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## 1<sup>st</sup> Singapore Health & Biomedical Congress

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**1<sup>st</sup> Singapore Health & Biomedical Congress (SHBC) 2010**

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**SG-CIA-01**

**Velo-Cardio-Facial Syndrome Related Gene Influences Neurocognitive and Neuroanatomical Intermediate Phenotypes in Chinese Patients with Schizophrenia**

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**Background/Hypothesis:** There are notable similarities between Velo-Cardio-Facial Syndrome (VCFS) and schizophrenia in terms of neurocognitive deficits and brain structural abnormalities. These similarities have supported the role of the armadillo repeat gene deleted in VCFS (ARVCF gene) as a susceptibility gene in schizophrenia. This study investigates the relationships between haplotypes of ARVCF gene and specific intermediate phenotypes in schizophrenia. Based on extant data, we hypothesise that specific ARVCF gene haplotypes reduce the caudate nucleus volume, fractional anisotropy and neurocognitive functioning in schizophrenia.

**Methods:** Blood samples from 200 Chinese participants (125 schizophrenia patients and 75 healthy controls) were genotyped, a subset of 166 participants underwent structural magnetic resonance imaging (sMRI), diffusion tensor imaging (DTI), and completed neuropsychological testing.

**Results:** A haplotype, ARVCF-Hap1 (TGATTGGCTGT), is significantly associated with fractional anisotropy of the caudate nucleus and executive functioning in patients. Specifically, patients with more copies of ARVCF-Hap1 have lower white matter integrity in caudate nucleus ( $P = 0.0008$ ) and greater perseverative errors ( $P = 0.00003$ ) on the Wisconsin Card Sorting Test. A trend of lower caudate volume ( $P = 0.015$ ) in patients with more copies of ARVCF-Hap1 is also observed.

**Discussion & Conclusion:** These findings are consistent with known ARVCF gene effects on neurodevelopment in terms of cellular arrangement, migration and intracellular signaling involving the striatum and may involve interactions with other brain networks such as prefrontal cortex, and underscore the importance of imaging-genetic studies to elucidate the genetic influences underlying intermediate phenotypes in complex neurobehavioural disorders.

## SG-CIA-02

### **A1C and Fasting Plasma Glucose: Diagnosis of Diabetes Mellitus and Correlation with Diabetes Related Complications in Asians**

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**Background/Hypothesis:** A glycated haemoglobin A1C (A1C)  $\geq 6.5\%$  has been recommended for the diagnosis of diabetes mellitus (DM). However, the relationship between A1C levels and diabetes complications has been limited to retinopathy. In addition, the agreement between A1C and fasting plasma glucose (FPG) in diagnosing DM has not been examined in populations of Asian ethnicity. We compared A1C and FPG for the diagnosis of DM and the ability to identify individuals in relation to the full range of diabetic micro- and macro-vascular complications.

**Methods:** We recruited 3897 Chinese, Malay and Indian individuals in a cross-sectional study. FPG and A1C were measured. Retinopathy was assessed from retinal photographs following standardised protocols. Peripheral neuropathy was defined as abnormal responses to a 10-g monofilament or neurothesiometer test. Chronic kidney disease was defined using presence of albuminuria (urine albumin:creatinine ratio  $>30\mu\text{g}/\text{mg}$ ) and estimated glomerular filtration rate, alone and in combination. Peripheral artery disease was defined as an ankle brachial index  $\leq 0.9$ . Stroke and coronary artery disease were assessed by standardised questionnaire.

**Results:** We found 325 patients (7.7%) had known DM. Of the remaining, 161 (4.1%) had FPG  $\geq 7.0\text{mmol}/\text{l}$  with no history of DM, of which 9 (0.2%) had A1C  $< 6.5\%$ . An additional 268 had A1C  $\geq 6.5\%$  with FPG  $< 7.0\text{mmol}/\text{l}$  and no history of DM. Agreement between the two criteria was 92.9%. The areas under the receiver operating characteristics curves (AUC) were similar for both FPG and A1C in relation to all diabetes related complications except for peripheral neuropathy (AUC greater for A1C,  $P = 0.015$ ). A1C  $\geq 6.5\%$  had greater sensitivity and lower specificity than FPG  $\geq 7.0\text{mmol}/\text{l}$  for identifying those with complications.

**Discussion & Conclusion:** In this Asian population, A1C  $\geq 6.5\%$  and FPG  $\geq 7.0\text{mmol}/\text{l}$  showed agreement in diagnosing DM and had similar ability to discriminate between those with and without diabetes associated complications.



**SG-CIA-03**

**Pyrosequencing as a Cost Effective Method for Early Detection of Hepatitis B Virus Drug Resistance Mutations**

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**Background/Hypothesis:** Hepatitis B drug resistance assay is important for guiding therapy after the development of virologic breakthrough for patients receiving nucleoside/-tide analogue therapy. However, the existing genotyping tools are costly or lack sensitivity to detect mixed genotypes, and new method of resistant mutation detection is needed.

**Methods:** We developed an assay protocol for clinical application using pyrosequencing method, capable of detecting all known validated Hepatitis B Virus (HBV) polymerase gene mutations that imparts resistance to lamivudine, adefovir, telbivudine and entecavir. Twenty-three serum samples with known HBV resistance genotypes, previously tested with a commercial line probe assay, were used for validation. Where there were discrepancies between the two methods, sequencing by Sanger's method was used for confirmation. Serial serum samples from a single patient who developed primary entecavir resistance were analysed.

**Results:** Our pyrosequencing method accurately identified all the cloned polymerase genotypes, and was able to distinguish as little as 5% of mutant populations. Analysis on 8 serial samples from a patient who eventually developed primary entecavir resistance demonstrated rtM204, rtL180 and rtS202 mutations as early as 2 weeks after commencement of therapy, when the mutations existed in a minor population. The assay can be performed on serum sample with HBV DNA of as low as 2 log copies/ml (by real-time PCR). The cost per test was less than a quarter of the existing commercial assay.

**Discussion & Conclusion:** HBV drug resistance pyrosequencing assay was more accurate and sensitive and cheaper compared with the existing methods. It can detect minor populations of drug resistant clones earlier, before the drug resistant clones become dominant, allowing opportunity for earlier change of therapy.

## SG-CIA-04

### Isolation and Characterization of a Novel Stem Cell Population from Human Umbilical Cord

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**Background/Hypothesis:** Transplantation of umbilical cord derived stem cells is a promising new treatment modality. Our aim was to isolate and characterise a novel stem cell population from human umbilical cord with a high proliferative capacity that can be used as a readily available source of stem cells for clinical transplantation.

**Methods:** A new cell type, mucin-expressing umbilical cord lining cell (UCLC-muc), was isolated from human umbilical cord by explant-culture in PTTe-1 media. Flow-cytometry was performed to define the cell-types. Proliferation assays (colony forming efficiency, population doublings, BrdU-ELISA assay) were used to analyse the cell growth characteristics. Gene expression was evaluated by RT-PCR and immunocytochemistry. BMP4 induced differentiation of UCLC-muc into mature epithelial cells and the molecular mechanisms underlying this pathway were analysed. UCLC-muc sheets were transplanted onto the denuded surface of rabbit eyes and monitored for 8 weeks.

**Results:** UCLC-muc were highly proliferative and expressed epithelial and mesenchymal antigens CD166, CD73, CD105, CD151 and Mucin1, as well as cytokeratins CK7, CK14 and CK19. Embryonic stem cell markers Oct4, Nanog, Sox2, Rex1 and SSEA-4 were also expressed. MHC class I expression was abundant while MHC class II was absent. The cells expressed cytokeratins CK7, CK14 and CK19. BMP4 promoted differentiation into cornea epithelial-like cells that were CK3/12-positive via upregulating gata3, jagged1, notch1, hes1 and ikk $\alpha$ . Rabbit eyes transplanted with UCLC-muc sheets had clear, epithelialised corneas.

**Discussion & Conclusion:** We isolated a novel stem cell population (UCLC-muc) that was highly proliferative and exhibited mesenchymal and epithelial stem cell characteristics. These cells are less immunogenic, highly proliferative and easily available. This has potentially important clinical applications as UCLC-muc may be a readily available source of stem cells for clinical transplantation and epithelial regeneration.

**SG-CIA-05**

**The Cost-Effectiveness of Epidermal Growth Factor Mutation Testing and First Line Treatment with Gefitinib for Advanced Non-Small Cell Lung Cancer**

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**Background/Hypothesis:** Epidermal growth factor receptor (EGFR) testing and first line therapy with gefitinib is quickly becoming the standard option for the treatment of advanced Non-Small Cell Lung Cancer (NSLC). Yet, to date, no study has quantified the cost-effectiveness of this approach within an Asian population, where the prevalence of activating mutations is greater than among western populations.

**Methods:** A decision-analytic model was developed to determine the cost effectiveness of 1) EGFR testing and first line treatment with gefitinib for those who were tested positive vs 2) standard care, which included first line treatment with chemotherapy followed by gefitinib as second line treatment. The model used clinical and outcomes data from 3 randomised clinical trials and societal (non-subsidised) costs from 3 cancer treatment centres in Singapore. Health effects were expressed as quality-adjusted life years (QALY) gained. Costs include relevant costs for prescription medications, physician visits, laboratory tests, scans, hospitalisations and treatment of adverse events. All costs and cost-effectiveness ratios were expressed in 2010 Singapore Dollars. Sensitivity analyses were conducted to identify the extent to which the results were robust to key model assumptions.

**Results:** EGFR testing and first line treatment with gefitinib was found to be a dominant strategy (lower costs and greater effectiveness) compared to the standard care. Because the primary savings in the testing arm result from not providing gefitinib to those who do not benefit, this finding holds regardless of the percentage of patients who were tested positive for the mutation. In a secondary analysis, first line treatment with gefitinib was also dominant when compared to first line chemotherapy in patients with activating EGFR mutations.

**Discussion & Conclusion:** Based on these data, EGFR testing and first line treatment with gefitinib for patients with activating mutations should become a standard treatment in advanced NSLC.

