospitals worldwide, including Singapore. Strategies to contain MRSA include active surveillance and cohorting. Universal decolonisation with antiseptics such as chlorhexidine have been shown to reduce MRSA infection, mainly in intensive care units. There is less evidence of its efficacy in long-stay general wards. Use of octenidine has also been suggested as an alternative. There have also been concerns raised about the potential for development of resistance to both products.

**Methods:**

In an attempt to reduce MRSA acquisition, we initiated routine antiseptic baths for patients in 2 long-stay wards starting from August 2013. Patients were bathed with antiseptic instead of their usual soap. One ward used chlorhexidine while the other ward used octenidine. Test of resistance to both disinfectants on randomly selected isolates, at the start of the study, and at the end of 6 months were performed using MIC testing.

**Results:**

Over 6 months, there were 71 patients in Ward A who had chlorhexidine baths, and 65 in Ward B who had octenidine baths. All patients had MICs that were in the susceptible range to both chlorhexidine and octenidine at the beginning of the study, and there was no significant change in MIC levels of isolates taken at the end of 6 months.

**Discussion & Conclusion:**

Widespread use of chlorhexidine and octenidine for methicillin resistant *Staphylococcus aureus* decolonisation did not lead to development of resistance.

**PP-NR-02**

**To Increase the Percentage of General Surgery (GS) Inpatients Going for Colonoscopy in Level 11 With Boston Score at Least 6 From 35% to 80% in Tan Tock Seng Hospital**

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**Background & Hypothesis:**

Adequate bowel preparation is essential before a colonoscopy, allowing us to make a proper examination of the entire mucosa. Diagnostic accuracy and therapeutic safety of colonoscopy depends on the quality of the colonic preparation.

**Methods:**

To meet an optimal bowel preparation, the Boston Bowel Preparation Scale (BBPS), which is a validated and reliable scale, is used to assess the cleanliness of the colon during colonoscopy. Inadequately cleansed bowel as a result of an insufficient bowel preparation may result in prolonged length of stay, additional colonoscopy time and increased cost for patients. In Tan Tock Seng Hospital, the first baseline study on inpatient bowel preparation with Boston Score  $\geq 6$  conducted in March 2013 was only 35%. The team developed a bowel preparation guideline and regime, as well as a motion chart to address the issue of no proper patient education and no reference of bowel preparation outcome. However, "Rescue Bowel Preparation" was implemented to activate if the bowel preparation is insufficient.

**Results:**

The team achieved approximately 70% of GS inpatients going for colonoscopy in level 11 with Boston Score of at least 6 and this led to a potential money saving of \$500 from each patient.

**Discussion & Conclusion:**

The project has been implemented in the general surgery wards.

PP-NR-03

**Unique Risk Factors for Hypoglycaemia in the Elderly Diabetic – A Review of Patients Managed in Primary Care**

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**Background & Hypothesis:**

Hypoglycaemia is defined as a serum glucose level less than 4 mmol/L and can be divided into asymptomatic and symptomatic hypoglycaemia. The aim of this study was to look for unique risk factors for symptomatic and asymptomatic hypoglycaemia in the elderly diabetic patient.

**Methods:**

Demographic data, presence of symptoms, risk factors for hypoglycaemia, and measures taken were recorded after initial correction of hypoglycaemia for all patients with serum glucose level less than 4 mmol/L detected at the laboratory in 2012 and 2013 after review by the care managers.

**Results:**

A total of 222 patients were treated for laboratory-detected hypoglycaemia in the 2-year period; 114 (51.4%) were more than 65 years old. The elderly presented with higher fasting serum glucose levels (3.57 mmol/L vs. 3.45 mmol/L,  $P = 0.01$ ) and had a higher HbA1c level than younger patients (7.42% vs. 7.35%,  $P = 0.01$ ). Elderly patients with previous hypoglycaemia were more likely to present with symptomatic hypoglycaemia (59.1% vs. 29.0%,  $P = 0.006$ ). There was no significant difference in the proportion of patients who were on insulin therapy, recent increase in medications or administered medications on the day of their laboratory test. Linear regression showed that overfasting and HbA1c level less than 7% were significant for a lower fasting serum glucose level in the elderly.