## SG-AH-01

### Irregular Meal Timing is Associated with Helicobacter Pylori Infection and Gastritis

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**Background/Hypothesis:** Since its discovery, attention has been focused on Helicobacter pylori (HP) as the cause of gastritis, which may lead to gastric cancer. There has not been any published literature on the impact of irregular meals. This study aims to determine if prolonged irregular meals increase the risk of gastritis and HP infection.

**Methods:** Three hundred and twenty-three subjects consented to participate in this study. Of these, 234 had previously undergone endoscopic biopsies. Subjects were divided into 3 groups: Gastritis group (n = 100), Helicobacter pylori group (n = 121), and control group (n = 102: 18 with normal endoscopy results and 84 community-recruited subjects with no history or symptom of gastritis or HP). Subjects were interviewed retrospectively on their meal timings and eating habits prior to the diagnosis of HP or gastritis. Multivariate logistic regression was used to compare between the groups. Adjusted odds ratios (OR) were derived controlling for gender, age, stressful events and consumption of probiotics.

**Results:** Subjects who deviated from their regular meals for  $\geq 2$  hours were 11.3 times more likely to experience HP infection (95% CI: 5.3 to 33.3,  $P < 0.001$ ) and 6.1 times more likely to have gastritis (95% CI: 2.5 to 15.0,  $P < 0.001$ ). When the frequency of irregular meals was taken into consideration, subjects who deviated their meals by  $\geq 2$  hours for  $\geq 2$  times per week had an adjusted OR of 6.3 and 3.5 of getting HP infection (95% CI: 2.6 to 15.2,  $P < 0.001$ ) and gastritis (95% CI: 1.5 to 8.5,  $P < 0.001$ ), respectively. The mean duration of meal timing deviation was 8 years for the HP and gastritis groups. No significant differences were found in subjects who skipped meals or had inconsistent amount of food.

**Discussion & Conclusion:** Frequent deviation from the regular meal timing for a prolonged period of time seemed to be associated with increased risk of HP and gastritis. Regular meal timing may play an important role in the prevention of HP infection and gastritis.

## SG-AH-02

### **Pharmacist-Run Medication Management Clinic in Community Wellness Centre - A One-Year Review**

**BK LI, KS CHEE**

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**Background/Hypothesis:** Medication therapy management has been recognised as a useful tool for pharmacists to assist physicians and outpatients in managing the clinical and economic outcomes of pharmacotherapy. A pharmacist-run Medication Management Clinic (MMC) was started in Community Wellness Centre (CWC) in May 2009 as a clinical quality initiative to provide comprehensive medication management and psycho-education services to psychiatric outpatients.

**Methods:** Data from MMC services provided to CWC outpatients over one year was retrospectively analysed for clinical and economic outcomes. Clinical outcome was measured by drug-related problem (DRP) resolution rate. Economic outcome was measured by estimated cost avoidance (ECA) based on estimated patients' annual cost savings from unnecessary outpatient/emergency room visits and inpatient admissions (minimal estimated length of stay at subsidised class C ward), and reduced annual medication costs. ECA was calculated based on current Institution of Mental Health (IMH) rates.

**Results:** Over the period of a year, MMC managed a total of 1038 DRPs for 686 outpatients with 89% having 2 or less DRPs. Close to half of these outpatients were discharged from future MMC follow-ups. Proportion of outpatients lost to follow-up was 3%. The common DRPs managed were inappropriate anti-cholinergic use (43%) and inappropriate benzodiazepine use (23%), medication non-adherence (17%), adverse effects (12%), and sub-therapeutic efficacy (3%). For clinical outcome, 46% of the DRPs were resolved and 26% were partially resolved. For economic outcome, the mean annual ECA per patient was SGD89.40 and the mean annual ECA per DRP managed was SGD59.08.

**Discussion & Conclusion:** Pharmacist-run MMC in CWC produced positive clinical and economic outcomes for psychiatric outpatients.

**SG-AH-03**

**Use of Bismuth Breast Shields for Female Thoracic Computed Tomography Scan:  
Reduction of Radiation Dose and Image Quality Evaluation**

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**Background/Hypothesis:** Since the introduction of multi-detector Computed Tomography (CT), it has become the preferred radiological modality of choice in the diagnosis of many pathology and abnormality. However, this has also brought about an elevation in the risk of latent carcinogenic effects of the radiation on radiosensitive organs. The purpose of this study is to evaluate the efficacy of bismuth radio-protective shields in reducing the radiation dose to radiosensitive organs, and its effect on image quality during routine thoracic CT scans.

**Methods:** Radiation dose to the breast tissue was measured using an ionisation chamber in an anthropomorphic chest phantom. Bismuth breast shields (0.060mm Pb equivalent) was placed over the thoracic region with a 2cm-thick foam pad in between to reduce potential scatter radiation and artifacts. Scans were acquired on a Siemens 64-Slice CT scanner. Imaging parameters included 120kV, thickness of 5mm, 0.5-sec gantry rotation, pitch value of 1.5, and tube current (range, 90 to 180mA). Reduction of radiation dose was calculated base on readings taken from breast areas with and without the bismuth shielding. Forty-three consecutive patients referred for follow-up thoracic CT scans (mean age = 56 years) were performed with scanning parameters and placement of bismuth shielding consistent with those used for phantom test. Effect on the image quality was evaluated both qualitatively by an expert radiologist; and in terms of comparison of image, noise from shielded versus non-shielded areas.

**Results:** Phantom test revealed a reduction of 32% in radiation dose to the breast. In the qualitative evaluation of the scan images, all were considered to be of diagnostic quality with no perceptible difference in image quality in shielded versus non-shielded lung. No statistically significant difference of noise was measured.

**Discussion & Conclusion:** Bismuth breast shields for routine thoracic CT scan reduce the radiation dose without qualitative or quantitative changes in image quality.

## SG-NA-01

### Nutritional Risk of Patients with Cancer

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**Background/Hypothesis:** Malnutrition is a significant problem among patients with cancer receiving chemotherapy, and has often been associated with severe morbidity and mortality. However, in ambulatory settings, nutritional screening is typically not performed as part of the standard care to identify risk of malnutrition. Moreover, no follow-ups were carried out to examine the changes in nutritional risk of patients over the entire course of their chemotherapy treatment. Therefore, the purpose of this study is to determine at which period during the chemotherapy treatment that patients with cancer will begin to exhibit the signs and symptoms of malnutrition; and identify the risk factors which significantly increase the risk of developing malnutrition.

**Methods:** The survey was conducted from January 2009 to February 2010. A total of 111 patients were recruited using a purposive sampling method.

**Results:** Depending on the type of cancer, some patients were at a greater risk of developing malnutrition during the early cycles of chemotherapy; however some patients tend to be at risk of malnutrition towards the end of the chemotherapy cycles. Multiple logistic regression analyses were used to identify a model to predict patients with cancer who will have risk of malnutrition. The results showed that participants with digestive cancer were 2.68 times more likely to be malnourished ( $P = 0.01$ ). Similarly, patients who were diagnosed with gynaecological cancer were 2.85 times more likely to develop malnutrition ( $P = 0.026$ ).

**Discussion & Conclusion:** Patients with upper digestive tract cancer or gynaecological cancer were at the highest risk of developing malnutrition. In addition, the risk of developing malnutrition varies depending on the baseline body mass index, number of chemotherapy cycles, type and stage of cancer.

**SG-NA-02**

**A Prospective Controlled Study to Examine the Effects of Aromatherapy in Improving Sleep Quality for Patients with Schizophrenia in Long-Term Care Settings**

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**Background/Hypothesis:** Sleep difficulties and poor quality of sleep are common among patients with schizophrenia. Medications are commonly prescribed for night sedation. However, such medications could cause undesirable side-effects. Other options to improve the quality of sleep include the use of alternative medicines or therapies. This study aims to examine the effects of aromatherapy in improving the sleep quality for inpatients with schizophrenia.

**Methods:** A pre-test and post-test single group design was used. Thirty-nine schizophrenia inpatients prescribed with as needed night sedation were recruited from 10 long-stay wards of a psychiatric hospital. Two drops of Lavender Oil were placed on the same corner of their pillowcases between 2030 hours to 2100 hours every night consecutively for 3 weeks. Sleep quality was assessed using a modified Pittsburgh Sleep Quality Index (PSQI) prior to the experimental period, and at the end of the 3-week experimental period. Paired-sample *t*-test was used to compare the PSQI mean before and after the intervention.

**Results:** Of subjects, 82.1% had better sleep quality during the intervention phase, with improvement of mean sleep quality score from 9.13 to 5.97. Overall, the mean difference between pre- and post- intervention was 3.154±3.233 (95% CI: 2.106 to 4.202, *P* < 0.001).

**Discussion & Conclusion:** The findings suggest that aromatherapy is effective in improving sleep quality of long-stay inpatients with schizophrenia. This finding provides evidence-based information that will assist nurses in making informed decisions on implementing aromatherapy to improve the sleep quality of institutionalised patients with schizophrenia.



## SG-NA-03

### Development of the Woman-Midwife Relationship Questionnaire

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**Background/Hypothesis:** Good midwifery care attends to the physical, emotional and social needs of childbearing women and is founded on a close supportive relationship. But such relationships may be difficult to achieve in a complex work environment due to shifting demands and unique circumstances. Despite the importance of the woman-midwife relationship being highlighted in several studies, there has been limited quantitative research in this area. In particular, there has not been any attempt to develop a tool to measure elements of the woman-midwife relationship.

**Methods:** This study aimed to develop and test a valid and reliable questionnaire to measure women's perceptions of the relationship with their attending midwife. Items of the Woman-midwife Relationship Questionnaire (WRQ) were constructed from 4 themes extracted from a comprehensive review of the literature. These themes were technical skills and knowledge, shared responsibility, individualised care and professional friend. Construct and face validity of the WRQ were assessed by an expert panel of midwives and small convenience sample of childbearing women. A pilot test with a larger sample of women (n = 125) was then conducted.

**Results:** The WRQ demonstrated good initial internal consistency (Cronbach's  $\alpha = 0.95$ ) and 3 factors (eigen values > 1) were extracted from the factor analysis. Women's responses to the WRQ were analysed and statistically significant differences in mean subscale scores were found. The highest average mean score was the midwife's technical skills and knowledge (mean = 4.33 ± 0.58).

**Discussion & Conclusion:** Midwives' clinical competence was a significant factor contributing to the woman-midwife relationship. The WRQ shows good psychometric properties in terms of content, face, and construct validity as well as reliability for women who have received midwifery care during labour. The instrument needs further testing with culturally diverse samples of women in order to determine its utility in other maternity services.

## YIA-BSTR-01

### Polymerase Chain Reaction Detection of Extended-Spectrum Beta-Lactamase Genes in Enterobacteriaceae

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**Background/Hypothesis:** The alarming global rise of plasmid mediated extended-spectrum beta-lactamase (ESBL) resistance has caused much concern over the past two decades. ESBL resistant strains are most difficult to treat as they are often co-resistant to other classes of antibiotics, making them multi-drug resistant.  $\beta$ -lactamases are classified by amino acid homology into 4 major classes A-D. In this study, we investigated the frequency of plasmid borne  $\beta$ -lactamase genes of the different classes by polymerase chain Reaction (PCR) screening. The screen picks up TEM; SHV; CTX-M; GES enzymes and KPC carbapenemase (Class A), VIM; IMP carbapenemase (Class B) MIR, ACT and LAT enzymes collectively; CMY enzyme variants (Class C), OXA variants (Class D). Each of the strains was screened by simplex PCR. Eventually we hope to develop a multiplex PCR for the screening process.

**Methods:** A total of 49 hospital isolates were used for the PCR screens. These were *Enterobacter cloacae* (n = 5), *Escherichia coli* (n = 10) and *Klebsiella pneumoniae* (n = 34). Antibiotic susceptibility testing of the strains towards beta-lactams was tested using penicillins, second and third generation cephalosporins and carbapenems by disk diffusion and agar dilution method.

**Results:** Antibiotic susceptibility testing revealed that all the 49 isolates were resistant to penicillins, 43 were resistant to second generation cephalosporins and 34 were resistant to third generation cephalosporins. Only 1 strain was resistant to carbapenem. From the PCR screening, 100 percent have the OXA-1,4,30 gene and 97.9 percent have the TEM gene. While 89.8 percent has the CTX-M gene, 85.7 percent have the SHV gene. Both OXA-7,10 and MILA have a 83.7 percent prevalence. None were positive for genes encoding KPC, CMY and OXA-2, OXA-48, GES, IMP and VIM enzymes.

**Discussion & Conclusion:** The screening reveals a high frequency of plasmid mediated beta lactamases in the clinical context. Such surveillance is important to understand the types of resistance genes present and to curb the spread of ESBL resistant strains.

## YIA-BSTR-02

### Multiple Myeloma SET Domain II: A Candidate Tumour Suppressor

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**Background/Hypothesis:** The multiple myeloma SET domain (*MMSET*) is identified as a gene involved in multiple myeloma (MM) t(4;14)(p16;q32) translocation. *MMSET*, a histone methyltransferase, is capable of producing 3 major isoforms. *MMSET II* (full-length) was proposed as a candidate oncogene due to observations of amplification and overexpression in t(4;14) MM. However, several groups reported it is not possible to express *MMSET II* construct in MM cell lines or transgenic mice. Here we hypothesise *MMSET II* is a tumour suppressor gene rather than an oncogene, while short isoforms (*MMSET I* and *REIIBP*) are oncogenes. The short isoforms might have gain of functions or interfere with *MMSET II* functions by dominant negative manner.

**Methods:** HEK293T cells with ectopic overexpression of *MMSET II* were established using puromycin selection after transfection with *MMSET II* gene. The involvement of *REIIBP* in t(4;14) myelomagenesis was assessed by shRNA mediated knockdown combined with several biological assays. The differential gene expression of *MMSET II* overexpression or *REIIBP* knockdown was analysed with expression microarrays.

**Results:** We found ectopic expression of *MMSET II* induced tumour suppressor-like features in HEK293T, such as reduced colony formation, inhibition of cellular growth and migration. Western-blot analysis indicated *MMSET II* increased H3K27M3, H3K36M3 and H4K20M3 levels. Immunofluorescence analysis indicated *MMSET II* localised to nucleus and *REIIBP* localised to cytoplasm. Furthermore, *REIIBP* could block *MMSET II* entering into nucleus when HEK293T cells co-expressed *REIIBP* and *MMSET II*. Knocking-down *REIIBP* in t(4;14) MM cell lines inhibited cellular growth, induced apoptosis and increased levels of H3K27M3, H3K36M3 and H4K20M3. Expression array data revealed oncogene *DDR2* is one of *MMSET II* targets.

**Discussion & Conclusion:** The presented data indicated that *MMSET II* is a candidate tumour suppressor and *REIIBP* is a potential therapeutic target for t(4;14) MM.

## YIA-BSTR-03

### Cardioprotective Effect of Stem Cell Derived Exosomes Via Adenosine-Mediated Extracellular Signal Regulated Kinase Pathway

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**Background/Hypothesis:** A single intravenous bolus of hESC (human Embryonic Stem Cells derived)-MSCs (Mesenchymal Stem Cells) conditioned medium (CM) has been shown to significantly reduce infarct size by 60% and improve cardiac function in a pig and mouse model of myocardial ischaemia/reperfusion (MI/R) injury. We further identified secreted microparticles, termed exosomes, as the active CM component. The mechanism behind this phenomenon is yet to be elucidated. Adenosine mediated ERK (Extracellular signal-Regulated Kinase) is crucial in cellular proliferation and survival and its up-regulation promotes survival of ischaemic cardiomyocytes. We hypothesised CD73, an MSC exosomal enzyme which cleaves extracellular AMP (Adenosine Mono Phosphate) to Adenosine may promote survival of cardiomyocytes by catalysing adenosine formation to activate ERK cascade signalling.

**Methods:** Confluent H9C2 rat cardiomyocytes were serum-starved overnight and treated for 1 hour in wells with or without ( $\pm$ ) exosome CM,  $\pm$  AMP and  $\pm$  theophylline (adenosine inhibitor). Cells were harvested for protein extraction; quantification before gel electrophoresis. Presence and activity of exosomal CD73 and phosphorylated ERK were analysed using Phosphate Gold Mix (Orange) complex and western blot.

**Results:** CD73 was present in exosome-containing CM and catalysed formation of adenosine and free phosphate from AMP. CM or AMP treatment alone did not induce ERK phosphorylation as much as the combined CM and AMP treatment. This induction was abolished by theophylline, an adenosine receptor inhibitor.

**Discussion & Conclusion:** This in vitro study shows MSC-derived exosomes can catalyse formation of adenosine from AMP and induce ERK phosphorylation in cells through adenosine receptors. In vivo studies to confirm exosomal activation of adenosine-mediated ERK signaling in mouse, MI/R injury model is underway. MSC-derived exosomes is an exciting potential therapy for myocardial ischaemia which is an important disease.

## YIA-CR-01

### MicroRNA Profiling of Children Acute Lymphoblastic Leukemia Reveal Novel Biomarkers Related to Patient Survival

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**Background/Hypothesis:** Acute Lymphoblastic Leukemia (ALL) is the most common cancer in children. Risk stratified treatment have greatly improved the outcomes of childhood ALL. However, risk stratification is complicated and involves bone marrow examination at multiple timepoints to assess minimal residual disease (MRD). Deregulated MicroRNA (miRNA) has been implicated in oncogenesis. Here we hypothesised that miRNA may have prognostic implications which leads itself to clinical applications.

**Methods:** Genomewide miRNA profiling was conducted on Agilent Human miRNA Microarray chip in a cohort of 63 ALL patients (44 complete remission (CR), 11 relapse and 8 death). Gene expression profiling (GEP) was performed on Affymetrix U133plus2 platform.

**Results:** Using Significance Analysis of Microarrays (SAM), we identified miR-335 to be significantly down-regulated in the relapse/death cases (FDR q-value <0.05) compared to CRs. Furthermore, miR-335 is aberrantly expressed in ALL compared to normal controls.

When correlating the miRNA profiles to GEPs, miR-335 is positively correlated with its hostgene MEST( $R > 0.85$ ,  $P < 10^{-11}$ ), suggesting the cause of its aberrant expression. The expressions of 12 genes, including several cancer related genes such as MAPK1 and NFKB1 (a predicted target of miR-335), are negatively correlated with miR-335( $R < -0.6$ ,  $P < 10^{-5}$ ), suggesting that miR-335 may play an important role in ALL development and therapeutic resistance through the MAPK-NFkappaB pathway.

Cox multivariate analysis indicates that miR-335 is an independent prognostic factor ( $P < 0.005$ ) among the others. Kaplan-Meier survival analysis using miR-335 alone shows comparable statistical power than the MRD and oncogene fusion status, which by far is the best prognostic factor used in clinic.

**Discussion & Conclusion:** We identified miR-335 as a novel prognostic factor in ALL that can be applied at one timepoint at diagnosis to risk-stratify patients. The pathways deregulated due to aberrant miR-335 expression provide insights and potentially novel therapeutic strategies.

## YIA-CR-02

### **Incidence and Outcome of Male and Female Breast Cancer: A Multinational Population Based Study**

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**Background/Hypothesis:** Male breast cancer is a rare disease as its incidence rate is about 0.5% to 1% of that of female breast cancer. Given its scarcity, few studies have assessed the risk and prognosis.

**Methods:** We performed a multinational population based study of 569,771 female breast cancer patients and 3615 male breast cancer patients diagnosed in Denmark, Finland, Switzerland, Norway, Singapore and Sweden from 1943 to 2007. We calculated the incidence and mortality as well as overall survival for both sexes. Life table analysis and Cox proportional hazard model were used to analyse the survival.