**Discussion & Conclusion:**

Elderly patients have increased risk of hypoglycaemia at higher HbA1c and fasting blood glucose levels in comparison with younger patients. Overfasting and a HbA1c level less than 7% are unique risk factors for worse hypoglycaemia in the elderly patients. Other risk factors for hypoglycaemia affect all patients in similar proportions.

**PP-NR-04**

**Improving Nursing Documentation on Pain Assessment for Patients With Keloids in National Skin Centre**

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<sup>1</sup>*National Skin Centre, Singapore*

**Background & Hypothesis:**

Keloid scars can cause itch and pain due to stimulation of small nerve fibres as part of the scar healing process. Due to the itch and pain caused by keloids, it is important to assess patient pain score both before and after injections. Hence, we sought to standardise the nursing pain assessment, and understand pain scores and management of patients undergoing injections for keloids.

**Methods:**

A survey of nurses was conducted at prestandardisation and poststandardisation of the pain assessment. A standardised pain reporting method was developed, and nurses were trained using pep talks and e-learning. Poststandardisation, nursing audits were carried out to assess the adherence of staff. Preprocedural and postprocedural pain assessments were obtained using electronic medical records.

**Results:**

A survey of 40 nurses was conducted in June 2013 and June 2014. Poststandardisation, there was a 50% increase in nurses obtaining prepain score (prestandardisation: 50%, poststandardisation: 100%). There was a 25% increase in nurses (prestandardisation: 50%, poststandardisation: 75%) obtaining postprocedural pain score using the standardised pain assessment method (2 to 5 minutes after procedure). Nursing audit was conducted on 40 procedures (16 nurses) poststandardisation from September 2013 to December 2013; 92.5% of them obtained prepain score, and 100% obtained postpain score 2 to 5 minutes after procedure. From electronic medical records, no significant differences were found in patient characteristic, pre and postintervention pain scores, and pain management techniques.

**Discussion & Conclusion:**

A standardised pain assessment is necessary to ensure consistency of care delivery. Nursing education and audits are essential to ensure that nurses are aware of the standard pain assessment methods.

PP-NR-05

**To Evaluate Tan Tock Seng Hospital Registered Nurses' Knowledge of Epidural Analgesia and Nursing Management**

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<sup>1</sup>*Tan Tock Seng Hospital, Singapore*

**Background & Hypothesis:**

Epidural analgesia for postoperative pain control is commonly used in Tan Tock Seng Hospital. Registered nurses (RNs) are involved in the nursing care of these patients. Their knowledge, ability to assess, identify and manage complications is important for good pain management and optimal patient outcomes such as speedy recovery and reduced hospital stay.

**Methods:**

A questionnaire comprising of 18 multiple choice questions was developed in consultation with a pain specialist. It tested 54 components of the RNs' knowledge of epidural analgesia, namely, motor blockade assessment using bromage scale, epidural complications, epidural anatomy, pharmacology and nursing care in accordance to the hospital clinical guidelines and nursing management. Questionnaire was piloted on 10 RNs working in the Post Anaesthesia Care Unit who routinely nurse patients with epidural analgesia. The finalised questionnaire was deployed on RNs working in 5 surgical wards prior to attending an epidural teaching session.

**Results:**

A total of 53 RNs completed the questionnaire, 62% of them have nursed patients with epidural analgesia. The average score achieved was 9 out of 18 with a standard deviation of 2. Respondents demonstrated good knowledge of motor blockade assessment (85% passing that component of the questionnaire), identifying complications (81% passes) and nursing care of epidural patients (75% passes). Fairly poor knowledge on epidural anatomy (43% passes) and pharmacology (45% passes) were noted.

**Discussion & Conclusion:**

The results demonstrated room for improvement on the nurses' knowledge of epidural anatomy and pharmacology. There is a need to review the epidural education programme and to conduct a post-teaching test to check for successful knowledge transfer.

**PP-NR-06**

**Extended Role for Female Nurse-led Services at Department of Sexually Transmitted Infection (STI) Control (DSC) in Women's Clinic**

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**Background & Hypothesis:**

DSC aims to provide a conducive environment specifically for female patients who require sexual health services. Hence, the women's clinic was started in 2004 whereby patients were attended by female staffs. In the past, all patients would be clerked first by doctors, who will delegate the screening/treatments to the nurses. Nurse-led services were introduced in mid-December 2013.

**Methods:**

All asymptomatic female patients were diverted to the nurses first instead to the doctor. A female nurse was tasked to assess patients' conditions, clerked cases, and determined type of tests required. Attending doctor was briefed about the case and tasked to perform genital inspection. Thereafter, patient's immediate results will be reviewed.

**Results:**

The increase of various services, displays a demand of screening and treatment by the nurses and these services are within the scope of a nurse's profession. There were 117 cases clerked by nurse-led from January till May 2014. Of which, 71 were asymptomatic cases, and 46 symptomatic cases were detected during nurse-led. With the time spent with the nurse, there'll be rapport established, hence a trust is built, and patients will feel more at ease.

**Discussion & Conclusion:**

Nurse-led services had proven to be feasible. The skills rendered by the nurses are recognised, and in return, nurses have to constantly upgrade to stay relevant in order to administer this service.

PP-NR-07

## Reduce Administration Rate of PRN Bedtime Sedative in Acute Psychogeriatric Ward

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### Background & Hypothesis:

Prescription and administration of bedtime PRN sedations are common in mental health facilities. However, research has shown that the use of sedation in the elderly increases fall risks, thereby leading to severe complications such as fractures. Therefore, it is the aim of this project is to “Reduce the high administration rate of bedtime PRN sedatives by nurses in the acute psychogeriatric ward by 30% in 6 months”.

### Methods:

Baseline data collected for 8 weeks showed an average administration rate of bedtime PRN sedatives of 95%. Using the cause and effect diagram, the team voted and identified 7 root causes. The Pareto principles were used to further brainstorm and prioritise the root causes. Team members deliberated and developed solutions to address the root causes. Four interventions were implemented with 2 weeks in-between to allow effectiveness of each to be observed. During this period, certain routines and beliefs were righted.

### Results:

Data collected over 8 weeks, postimplementation of interventions showed that average administration rate of bedtime sedation has greatly reduced from 95% to 44%; a total reduction of 51%. This was an overachievement of 21% from the target set.

### Discussion & Conclusion:

Reduction of unnecessary administration of sedatives resulted in lesser workload and documentation. Time saved allowed staff to conduct value-added activities for patients. The risk of fall was decreased and customer satisfaction level was increased. Administration of sedation should only be considered after other alternatives had been exhausted. With modification of the ward environment and education to patients and nurses, use of unnecessary sedation can be reduced.

**PP-PCR-01**

**Outcomes Using a Team-based Care Model for Managing Stable Hypertension and Hyperlipidaemia in Primary Care**

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**Background & Hypothesis:**

Management of chronic diseases is an increasing load on polyclinics in Singapore. A team-based model of care for hypertension and hyperlipidaemia eases the burden on physicians and allows greater participation by other healthcare professionals in providing care. Safety and good health outcomes of employing such a model of care needs to be established.

**Methods:**

A total of 388 patients recruited into a team-based care programme were compared against 88 eligible patients who declined participation and managed with traditional physician-only care. Patients of both groups had stable hyperlipidaemia and/or hypertension. Patients in the team-based care programme were followed-up at 6-months by either a nurse care manager, dietician or care coordinator. At 1-year, the programme was concluded with a physician consultation. Health outcomes (BP and LDL levels) and physician time-spent were compared between the 2 groups.