**Results:** The overall incidence rates, adjusted to the World Standard Population, of breast cancer were 60.2 per 100,000 in women and 0.4 per 100,000 in men. Women were diagnosed with breast cancer at a younger median age (61.4 years) than men (68.9 years). Among the 203,093 patients (35%) with information on tumour, node and metastases TNM stage, 50% of the women and 47% of men were classified as stage I whilst stage III and stage IV cases accounted for 11% and 20% for women and men, respectively. The 5-year cumulative survival was 66.2% for women and 53.0% for men. The adjusted relative risk of death was 24% higher in men [HR 1.24 (95% CI: 1.19 to 1.28)] as compared to women after controlling for age and time at diagnosis. Men had an 18% higher relative risk of death [HR 1.18 (95% CI: 1.09 to 1.27)] compared to women after further adjustment for TNM stage.

**Discussion & Conclusion:** Male breast cancer patients have later onset and worse prognosis than female patients. This may be due to the difference in tumour characteristics and treatment.

**YIA-CR-03**

**Novel Quantitative Retinal Vascular Changes in Diabetes and Retinopathy**

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**Background/Hypothesis:** To examine the relationships of a spectrum of new quantitative retinal vascular parameters with diabetes and retinopathy signs.

**Methods:** Retinal photographs from the Singapore Malay Eye Study (SiMES), a population-based, survey of 3280 (78.7% response) persons aged 40 to 80 years old, were analysed for this study. Changes in the retinal vasculature (branching angles, vascular caliber, vascular tortuosity and fractal dimension) were measured quantitatively using a newly developed semi-automated computer-based program. Retinopathy signs were graded from photographs using the modified Airline House classification system.

**Results:** Diabetic patients (n = 2142) were more likely to have straighter (less tortuous) arterioles, larger arteriolar branching angle, smaller fractal dimension, wider arteriolar caliber and wider venular caliber than those without diabetes (n = 622). In multivariable-adjusted linear regression models, higher HbA1c level was significantly associated with straighter arterioles (standardised beta coefficient,  $s\beta = -0.044$ ,  $P = 0.021$ ), wider arteriolar caliber ( $s\beta = 0.038$ ,  $P = 0.047$ ) and wider venular caliber ( $s\beta = 0.079$ ,  $P < 0.001$ ); higher glucose level was significantly associated with smaller fractal dimension ( $s\beta = -0.04$ ,  $P = 0.034$ ), wider arteriolar caliber ( $s\beta = 0.074$ ,  $P < 0.001$ ) and wider venular caliber ( $s\beta = 0.079$ ,  $P < 0.001$ ). Among the non diabetic group, those with retinopathy had more tortuous venules than those without ( $5.14 \times 10^4$  vs  $4.27 \times 10^4$ ,  $P < 0.001$ ). Among the group with diabetes, those with retinopathy have wider venular caliber than those without ( $205.0 \mu\text{m}$  vs  $211.3 \mu\text{m}$ ,  $P = 0.001$ ).

**Discussion & Conclusion:** We demonstrated a range of retinal vascular changes, quantitatively measured from digital retinal images, associated with diabetes and non-diabetic/diabetic retinopathy. Our findings further support the concept that subtle alterations in retinal vascular architecture may reflect early diabetic damage.



## YIA-QHSR-01

### Nutritional Status of Older Adults under Public Assistance in Central Community Development Council, Singapore

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**Background/Hypothesis:** Public Assistance and Special Grant (PA/SG) are social welfare schemes for needy Singaporean citizens and permanent residents respectively. Studies show that socioeconomically-disadvantaged populations are more likely to be malnourished, but no local studies have been done to assess the nutritional status of PA/SG recipients. We aim to assess nutritional status of a sample of PA/SG recipients, and to assess factors associated with poor nutrition.

**Methods:** The study utilised a cross-sectional design. Four hundred and sixty-five PA/SG recipients from the Central Community Development Council (CDC) region were surveyed using a questionnaire based on validated tools. It included sociodemographic data, nutritional status, and possible nutrition factors such as depression, comorbidity burden and functional status. Qualitative analysis was subsequently done on malnourished participants to identify the barriers faced by them.

**Results:** The prevalence of malnutrition among adults on PA/SG living in Central Community Development Council was low (2.6%) but a significant proportion were at risk of malnutrition (50.3%). Malnutrition risk was associated with age > 75 years (OR = 1.429, 95% CI: 1.197 to 1.707,  $P < 0.001$ ), low Body Mass Index (BMI) < 19 kg/m<sup>2</sup> (OR = 2.213, 95% CI: 1.863 to 2.630,  $P < 0.001$ ), positive depression risk (OR: 0.699, 95% CI: 0.574 to 0.852,  $P = 0.002$ ), basic activities of daily living (BADL) impairment (OR = 1.417, 95% CI: 1.173 to 1.712,  $P = 0.001$ ) and single marital status (OR = 0.680, 95% CI: 0.453 to 1.021,  $P = 0.040$ ) among community-dwelling recipients. BADL impairment (OR = 2.628, 95% CI: 1.339-5.158,  $P < 0.001$ ) was the only factor among nursing home recipients. Barriers to adequate nutrition included financial hardship, physical barriers, social isolation and lack of knowledge.

**Discussion & Conclusion:** The risk of malnutrition among PA/SG recipients is relatively high. There is a need to raise awareness about the prevalence of this situation. This can be ameliorated by emphasising nutritional education and dissemination of information about food services.



## YIA-QHSR-02

### Cost-Benefit Analysis of a 21-Gene Recurrence Score for Early Stage Breast Cancer in Singapore

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**Background/Hypothesis:** Breast cancer represents a significant burden of illness worldwide. Cost of cancer management is a key policy concern. The adoption of 21-gene breast cancer recurrence score (RS) was projected to be cost-effective. We aimed to assess the cost-benefit of the 21-gene RS for lymph node negative, estrogen receptor positive early-stage breast cancer (ESBC) in Singapore from a patient's perspective.

**Methods:** We adopted a validated Markov model to calculate the cost implications of RS for an early-stage breast cancer patient. The probability of individual's risk of recurrence, chemotherapy benefits and decision impact of RS were derived from existing studies. The model accounted for both direct and indirect costs associated with adjuvant chemotherapy. Direct costs included chemotherapy drugs, supportive care drugs, administration and management of adverse events adjusted by incidence, and cost of recurrence. Indirect costs included productivity loss during chemotherapy and distant recurrence. Chemotherapy regimen distribution and costs were obtained from medical oncologists at a private and a public cancer centres in Singapore.

**Results:** The pretest probabilities of risk of recurrence per woman were: low, 49.8%; intermediate, 30.3%; high, 19.9%. The average direct potential savings in Singapore Dollars (SGD) for chemotherapy drug, supportive care, management of AE and administration were \$2960, \$1083, \$107 and \$1348, respectively. Savings from productivity loss during treatment were \$472. At manufacturer's price, the model projects immediate realised total savings of \$433 with the adoption of the RS. The model also projects \$1382 of direct savings and \$1962 of indirect savings from preventing distant recurrence. Multiple sensitivity analyses demonstrate the robustness of the savings with adoption of RS under a variety of conditions.

**Discussion & Conclusion:** For women with ESBC in Singapore, the RS is a cost-saving adjuvant chemotherapy decision tool.

## YIA-QHSR-03

### **Predicting Hospital Admissions at Emergency Department's Triage using Routine Administrative Data**

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**Background/Hypothesis:** Predicting hospital admissions for emergency department (ED) patients at the time of triage may improve throughput. The objective of this study is to develop and validate a predictive model to predict inpatient admission among ED patients using routine hospital administrative data.

**Methods:** Data collected at the time of triage by nurses among patients who visited the ED in year 2007 and 2008 were extracted from hospital administrative databases. They were merged with data from the chronic disease registry. Variables included were demographics (age, gender and ethnic group), prior ED visit or hospital admission in preceding 3 months, arrival mode, patient acuity category (PAC) of the ED visit, and co-existing chronic diseases (diabetes, hypertension and dyslipidaemia). Chi-square tests were used to study the association between risk factors and the admission status. Logistic regression was applied to compare the admission risk and to develop the prediction rules. Data was split for training (60%) and testing (40%). ROC and calibration table were applied on validation dataset to evaluate the model.

**Results:** Out of 317,581 ED patient visits, 30.2% resulted in immediate hospital admission. In the developed predictive model, age, PAC status, and arrival mode were ranked the top 3 predictors for immediate hospital inpatient admission. The c-statistics of the ROC curve was 0.849 (0.847-0.851). The goodness-of-fit test showed that the developed model was not significantly different from patients' actual admission status.

**Discussion & Conclusion:** Rules for predicting the risk of immediate hospital admission at triage for all-cause ED patients were developed and validated using routinely collected hospital data. Predicting hospital admission early at triage may help identify patients for early admission planning and better resource allocation and may potentially reduce ED overcrowding.

**BP-AH-01**

**Pilot Survey of Postnatal Women at Jurong Polyclinic**

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**Background/Hypothesis:** This pilot survey examined the prevalence of depressive symptoms in 1 to 4 months postnatal women paying routine visits at Jurong Polyclinic, and their knowledge on the impact of perinatal/postnatal depression.

**Methods:** Women at 1 to 4 months after delivery were asked to complete a survey on demographic and socioeconomic information, including some questions on belief towards depression. The validated Edinburgh Postnatal Depression Scale (EPDS) in English and Chinese versions were also admitted. Those with an EPDS score of 10 and above were offered a brief or full assessment by trained interviewers.

**Results:** Data collected over a month showed that out of the 99 postnatal women interviewed, 23 of them had an EPDS score of 10 and above. Among the 9 mothers who received brief or full assessment, 8 mothers had adjustment with depressive or anxious mood whereas 1 mother had major depressive symptoms. With regards to knowledge on perinatal/postnatal depression, 92% were aware of it and at least 70% acknowledged the negative impact on mother-child bonding.