**Results:**

No significant difference in demographic and baseline BP and LDL between 2 groups ( $P > 0.05$ ). In both groups, majority of patients had stable BP  $< 140/90$  (programme: 86.67%; non-programme: 88.64%) and LDL  $< 3.4$  (programme: 86.33%; non-programme: 77.27%) at 1-year. There was no significant difference in final BP ( $P = 0.947$ ) and final LDL ( $P = 0.364$ ) between the 2 groups, adjusted for demographic and baseline BP and LDL. In the team-based care group, type of healthcare professional at 6-months follow-up had no significant effect on final BP and LDL ( $P > 0.05$ ). Average time-spent by physicians on each programme and non-programme patient were 15.24 mins (95% CI = 14.01-16.48) and 36.95 mins (95% CI = 34.60-39.31) respectively in 1-year.

**Discussion & Conclusion:**

A team-based care model in management of stable hypertension and hyperlipidaemia yields comparable health outcomes to a traditional physician-only model. This allows physicians to better utilise consultation time.

**PP-PCR-02**

**Implementing Best Practices on Sharps Prevention in Primary Care**

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**Background & Hypothesis:**

The Centers for Disease Control and Prevention estimated that 385,000 sharps and needle-sticks injuries are sustained by healthcare workers (HCW) in hospital settings annually, with the highest occurrence from after using and before sharps disposal (40%). The occupational exposure to infection such as hepatitis B, C and HIV poses a work hazard which can be minimised through safe practices and training. Our study aims to incorporate the Joanna Briggs Institute (JBI) sharps prevention practice into the polyclinics.

**Methods:**

The study was conducted in 4 local polyclinics between September 2013 and March 2014 to evaluate the extent for which sharps prevention was practised according to evidence-based practice. A prepost audit was conducted for nurses and laboratory staffs as they were frequently involved in handling hypodermic needles. The study team and the respective clinic's infection control advocates audited the fill level, accessibility of sharps containers and sharps disposal at the point-of-care according to the criteria from JBI Practical Application of Clinical Evidence System. Specific strategies were implemented to address the knowledge gaps and identified barriers.

**Results:**

Postintervention audit on 56 HCWs were analysed using the exact McNemar's test. A prepost intervention findings indicated statistical significance on 2 criteria consisting of easy accessibility to sharp box ( $P < 0.01$ ) and sharps disposal at the point of use ( $P < 0.01$ ).

**Discussion & Conclusion:**

The utilisation of evidence-based practice facilitated a culture of safety to minimise potential occupational hazards. The introduction of evidence-based educational programmes and audits were effective measures to increase compliance in sharps prevention practice.

**PP-PCR-03**

**Percutaneous Injuries Among Dental Professionals in the Primary Care Setting**

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**Background & Hypothesis:**

In the dental setting, avoiding percutaneous injuries remains the most effective way of preventing disease transmission. Accidents still occur resulting in exposure to potentially infectious materials. Identifying at-risk groups and procedures are useful in developing further controls. Aim: To analyse sharp injuries and its relationship to staff categories and whether experience was a factor for this category. A secondary aim is to evaluate the acceptance of current preventive measures.

**Methods:**

An analysis of injuries submitted through IRIS for 2013 was carried out to identify staff categories and procedures that are at higher risk of injury. An anonymous e-questionnaire survey was conducted among all 38 dentists in 2013.

**Results:**

Fifty percent (10/20) of the injuries occurred during fillings and extractions. Sharp injuries were common in certain job categories and it was statistically significant ( $P = 0.009$ ). Dentists had the highest occurrences of 14 (70%) incidences out of 20 occurrences. Dental assistants had a reduced risk of 84% of sustaining an injury compared with a dentist (OR = 0.16, 95% CL = 0.03-0.89). The sharp injuries were significantly associated with the staff of <1 year experience ( $P < 0.018$ ). Thirty (79%) responded to the e-questionnaire; 100% responded that training (Orientation/Competency) was useful in increasing awareness on Sharps Safety. Twenty-six (89%) found that sharing of incidences and constant reminders could further prevent sharp injury.