**Discussion & Conclusion:** Results of this pilot survey indicated the importance of promoting awareness of perinatal/postnatal depression and its impact on the emotional health and well-being of mothers and infants.

**BP-AH-02**

**Pharmacist-Conducted Medication Reconciliation at Ward Admission: Evaluating Discrepancies**

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**Background/Hypothesis:** Medication reconciliation is the formal process of obtaining a complete and accurate list of patient's pre-admission medications (PAMs) and comparing a prescriber's orders to it. An unintended medication discrepancy (UDM) is any inconsistency/difference between admission orders and PAMs that has no specified clinical intention. Differences between patients' PAMs and admission orders can range from 30% to 70%, and approximately 40% of UMDs can cause moderate-to-severe discomfort or clinical deterioration. Medication reconciliation can intercept 50% of admission errors before they reach patients; thus reducing medication errors and adverse drug events.

**Methods:** Data from pharmacist-conducted medication reconciliation for patients admitted to Institution of Mental Health (IMH) over one year were retrospectively analysed to determine the proportion of patients with at least one UMD at admission. UMDs were characterised by types, frequencies, medication classes, potential to cause patient harm (adapted NCCMERP 9-Point Index for Categorising Medication Errors), and high-alert medication status (ISMP).

**Results:** Medication reconciliation was conducted for 7030 inpatient admissions and 7.8% had at least one UMD at admission. Among the 1009 UMDs identified, 9.6% involved high-alert medications. The most common UMDs were drug omission (71.4%), wrong dosage regimen (19.7%), and wrong drug/dosage form (4.3%). Common medication classes with UMDs were antipsychotics (12.0%), vitamins/minerals (11.8%), and antihypertensives (10.6%). Less than 50% of the identified UMDs had the potential to cause patient harm.

**Discussion & Conclusion:** UMDs can occur considerably at ward admissions. Understanding UMDs can help clinicians and hospital administrators to develop a structured medication reconciliation programme and a patient/caregiver education programme to ensure medication safety and prevent potential medication mishaps.

**BP-BSTR-01**

**Disruptions of Subcortical-Cortical Structural Connectivities in Schizophrenia: Evidence from Analyses of Hippocampal Shape, Cortical Thickness, and Integrity of White Matter Bundles**

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**Background/Hypothesis:** Disruptions in the hippocampal-cortical functional connectivities have been implicated in schizophrenia but less is known about their anatomical disconnectivities and association with clinical symptoms. Based on earlier evidence, we hypothesise that schizophrenia would differ from healthy controls in terms of greater anterior hippocampal deformity, reduced prefrontal and temporal cortical thickness and disruptions in their interconnecting white matter bundles such as cingulum and fornix.

**Methods:** We assessed the anatomical relationships between hippocampal shape, cortical thickness, and integrity of white matter bundles between them. A brain mapping technique, large deformation diffeomorphic metric mapping, was used to analyse structural magnetic resonance imaging and diffusion tensor imaging scans of 126 schizophrenia patients and 77 age, gender and handedness matched healthy controls.

**Results:** Patients with schizophrenia have surface inward-deformation in the bilateral anterior hippocampi and cortical thinning in the regions of bilateral prefrontal, temporal, and occipital cortices compared with healthy controls. Anterior hippocampal shape deformity is associated with cortical thinning in the brain regions involved in visuo-spatial and verbal memory pathways. Canonical analysis reveals that greater disruptions in the hippocampal-cortical connectivity are associated with more severe negative symptoms in schizophrenia. Furthermore, fractional anisotropy in the fornix and cingulum bundles are reduced indicating abnormal integration of white matter between hippocampus and cortex in schizophrenia.

**Discussion & Conclusion:** Our findings suggest that aberrant structural hippocampal-cortical connectivities may serve as a marker of the illness and provide further structural evidence to support the notion of schizophrenia as a disorder of brain connectivity.

## BP-BSTR-02

### Biology of Endothelial Progenitor Cells in Mid-Trimester Foetal Circulation

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**Background/Hypothesis:** Endothelial progenitor cells (EPC) are progenitor cells found in peripheral circulation that are suggested to contribute to vasculogenesis. We hypothesise that EPC can be found and isolated from the foetal circulation, and may play a crucial role in vasculogenesis during development. Here, we present data on the characterisation of foetal blood-derived EPC, as compared against their umbilical cord blood (UCB) derived counterparts.

**Methods:** EPC were isolated from umbilical cord blood (UCB) and mid-gestation foetal blood (FB) by adhesion selection in endothelial growth media. Immunocytochemistry profiling, Matrigel differentiation and colony forming assays demonstrate increased vasculogenic potential of FB-EOC. Genome-wide microarray analysis was carried out to compare the expression profiles of both cell populations; differentially regulated genes were identified and associated gene ontology and signalling pathways were analysed. To study the use of EPC for therapeutics, the cells were then transplanted into a mouse model of ischaemia.

**Results:** FB-EPC and UCB-EPC were found to be capable of generating endothelial-like progeny. However, marked differences could be found in the expression patterns and fEPCC demonstrate higher colony forming capacity as well as more extensive vessel formation in Matrigel assays. Through microarray analysis, 56 genes known to be involved in angiogenesis and vascular development were found to be differentially regulated. In addition, FB-EPC appears to demonstrate greater potential for ischaemic rescue.

**Discussion & Conclusion:** This study demonstrates significant differences in gene expression profiles between foetal blood and cord blood. Microarray analysis demonstrates several genes associated with angiogenesis and vascular development. Our results suggest that these differences contribute to superior vasculogenicity of FB-EPC, and a potential role for FB-EPC in foetal development.

## BP-BSTR-03

### Endotoxin-Tolerance Monocyte Profile in Nephrotic Syndrome

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**Background/Hypothesis:** Minimal change nephrotic syndrome (MCNS) is often complicated by bacterial infections, contributing significantly to the morbidity of this benign disease. We have previously shown upregulation of lymphocyte interleukin (IL)-13 gene expression during nephrotic relapses. This was associated with downregulation of proinflammatory cytokines, IL-8 and tumor necrosis factor (TNF)- $\alpha$  in lipopolysaccharide (LPS)-stimulated monocytes, and decreased monocyte CD14 expression, suggestive of an IL-13-induced anti-inflammatory effect. This study aimed to identify the 'gene signature' in monocytes from MCNS patients, both remission and relapse cases, in order to explain the increased susceptibility to infections during relapses.

**Methods:** Monocytes isolated from 5 MCNS patients in relapse and remission using MACS-monocyte Isolation Kit II, were cultured for 4 hours with and without LPS. RNA was converted to cRNA and hybridised into Illumina Human Ref 8 chips. Gene ontology (GO) and pathway analysis were carried out using MetaCore<sup>TM</sup>.

**Results:** The transcription profile of unstimulated monocytes from MCNS patients in relapse showed >2-fold change in expression of 734 genes. GO analysis showed marked upregulation of genes involved in inflammatory response (*IL-1R1*, *IL-6*, *LTA*, *TNF*), including interferon-inducible genes (*IRF4*, *IRF7*, *IFI6*, *IFI27*, *IFI35*, *IFI44*, *SERPING1*, *Mx1*, *OAS1*, *OAS2*, *OAS3*, *OASL*, *CXCL9*, *CXCL10*), antiviral genes (*DDX58*) and genes involved in STAT1 pathway. However, following LPS stimulation, genes that are usually responsive to LPS (*CD86*, *IL-1*, *IL-6*, *TNF*) were downregulated, exhibiting a refractory state of monocytes.

**Discussion & Conclusion:** Our results demonstrated the bipolar nature of monocytes in MCNS patients in relapse, with the presence of an inflammatory profile *in-vivo*, but which appeared refractory to LPS stimulation suggesting an anti-inflammatory or endotoxin-tolerance profile. This could explain the increased susceptibility to infections during MCNS relapses.

## BP-CR-01

### Transcutaneous Bilirubinometry - Efficient, Effective and Safe

#### A CHINNADURAI

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**Background/Hypothesis:** Visual quantification of neonatal jaundice is imprecise and results in the need for serum bilirubin (TSB) measurements, an invasive and painful procedure. Transcutaneous bilirubin (TCB) measurements are noninvasive and pain free and have shown good correlation with the TSB. TCB use can safely and effectively reduce TSB by 50%. Our objective was to demonstrate that by using a TCB value that is 90% of the phototherapy value (0.9PV) to decide on the need for a TSB, we could safely reduce the number of TSB measurements by 50%.

**Methods:** This prospective cohort study was conducted on 210 on well term newborn infants who underwent TSB measurements between August and November 2009. TCB measurements within 30 minutes of blood sampling for TSB were obtained using the JM 103 jaundice meter. IRB exemption for consent was obtained.

**Results:** There was good correlation between TCB and TSB ( $r = 0.79$ ). Limits of agreement using Bland and Altman plots showed that the TCB over-read the TSB by a mean value of 24  $\mu\text{mol/L}$  (range, -32 to +80). Using 0.9PV as cut off to do TSB, the sensitivity, specificity and negative predictive values and false positive rates were 100%, 61%, 100% and 32%, respectively. TCB measurement was efficient in identifying 61% of the babies who did not need phototherapy and could have potentially avoided 51.3 % (range, 44% to 58%) of the TSB measurements.

**Discussion & Conclusion:** TCB can safely be used as a screening tool to decide on the need for TSB.



## BP-CR-02

### Resection Margins in Breast Conservation Surgery: What is an Adequate Margin?

**PMY CHAN**

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**Background/Hypothesis:** Adequate surgical margins are the strongest predictors of local recurrence following breast conservation surgery (BCS). However, there is no consensus as to what is being considered adequate. We therefore sought to determine the incidence of residual tumour following BCS, and to identify factors predictive of local recurrence.

**Methods:** A retrospective review was performed of 550 patients who underwent BCS at our institution from January 2001 to December 2008. The presence of residual tumour and local recurrence was correlated with the closest surgical margin and standard clinicopathological parameters.