**Discussion & Conclusion:**

In the dental setting, dentist was the job category significantly associated with sharp injuries. Staff with <1 year of experience were found to be significantly higher risk. Orientation, Competency and sharing of past incidences were accepted as most useful in increasing sharp awareness and hence, its prevention among dentists.

**PP-PCR-04**

**Does the Preventer to Reliever Inhaler Dispensing Ratio Correlate With Nebulisation Rates for Asthma Patients in a Primary Care Setting? A Cross-sectional Study**

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**Background & Hypothesis:**

Several studies have demonstrated an association between the preventer to reliever inhaler dispensing ratio (PR ratio) and the control of asthma, leading to suggestions that the PR ratio may be a good practice quality indicator in the management of patients with asthma. However, there were instances that this association was seen only in selected patient populations or practice centres. This study aims to evaluate if the association between PR ratio and asthma control exists for the patients in our practice.

**Methods:**

This was a cross-sectional study across 9 polyclinics. The ratio of preventer to reliever inhalers dispensed to our patients with asthma was obtained every month for the period April 2013 to May 2014. The monthly nebulisation rates and asthma control test scores (ACT) were also extracted for the same time frame. The Spearman test was applied to investigate the possible correlation between the variables of interest.

**Results:**

The nebulisation rates ranged from 5.33% to 7.33% while the PR ratio ranged from 1.70 to 2.01. The Spearman correlation coefficient (rho) for PR ratio versus nebulisation rate was 0.3147 ( $P = 0.273$ ), while rho for PR ratio versus ACT score was 0.3204 ( $P = 0.264$ ).

**Discussion & Conclusion:**

The correlations between PR ratio and nebulisation rates or ACT scores were not statistically significant. This may imply that the PR ratio does not predict the control of asthma for the patients in our practice. This study is however limited by the low number of data points and the narrow ranges of PR ratio and nebulisation rates.

**PP-PCR-05**

**Diabetic Patients at the National Healthcare Group Polyclinics Who Required Hospitalisation due to Hypoglycaemia**

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**Background & Hypothesis:**

Aim: To study the profile of diabetic patients with hypoglycaemia discharged from the National University Hospital (NUH).

**Methods:**

Retrospective case note review was done for patients with hypoglycaemia discharged from NUH and all other diabetic patients managed in 5 polyclinics from November 2008 to January 2010. Laboratory data were retrieved using Business Intelligence module and Chronic Disease Management database. Data analysis was performed using SPSS v19.

**Results:**

Among the 120 patients discharged from NUH, 68.3% were female versus 53.1% among control group ( $P = 0.001$ , Chi-square test). The mean age of study group was 71 years old with 56.7% of the patients being  $\geq 65$  years old versus 39.8% of control group ( $P < 0.001$ , Chi-square test). The mean HbA1c for study and control groups were 7.3% and 7.5% respectively. The study group had higher prevalence of complications versus the control group ( $P < 0.001$ , Chi-square test): coronary artery disease (37.5%; 16.8%), heart failure (16.7%; 2.6%), stroke (23.3%; 9.4%), chronic kidney disease (CKD) (81.8%; 49.1%) and among those with nephropathy, the prevalence of CKD 3 to 5 was 49.1% and 16.1%, respectively. The commonest causes of hypoglycaemia were poor oral intake (52.5%, of which 16.7% had infection) and tight glycaemic control (30%). By avoiding strict glycaemic control among at-risk patients and equipping patients and caregivers with skills on management of sick days, the incidence of hypoglycaemia had reduced from 1.8% in 2008 to 0.9% by 2013.

**Discussion & Conclusion:**

Less stringent glycaemic control of at-risk patients and patient empowerment are useful in reducing the incidence of hypoglycaemia.

**PP-PCR-06**

**Safety Leadership Walkabout at National Healthcare Group Polyclinics**

**CK LIM<sup>1</sup>, EL CHUA<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

**Background & Hypothesis:**

National Healthcare Group Polyclinic (NHGP) had initiated Safety Leadership Walkabout (SLW) at our clinics, to act as a direct channel of communication and discussion between staff and institution management in promoting safety culture and identifying opportunities for improvement.