**Results:** Forty-seven of 185 patients (25.4%) who underwent repeat surgery were found to have residual tumour. Twenty-six percent (44 of 170) of patients with involved or close margins had residual tumour, compared to 10% (1 of 33) of those with margins of 1mm; this was however not statistically significant. The anterior or posterior margins alone were involved or close in 46 patients; 8 of whom underwent repeat surgery. No residual tumour was found in all cases. None of the 38 patients who did not have repeat surgery developed local recurrence. Margin status did not correlate with the risk of local recurrence; only the presence of lymphovascular invasion and oestrogen receptor status were found to be independent predictors of local recurrence on multivariate analysis. Local recurrence was slightly more common in patients with close or involved margins (13 of 204 patients) compared to those with margins of 1mm or more (19 of 323 patients), but this was not statistically significant.

**Discussion & Conclusion:** Our study suggests that factors other than margin status predict for local recurrence. Margins of 1mm and more were not associated with a worse outcome and should be considered as adequate. It is also reasonable not to offer patients with involved anterior or posterior margins repeat surgery if the excision had been taken from the skin down to the pectoralis fascia.

**BP-CR-03**

**Correlations between Insulin Sensitivity and Insulin Resistance with Intraabdominal Fat and Intrahepatic Triglycerides among Three Different Ethnic Groups in Singapore**

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**Background/Hypothesis:** Correlations between insulin sensitivity and resistance with intra-abdominal fat and intra-hepatic triglycerides may show ethnic differences within a cross-sectional sample of young healthy overweight to mildly obese males from the general population of Singapore.

**Methods:** Insulin sensitivity was determined using hyperinsulinemic, euglycemic glucose clamp while insulin resistance was quantified using homeostasis assessment model (HOMA-IR). Intra-abdominal fat was calculated using a segmentation algorithm on abdominal magnetic resonance imaging (MRI) data while intra-hepatic triglycerides were evaluated via liver magnetic resonance spectroscopy (MRS). We hereby report our interim analysis (N = 81, comprising 48 Chinese, 20 Malays, 13 Indians - MRI dataset; N = 31, comprising 21 Chinese, 8 Malays, 2 Indians - MRS dataset).

**Results:** There is a significant negative correlation between total intra-abdominal fat (subcutaneous + visceral) with whole-body glucose disposal (M-value) ( $r = -0.5026$ ,  $P < 0.0001$ ), insulin sensitivity index (ISI) ( $r = -0.6248$ ,  $P < 0.0001$ ), and a positive correlation with HOMA-IR ( $r = 0.3584$ ,  $P = 0.0039$ ). Similar findings apply to visceral fat: M-value ( $r = -0.5239$ ,  $P < 0.0001$ ), ISI ( $r = -0.6257$ ,  $P < 0.0001$ ), HOMA-IR ( $r = 0.4137$ ,  $P = 0.0008$ ). Intra-hepatic triglycerides correlated significantly with M-value ( $r = -0.5241$ ,  $P = 0.0042$ ) and ISI ( $r = -0.4994$ ,  $P = 0.0068$ ).

**Discussion & Conclusion:** Intra-abdominal fat volume and intra-hepatic triglyceride burden both correlate well with insulin sensitivity and resistance among the 3 ethnic groups of overweight and mildly obese males in Singapore.

**BP-NA-01**

**Methicillin-Resistant Saphylococcus Aureus Universal Screening-Should We Do It?**

**F CHNG**

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**Background/Hypothesis:** Asymptomatic MRSA carriers are often not recognised. In 2003, a Society for Healthcare Epidemiology Association (SHEA) taskforce advocated a strategy of using active surveillance cultures to identify MRSA carriers. However, universal MRSA screening remains controversial. At Alexandra Hospital, only patients classified as high risk for MRSA were screened on admission. The study aims to investigate the prevalence of MRSA on all admissions and assess the need for universal screening for MRSA according to risk stratification, and to propose the most appropriate strategy for MRSA screening, to control MRSA transmission among hospitalised patients.

**Methods:** Surveillance screening for MRSA was conducted on all adult inpatients on admission. MRSA surveillance swabs were taken from nasal, axilla, groins and wound if present. Patients were stratified into high risk, moderate risk and low risk group according to the disease processes, history of hospitalisation and nursing home. Prevalence of MRSA is tabulated according to different risk groups.

**Results:** Three hundred and seventy-seven cases were admitted to Alexandra Hospital from 27 April to 4 May 2010 (Refer Table). Prevalence of MRSA on admission was 10.3%. MRSA prevalence for high risk group of 127 cases was 22%, moderate risk group was 5.5%, and low risk group was 2.9%

Despite high risk group has the highest prevalence of MRSA, it only represents 34% of all in-patient; 66% of admissions were from moderate to low risk group which contributes 28% of all MRSA on admission.

**Discussion & Conclusion:** By screening only high risk group for MRSA, 28% of MRSA will be undetected on admission. This would probably lead to poor control of MRSA in hospital due to missed opportunity of contact precautions. Our findings would support the need for universal MRSA screening on admission to control MRSA transmission among hospitalised patients.

## BP-NA-02

### Diabetic Patients' Perception of Insulin Initiation

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**Background/Hypothesis:** Due to progressive defects in insulin secretion and insulin action, most Type 2 diabetic patients would eventually require insulin therapy to maintain glycaemic control. However, at National Healthcare Group (NHG) Polyclinics, Singapore, 60% of these patients with haemoglobin A1c (HbA1c) of 9% are not on the therapy. The objective of this study was to explore the attitudes and resistance of Type 2 diabetic patients towards insulin therapy.

**Methods:** An interviewer administered cross-sectional survey was conducted amongst insulin naïve Type 2 diabetic patients at a polyclinic from September 2009 to April 2010. Patients' were asked about their attitudes toward receiving insulin therapy using the validated Insulin Treatment Appraisal Scale (A 20-item 5-point Likert scale that test respondents' perception towards the therapy).

**Results:** Among 407 patients surveyed (37% male, 63% female, mean age 61 years (SD = 9.9)), their mean HbA1c was 7.5% (SD = 1.3) and mean duration of diabetes was 6 years (SD = 4.9). Most patients (75%) wrongly perceived that being on insulin therapy meant the disease had become severe and 74% had perceived that they had failed to manage the disease through diet and tablets. Sixty-nine percent also felt that more time and energy are needed to administer and 93% felt that they would not need it in future. Comparing the willingness of patients to receive insulin therapy, unwilling patients were more likely to be afraid of injections (73% vs 57%,  $P < 0.01$ ), thought that insulin injections were painful (63% vs 56%,  $P = 0.02$ ) and felt the timely injection of the right amount of insulin was difficult (75% vs 65%,  $P = 0.05$ ). Willing patients however were more likely to state that insulin helped to maintain good glycaemic control (53% vs 40%,  $P = 0.01$ ) and improved energy levels (44% vs 33%,  $P = 0.02$ ).

**Discussion & Conclusion:** Patients' rejection of insulin therapy was mainly due to resistance towards injections. Patients also had a few misconceptions towards insulin therapy. Future insulin interventions should focus on addressing patients' fear and misconceptions of injections.

## BP-QHSR-01

### Factors Contributing to Unplanned Hospital Readmission in Singapore

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**Background/Hypothesis:** Repeated unplanned hospital admission is an issue of concern for healthcare service providers. In Singapore, the unplanned readmission rate within 15 days was varied from 5.4% to 9.2%. Research findings reveal that multiple factors such as predisposing characteristics, needs, enabling resources, health outcomes, and health behaviour can contribute to the phenomenon, but no study has examined the direct and indirect effects of these factors on hospital readmission. This study was launched to address the knowledge gap regarding factors leading to readmissions to hospital in Singapore. We hypothesise that predisposing characteristic, needs, enabling resources, health outcomes, and health behaviour factors have significant effects on hospital readmission.

**Methods:** This was a case-control study with 79 readmitted (case) patients and 546 non-readmitted patients (control) recruited in one actual hospital from December 2009 to March 2010. The variables included predisposing characteristics, needs, enabling resources, health outcomes, and health behaviour. Regression model was used to identify risk factors contributing on hospital readmission.

**Results:** Results shows that there are significant differences between readmitted and non-readmitted groups on predisposing ( $P = 0.017$ ), health resources ( $P = 0.021$ ), health behaviour ( $P = 0.029$ ), health outcomes ( $P = 0.009$ ), need factor ( $P = 0.006$ ) and length of stay ( $P = 0.040$ ).

**Discussion & Conclusion:** The results of this study might provide hospital managers with a model to design specified intervention to reduce unplanned hospital readmissions.

## BP-QHSR-02

### Perception and Receptiveness of Primary Healthcare Personnel to Seasonal Influenza Vaccine

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**Background/Hypothesis:** Seasonal influenza vaccination is a key strategy to prevent infection, morbidity, work-absenteeism and the spread of influenza among primary healthcare personnel (PHP) and their patients but uptake is often suboptimal. This study aims to elicit the perceptions and receptiveness of PHP in the public sector in Singapore to seasonal influenza vaccination.

**Methods:** Survey was conducted amongst doctors, nurses, allied health and operations personnel working in all 9 National Healthcare Group-Polyclinics in November 2009.

**Results:** The survey response rate was 80%. Of the 871 respondents, 64.6 % had previously received influenza vaccination whereas 35.4% had not or were unsure. Only 56.5% of PHP were willing to go for influenza vaccination again. The 3 most common reasons for being unwilling for influenza vaccination were: fear of side-effects, dislike of injections and the perception of "not getting flu easily". Those who had seasonal influenza vaccination previously were more amenable to this vaccination compared to those who had not (75.3% vs 21.9%,  $P < 0.01$ ). Only 11.9% of respondents believed that the seasonal influenza vaccine provided protection against H1N1-influenza. The receptiveness to seasonal influenza vaccine uptake was higher among those who had been assigned to fever/flu tent (59.8% vs 50.8%,  $P < 0.05$ ) during the H1N1-pandemic and among PHP who had attended workplace health-talks (59.7 % vs 42.8%,  $P < 0.01$ ). Doctors and dentists reported the highest uptake of influenza vaccine in the preceding 2 years (75.4%) as compared to Nurses (65.6%), Allied Health (68%) and Operations personnel (58.1%).