**Methods:**

SLW begins with presentation of safety-related data, discussion session between senior management and representative from the ground, followed by a walkabout at the clinic. Safety concerns were gathered through observations and staff interviews. Reports circulated and progress updates were obtained periodically.

**Results:**

SLW had been completed for each of our 9 Polyclinics between July 2012 and November 2013. A total of 107 safety concerns were identified, of which, 61 safety concerns (57%) had been completely rectified, 34 (31.8%) have active improvement work in progress, while 12 (11.2%) were kept in view to be incorporated into the design of new facilities.

**Discussion & Conclusion:**

SLW had successfully involved the ground staff in sharing their safety concerns and the progress of rectification for each safety concerns was monitored closely. A few areas for improvement had been identified: Effectiveness of SLW was not monitored; lack of channel for further discussion post-SLW; lack of proper categorisation of safety concerns; lack of feedback loop to the ground regarding the interventions. A few improvements had been proposed: Pre and postquestionnaires to evaluate effectiveness of SLW; Vincent's taxonomy to categorise safety issues raised for data analysis; IT enhancement to facilitate the communication and follow-ups; Sharing of interventions in newsletter.

**PP-PCR-07**

**Effectiveness of Group Diabetes Education for Newly Diagnosed Type 2 Diabetes Mellitus Patients in the Primary Care Setting**

**SM NG<sup>1</sup>, SM NG<sup>1</sup>, YF SIM<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

**Background & Hypothesis:**

Diabetes self-management education is an integral component of diabetes management contributing towards positive patient outcomes. This study aims to investigate the effectiveness of group education (GE), compared with individual education (IE) on patients' self-care activities and metabolic outcomes.

**Methods:**

Newly diagnosed DM patients are allocated to receive GE or IE. Fifty (21 from GE; 29 from IE) patients completed the 3-month follow-up are included in preliminary analysis. Summary of Diabetes Self-Care Activities (SDSCA) questionnaire is administered at baseline and 3-months to monitor lifestyles changes. HbA1c and weight are also taken. Non-parametric statistical tests are employed to evaluate within-intervention effect and intervention effect between the 2 groups.

**Results:**

Demographic and baseline characteristics between the 2 groups are balanced ( $P > 0.05$ ). At 3-months, on average, patients receiving GE spend 1.55 days/week more (95%CI = 0.31-2.79) on exercise. These patients also report increasing 1.40 days/week (95%CI = 0.50-2.29) in performing footcare at 3-months, while patients receiving IE report 1.23 days/week more (95%CI = 0.51-1.95). However, difference between groups is not significant ( $P = 0.984$ ). Trend in home monitoring, less cigarettes smoked, and better diet adherence are observed in GE group, however these improvements are not significant ( $P > 0.05$ ). HbA1c significantly decrease in both groups (mean = 1.35% for GE; mean = 1.02% for IE) at 3-months, but difference between the groups is not significant ( $P = 0.395$ ).

**Discussion & Conclusion:**

GE results in significant changes in patients' self-care activities at 3-months. Patients receiving GE are doing more exercise due to the benefit of peer support in setting goal and resulting in significant decrease in weight (mean = 1.25kg, 95% = 0.33-2.17). This study is continued for 1 year to evaluate the long-term effect of GE and IE.

**PP-PCR-08**

**Does Nurse-led Vaccination Lead to Increased Difficulty Completing Subsequent Developmental Assessment in Children Below 18 Months of Age?**

**WLD NG<sup>1</sup>, XP CHANG<sup>1</sup>, AN HAN<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

**Background & Hypothesis:**

Vaccination practices differ across polyclinics in National Healthcare Group. Some polyclinics vaccinate children before developmental assessment once potential contraindications are excluded, while others only do so after. There are no studies favouring one approach over another. The aim of this study was to see if vaccination sequence led to increased difficulty with developmental assessment in children below 18 months of age.

**Methods:**

Over a 2-week period, children below 18 months were vaccinated by the nurse after excluding potential contraindications, then sent to the doctor for developmental assessment. In the subsequent 2-week period, all children were vaccinated after developmental assessment. The doctor who was blinded to vaccination sequence documented any inability to complete 1 or more parts of the developmental assessment in these children.

**Results:**

A total of 110 children were seen over the 4-week period. Seventy-nine (49.3%) were below 18 months of age; 39 (35.5%) were vaccinated before seeing the doctor. In children below 18 months of age, 2 (6.67%) children vaccinated before developmental assessment had problems with subsequent developmental assessment while 1 (3.03%) child had problems with developmental assessment despite not vaccinating the child beforehand ( $P = 0.49$ ). Children more than 18 months of age were more likely to have problems completing developmental assessment even though they were not vaccinated beforehand (19.4% vs. 3.80%,  $P = 0.007$ ).

**Discussion & Conclusion:**

Nurse-led vaccination before developmental assessment does not lead to increased difficulty completing developmental assessment in children below 18 months of age. Children 18 months of age and above have increased difficulty completing developmental assessment and should have developmental assessment performed first.

**PP-PCR-09**

**How NHGD Responds to the Current Emerging Pressure on the Increased Demand of Ultrasound Utilisation in Primary Healthcare Setting**

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<sup>1</sup>*National Healthcare Group Diagnostics, Singapore*

**Background & Hypothesis:**

Singapore has one of the fastest ageing populations in the world and it creates a major demand on increasing utilisation of health services and primary healthcare is vital in determining how well the health system responds to the current emerging pressure. Before NHGDiagnostics introduced portable ultrasound service, some patients of NHGPolyclinic who were referred for ultrasound scan had to do the procedure either in Ang Mo Kio, Yishun, Chua Chu Kang or Woodlands polyclinics. These patients had to wait for 2 months appointment waiting time and had to travel over long distance. The objective is to maximise the overall benefits to patient and the company and to identify the impact, be it tangible and intangible benefits.

**Methods:**

Data was collected to identify the impact of the new service, based on costs, quality of service, appointment waiting time and number of patients referred to other polyclinic.

**Results:**

From May 2013 to May 2014, a dramatic decrease was seen in the number of patients referred to other polyclinics; 2546 patients had undergone ultrasound procedure; 812 in Hougang, 638 in ToaPayoh, 401 in Clementi and 665 in Bukit Batok, respectively. Tangible and intangible benefits were clearly identified.

**Discussion & Conclusion:**

The implementation of the portable ultrasound is therefore a glorious example of NHGDiagnostics' commitment to its mission and it heralds a good future for the company as a whole where some elderly people who are based in old folks home and nursing home can gain access to ultrasound service, at bedside, without travelling and in the comfort of their home.

**PP-PCR-10**

**Systematic Identification of Smoking Patients for Smoking Cessation Engagement**

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**Background & Hypothesis:**

In 2010, the prevalence of daily smoking among Singaporean adults, aged 18 to 69 years, increased to 14.3% from 12.6% in 2004. In Choa Chu Kang Polyclinic (CCK) there is no systematic approach towards identifying smoking patients for engagement in smoking cessation, even though smoking remains a major risk factor for coronary heart disease.

**Methods:**

This study aims to increase the percentage of CCK's smoking patients who are systematically identified for engagement in smoking cessation. Patients aged 18 years and above having acute complaints were targeted. The intervention adopted the 5A's approach. Every acute patient was first "asked" about their smoking status and then "advised", "assessed", "assisted" and "arranged" for follow-up, if found to be a smoker. Various healthcare professionals performed the 5A's function at multiple touch points. A total of 324 patients were surveyed preintervention and 269 patients postintervention.

**Results:**

Smoking Status Enquiry rate (SSER) measured the proportion of interviewees who were "asked" about their smoking status. The Mean Smoker Engagement Score (MSES) provided a perfect score of 5 points if a smoking patient was fully engaged using the 5A's approach. Overall preintervention SSER was 25%. Twenty-six smokers were identified with MSES of 2.65 points. Postintervention results show SSER was 77% and MSES was 3.47 among the 60 smokers identified.