**Discussion & Conclusion:** This study reinforces the need for a multi-prong approach to seasonal influenza vaccine promotional activities among PHP. This may include targeted health education to address fears and misconceptions coupled with provision of alternative vaccine routes for PHP with fear/dislike of injections.

**BP-QHSR-03**

**Papanicolaou Smear: Knowledge, Perceptions and Practices of a Local Community of Women**

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**Background/Hypothesis:** Cervical cancer is the second most common cancer among women worldwide and is responsible for many deaths every year. The Papanicolaou (Pap) smear is a screening test which allows detection of cervical cancer in its pre-invasive stages during which it is almost certainly curable. This study investigated the knowledge, perceptions and practices of women in a local community with regards to cervical cancer screening.

**Methods:** A community-based cross-sectional study was carried out in January 2010 on women between aged 25 to 69 years in Bedok North Estate, Singapore. A questionnaire administered via face-to-face interviews elicited knowledge, perceptions and screening behaviour of subjects. Binary logistic regression was used to compute odds ratios while controlling for confounding factors.

**Results:** The response rate was 67.9%, with 549 completed responses. Of our respondents, 83.0% had heard of the Pap smear. However, 40.9% had misconceptions about its purpose and only 29.5% knew the appropriate time to commence Pap smear screening. Among respondents who had been sexually active, only 46.9% had regular Pap smears. Adjusted analysis revealed an association between high levels of knowledge about the Pap smear and good Pap smear practices (OR = 30.1,  $P < 0.001$ ). The top 3 barriers that respondents faced with regards to going for regular Pap smears include the pain involved, the fear that a male doctor would be performing the Pap smear and the fear of what the test results may reveal.

**Discussion & Conclusion:** Although majority of the women were aware of the existence of the Pap smear, a significant proportion was found to have misconceptions and poor Pap smear practice. Our study finds that good Pap smear practice is associated with a high level of knowledge about the Pap smear. To increase Pap smear uptake, more effort has to be made to minimise the barriers and educate women about the Pap smear.



**OP-AH-01**

**Evaluation of Robotic-Assisted Locomotion Training Outcomes in Tan Tock Seng Rehabilitation Centre**

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**Background/Hypothesis:** In recent years, there has been a growing trend towards the use of technology in the field of physical rehabilitation. Robotic-assisted locomotion is one of the technologies evolving in modern rehabilitation centres.

The aim of the study was to determine whether robotic-assisted locomotion training, a new clinical service introduced in Tan Tock Seng (TTSH) Rehabilitation Centre, was effective in improving (a) the ability to transfer, and (b) the ambulatory status of the patients with acquired brain injury.

**Methods:** This study was a retrospective review of data collected from patients with acquired brain injury, pre- and post- robotic-assisted locomotion training in TTSH Rehabilitation Centre for the period of September 2008 to May 2009. The primary outcome measures used were functional independence measure (FIM) for transfer and ambulation, and Rivermead Motor Assessment Gross Function Subscale (RMA). The secondary outcome measures used were the Motricity Index (MI) and Modified Ashworth Scale (MAS) of the lower limb.

Statistical analysis was performed on these data to evaluate whether robotic-assisted locomotion training was effective in improving the functional mobility of these patients.

**Results:** The results revealed that there were significant improvements in the scores of FIM transfer ( $P = 0.001$ ), FIM Ambulation ( $P = 0.000$ ) and RMA ( $P = 0.002$ ) after robotic-assisted locomotion training. There were also significant improvements in MI of hip flexion ( $P = 0.001$ ), knee extension ( $P = 0.005$ ), and ankle dorsiflexion ( $P = 0.027$ ) post-training.

**Discussion & Conclusion:** Robotic-assisted locomotion training has been found to be effective in improving transfer, ambulation and functional mobility of the patients with acquired brain injury in TTSH Rehabilitation Centre.



## OP-AH-02

### Transitional Feeding Programme for Nursing Homes

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**Background/Hypothesis:** Transitional feeding is the progression from non-oral feeding to oral feeding. In the process, individuals may be at risk of being inadequately nourished. Serving an inappropriate diet consistency to dysphagic individuals can result in aspiration pneumonia. This project aims to extend and promote adequate and safe feeding into the community, specifically nursing homes.

**Methods:** Needs assessment was conducted in 10 nursing homes (4 voluntary; 6 private) using a questionnaire administered through a face-to-face interview with nurses and nursing aides to enquire their knowledge, attitudes and practices, ascertain interest and understand their felt needs on transitional feeding and modified diet consistencies. Subsequently, a targeted intervention was developed.

**Results:** The needs assessment showed that the target group (n = 102) displayed a lack of knowledge in what modified diet consistencies are (voluntary: 72.5%; private: 47.1%; both: 59.8%), when to wean off feeding tubes for individuals in transitional feeding (voluntary: 37.3%; private: 59.4%; both: 46.1%) and transitional feeding procedure in their nursing homes (voluntary: 88.2%; private: 86.3%; both: 87.3%). The response rate to attend relevant training programs was 64% (voluntary: 64.7%; private: 62.7%).

**Discussion & Conclusion:** Training programme materials - presentation, video, booklet, transitional feeding log template, posters, pre- and post-programme survey forms, post-programme evaluation form, job instruction breakdown sheet on 'accurate identification and serving of different modified diet consistencies for residents' and a standard work on 'transitional feeding process' were created. This developed training programme aims to empower the community care providers to provide safety practice and optimal nutrition for their clients. After implementation, future evaluation from the participants and clients' health outcomes will determine the effectiveness of the training programme.

**OP-AH-03**

**Assessing Social Functioning Level Improvements in Patients with Schizophrenia Using the Personal and Social Performance Scale**

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**Background/Hypothesis:** Patients with Schizophrenia require assistance both in minimising their psychopathological illness symptoms as well as improving their social functioning behaviour so as to enable them to integrate back into society. This paper reports the demographic, clinical and social performance of 89 patients who were admitted and treated for Schizophrenia in 8 acute wards of the hospital.

**Methods:** A trainer guided case Managers in August 2009 on the use of the Personal and Social Performance scale (PSP), which is designed to measure and distinguish specific domains of social functioning. Practices were also done using training vignettes. Between August 2009 and October 2009, 89 patients were assessed on their social functioning level on admission and upon discharge. The results were analysed using SPSS version 14.

**Results:** There were 35 (39.3%) males and 54 (60.7%) females, aged between 18 and 70 years. The majority were Chinese (79.8%). Of them, 56.2% had one to three previous admissions and 67.4% had schizophrenia for up to 9 years. The mean PSP exact score on admission was 38.89 with a standard deviation of 15.759. Upon discharge the mean PSP exact score was 67.51 with a standard deviation of 13.131. Paired *t*-test *P* value showed a significant difference of <0.001.

**Discussion & Conclusion:** The PSP scale has assisted case managers to understand their patients' social functioning level improvement. Therefore with this social functioning level improvement knowledge and clinical knowledge of their patients, case managers are able to provide a more comprehensive discharge plan and follow-up care for their patients.

## OP-AH-04

### Health of People with Spinal Cord Injury in Singapore

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**Background/Hypothesis:** Knowledge about the health of people living with spinal cord injuries (SCIs) in the community is lacking in Singapore. This study described the health of people with SCI in Singapore.

**Methods:** Demographic data, injury information and information about SCI-related secondary impairments, chronic conditions and their associated risk factors, medical and hospital utilisation, participation (Craig Handicap Assessment and Reporting Technique) and life satisfaction (Satisfaction with Life Scale) were collected via interviews from people living with traumatic SCI. Descriptive statistics were generated, and post-hoc between-group comparisons and correlations were conducted.

**Results:** On average, participants (50 men and 5 women) were aged 48.3±16.54 years and had had their SCIs for 5 years. Three quarters (78.2%) had tetraplegia. The most prevalent SCI-related secondary impairments were pain, spasms, bladder problems, bowel problems and oedema. Chronic conditions (e.g. diabetes, hypertension and obesity) and their associated risk factors (e.g. smoking and physical inactivity) were prevalent. The data also suggested that the prevalence of chronic conditions and their associated risk factors was greater among the participants than previously reported for Singaporeans overall. Participation and life satisfaction scores were lower than those reported for similar populations cross-culturally.

**Discussion & Conclusion:** There are several areas in which people with SCI in Singapore report experiencing lower levels of health than the general population in Singapore. By focusing on community reintegration and health promotion, hospital and community-based physiotherapists and other rehabilitation professionals may augment health outcomes and improve the quality of life of this and other similar populations in Singapore.

**OP-AH-05**

**Ensuring Quality Care with Continuous Support Service Provisions for Male Patients on a Psycho-Geriatric Unit in a Tertiary Hospital**

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**Background/Hypothesis:** Case Management (CM) in the Psycho-geriatric Unit commenced in June 2006. The Case Manager, who is part of the multidisciplinary team (MDT) ensures the continuity of care from admission to discharge. The brokers services from various agencies, advocates and monitors the patients' treatment compliance. This paper profiles the CM strategies for patients in a 38-bedded male acute psychogeriatric ward.

**Methods:** Data mining of patients admitted from January to December 2009 was done. Results were analysed using Microsoft Excel.

**Results:** Two hundred and thirteen male patients were admitted. Of these, 46% had dementia, 21% depression, 15% schizophrenia and the remaining 18% bipolar disorder, delusional disorder, substance abuse, anxiety and personality disorder. Demographic data revealed 82% Chinese, 50% were in the 65 to 74 age group, 62% Married. Forty-eight percent of new cases and 82% were brought by relatives for admission. Behavioural and psychological symptoms of dementia (76%) were cited as the main reason for admission as well as caregiver stress and burden of care (18%), social reasons (4%) and respite care (2%).