**Discussion & Conclusion:**

The multiple touch point intervention improved the systematic identification and engagement of smoking patients through patient-centred division of labour. It demonstrated that a health promotion workflow can be integrated into a busy polyclinic setting, making it worthwhile to explore this new approach.

**PP-PCR-11**

**Correlation Between Motivational Determinants and Its Impact on Beliefs, Attitude and Practice in Hand Hygiene**

**CC YAN<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

**Background & Hypothesis:**

Infectious diseases caused by microorganisms accounts for a significant percentage of all deaths worldwide and are a major threat to public health. About 10% to 70% of most infections occurring in healthcare can be prevented. Despite evidence indicating the effectiveness of hand hygiene in reducing healthcare-associated infections (HAI), compliance among healthcare workers are around 50%. New ideas are required taking into account the intricacy surrounding the dynamic of behavioural change to promote hand hygiene compliance. The self-determination theory (SDT) has been found to be effective in promoting effective functioning and behavioural outcomes. This study aims to examine the correlation between motivational determinants in SDT and hand hygiene beliefs, attitude and practice.

**Methods:**

A pilot study on a convenience sampling of 30 primary care nurses was carried out to test the questionnaire. Participation was voluntary and confidentiality was maintained. The questionnaire consists of demographic profiles, self-regulation questionnaires (SRQ) on a 7-point scale and beliefs, attitude and practice on a 5-point scale.

**Results:**

Cronbach A coefficient for SRQ ranged from 0.55 to 0.89 while the hand hygiene beliefs, attitude and practice scale ranged from 0.60 to 0.93. Univariate analysis on the relationship between SRQ motivational determinants and self-reported hand hygiene practice inventory identified several variables that were significantly correlated. Beliefs was significantly correlated to autonomy ( $r = 0.40$ ,  $P < 0.02$ ).

**Discussion & Conclusion:**

Primary care nurses' beliefs on hand hygiene are associated with autonomy support. Autonomy support is an important variable to consider in interventions aimed at improving compliance on hand hygiene practice. Improved hand hygiene compliance can prevent the transmission of harmful microorganisms.

## PP-PCR-12

### Detecting Harm in National Healthcare Group, Singapore Polyclinics

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#### **Background & Hypothesis:**

While studies on harm in acute hospital setting are common, there is no similar study in our local primary care. This first study for harm detection by National Healthcare Group, Singapore Polyclinics (NHGP) aims to identify prevalence of harm to patients in our 9 polyclinics and to evaluate the National Healthcare System Primary Care Trigger Tool (NHS-PCTT) and the Institute of Healthcare Improvement Outpatient Trigger Tool (IHI-OTT) for future use.

#### **Methods:**

Random sampling of 1350 patient records from 9 NHG Polyclinics from 2012 was carried out. Inclusion criteria were age >18 years with at least 3 visits to the NHGP. Two primary reviewers screened these records independently. Physicians further reviewed these positive records to confirm the harm and grade its severity, preventability and origin.

#### **Results:**

NHS-PCTT detected 703 positive triggers and 60 incidences of harm in 8344 visits, representing a rate of 4.3% or 6.2 harm per 1000 visits. IHI-OTT found 1303 positive triggers and 70 incidences of harm, representing a rate of 4.9%, or 8.4 harm per 1000 visits. IHI-OTT detected all the episodes of harm picked up by NHS-PCTT. Majority of harm (90%) was temporary; 86% were drug-related injuries and 74% originated from NHGP. In both sets of tool, the trigger relating to cessation of medication had the highest predictable value.

#### **Discussion & Conclusion:**

The overall harm rate of 4.9% was higher than that reported by voluntary methods. The retrospective chart review using trigger tool methodology complements current voluntary reporting. However, the list of triggers would need to be reviewed and modified.

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