Average hospitalisation was 30 days. Linkages done: 20% Day Care, 14% Community Nursing Service and 31% to Nursing Homes. Other CM services included: 806 individual counselling sessions, 214 family counselling sessions, 547 telephonic case management, 514 referrals to other allied health services, 22 visits to Nursing Homes and Step-Down Services. With this combination of CM and MDT care, only a 5% unplanned readmission rate was recorded.

**Discussion & Conclusion:** CM supports mental healthcare delivery by ensuring patients receive coordinated and integrated care from inpatient to outpatient settings. They received individualised care and psychoeducation. Regular follow-up phone calls gave the carers the opportunity to discuss the various issues they faced. This results in better clinical outcomes for both patients and carers.

**OP-AH-06**

**Psychosocial Functioning, Quality of Life and Neurocognitive Status in First-Episode Bipolar Disorder and Schizophrenia**

**PS WOON<sup>1</sup>, MY SUM<sup>1</sup>, MY CHIA<sup>1</sup>, K SIM<sup>2</sup>**

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**Background/Hypothesis:** Most early studies of functional parameters examined schizophrenia and bipolar disorder separately and predominantly within more chronic conditions. This study seeks to compare and contrast the functional parameters (level of psychosocial functioning, quality of life, neurocognitive profile) of first episode schizophrenia and bipolar disorder. We hypothesise that patients with schizophrenia fared worse followed by bipolar disorder when compared to controls on these functional features.

**Methods:** Fifty-eight patients with schizophrenia, 30 patients with bipolar disorder and 57 healthy controls were assessed on their level of psychosocial/occupational functioning and subjective quality of life using the Global Assessment of Functioning and World Health Organization (WHO) Quality of Life Scales respectively. A neurocognitive battery was also administered. Hierarchical regression analysis was employed to examine correlates of the functional parameters.

**Results:** The level of psychosocial functioning ( $P < 0.001$ ) and quality of life (overall, psychological,  $P < 0.01$ ; physical & environment,  $P < 0.05$ ) were poorer in patients with schizophrenia compared with bipolar disorder. Psychosocial functioning was negatively correlated with symptom severity in schizophrenia and bipolar disorder. In patients with schizophrenia, poorer quality of life was associated with worse neurocognitive function. In patients with bipolar disorder, quality of life was negatively correlated with symptom severity.

**Discussion & Conclusion:** The level of psychosocial functioning and quality of life are affected early in the course of schizophrenia and bipolar disorder. The association of different functional features in schizophrenia and bipolar disorder signify the need to monitor these functional features even in early onset cases in order to optimise care of these individuals.

## OP-AH-07

### Neurocognitive Impairments in Patients with Remitted First Episode Mania

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**Background/Hypothesis:** Neurocognitive impairments have been previously observed in patients with chronic bipolar disorder. The current study seeks to examine whether neurocognitive impairments are found in patients with remitted first episode mania. Based on previous literature, we hypothesise that patients with first episode mania are associated with neurocognitive deficits involving verbal memory, attention, motor speed and executive functioning.

**Methods:** Thirty patients with first episode mania and 30 healthy controls were recruited with both groups matched for age, gender, education and premorbid intelligence. A neuropsychological battery was administered to assess several neurocognitive domains such as verbal memory, working memory, motor speed, verbal fluency, attention, speed of information processing, and executive function. Independent samples t-test was used to compare the neurocognitive outcomes between healthy controls and bipolar patients

**Results:** Patients with first episode mania are found to perform significantly worse on tasks which assess verbal memory (39.5+/-9.8 versus 48.6+/-8.4,  $t = 3.84$ ,  $P < 0.001$ ), working memory (21.5+/-3.1 versus 18.8+/-4.6,  $t = 2.6$ ,  $P = 0.011$ ), motor speed (75.4+/-11.4 versus 66.2+/-14.0,  $t = 2.8$ ,  $P = 0.007$ ), as well as attention and speed of information processing (65.6+/-9.3 versus 50.8+/-14.0,  $t = 4.8$ ,  $P < 0.001$ ). However, no significant difference was found between the two groups on verbal fluency (53.2+/-10.9 versus 48.0+/-14.3,  $t = 1.6$ ,  $P = 0.116$ ) and executive functioning (16.8+/-2.0 versus 15.3+/-4.5,  $t = 1.8$ ,  $P = 0.084$ ). The length of illness was found to have no effect on the patients' neurocognitive functioning.

**Discussion & Conclusion:** This study highlights that neurocognitive impairments are present early in the course of bipolar disorder. Greater focus should be placed on identifying these neurocognitive deficits and formulating ways to manage and ameliorate these potentially disabling impairments.

**OP-AH-08**

**A Hybrid Model of Community-Based Participatory Research**

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**Background/Hypothesis:** Community-based Participatory Research (CBPR) is a widely used model of public health research emphasizing equitable involvement and collaboration between researchers and communities in which the research is conducted, allowing them to benefit from involvement in research. However, CBPR is unfeasible when areas of research require much expertise and remain largely unknown to the community. We describe a hybrid model incorporating certain key principles of CBPR in a prospective study seeking to establish the biomarkers of psychosis.

**Methods:** The Longitudinal Youth At-Risk Study is a large scale study investigating the psychosis prodrome. Community involvement is minimal in the initial design and planning stages as the research questions require specialised clinical and research expertise. Our community partners include counsellors, social workers and psychologists from family service centres, counselling services from schools and institutes of higher education, clinicians from the Singapore Armed Forces and general practitioners. To help partners build their capabilities, we disseminate what we know from our management and research of those with psychosis and those at possible risk of psychosis. Communities are engaged and empowered via training workshops for counselors, holding consultation sessions with experts in the field, and forming an ongoing collaboration.

**Results:** Forty-one agencies and organisations have been engaged as partners, with more collaborations being forged. Ten workshops have been conducted since December 2009, with 193 counsellors trained. More workshops are scheduled in the coming months. The partnerships have already led to the identification of individuals at risk of psychosis.

**Discussion & Conclusion:** This study is a public health initiative that takes a community-engaged research approach. In seeking to work collaboratively with and through community partners, we aim to combine knowledge with action to improve health outcomes.

**OP-AH-09**

**Validity of the South Oaks Gambling Screen in Multiracial Asian Community Sample in Singapore**

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**Background/Hypothesis:** Gambling is increasingly becoming a public health concern. A reliable and valid instrument is necessary for measuring and tracking the prevalence of gambling problems in the general population. The South Oaks Gambling Screen (SOGS) is widely used to assess the prevalence of pathological gambling. The purpose of the present study was to provide evidence for the construct validity of SOGS in a multiracial Asian community sample living in Singapore.

**Methods:** A cross sectional study was conducted between September 2009 and April 2010 after receiving ethical approval from the relevant Institutional Review Boards. The SOGS was administered to all respondents; sociodemographic details were also collected using a structured questionnaire. Internal consistency of reliability was determined using Cronbach's alpha coefficient, whilst construct validity was examined using exploratory factor analysis (EFA).

**Results:** The scree plot using eigenvalue > 1.0 rule has suggesting one-factor solution for this sample. In the EFA specifying to one-factor model, all 13 items were loaded with the greatest factor loading, ranging from 0.95 to 0.99 and fit the data well with chi square statistic of 15.875 and degree freedom of 14 ( $P = 0.321$ ). All indices fit the data and supported construct validity of a single factor model (RMSEA = 0.018, CFI = 0.996, TLI = 0.997). The SOGS demonstrated high internal consistency with Cronbach's alpha coefficient of 0.85.

**Discussion & Conclusion:** The results of the validation study suggested that the SOGS scale is reliable and valid for screening gambling problem in a multiracial Asian community sample.



## OP-AH-10

### Effectiveness of Exercise-Based Programme for Neck Pain

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**Background/Hypothesis:** Exercise-based programmes have been used in some Singapore hospitals to treat various subacute to chronic neck conditions. The aim of this study is to evaluate the effectiveness of a group exercise-based programme conducted in Tan Tock Seng Hospital Physiotherapy department for patients with neck pain.

**Methods:** A retrospective study involving 97 subjects was performed. These subjects attended a course of group exercise-based therapy for their neck pain. The therapy was conducted by a Physiotherapist, and the exercises performed were part of a standardised neck exercise regime. The Neck Disability Index was administered to the participants pre- and post-exercise programme. The effectiveness of the program was evaluated by comparing the mean change between the pre- and post-exercise Neck Disability Index scores.

**Results:** The results of the study show a minimal mean Neck Disability Index point change of 2.78 (SD = 3.93) between pre- and post-intervention, with a median of 3 sessions attended. However, the participants were found to have low mean Neck Disability Index scores of 12.10 for pre-exercise programme (SD = 6.35).

**Discussion & Conclusion:** Patients more likely to respond to exercise-based intervention should be identified, and referred to the group-based exercise programme as early as possible. Classification systems for neck conditions, and the prediction of identifiers of a good response to exercise therapy should be further explored. Clinicians need to consider these when referring their patients into the exercise-based programme.

## OP-AH-11

### Evaluation of Free Triiodothyronine Assay on Beckman Coulter DxI 800

**SAZ AHMAD, J TSE, AB YAP, RC HAWKINS**

*Laboratory Medicine, Tan Tock Seng Hospital, Singapore*

**Background/Hypothesis:** Triiodothyronine (T3) is the major biologically active thyroid hormone. The unbound form, Free Triiodothyronine (fT3), regulates many aspects of normal growth and development. This study evaluates the performance of fT3 measurement on the Beckman Coulter DxI 800 Immunoassay Analyser.

**Methods:** A competitive immunochemiluminometric method was used to measure fT3 on the DxI 800. Three levels of manufacturer-supplied QC materials were analysed for 20 days to assess imprecision. Analytical sensitivity was determined using the Beckman Coulter QMIT method. Linearity was assessed using 6 levels of manufacturer-supplied calibrators. A non-parametric method was used to analyse the results of 120 samples taken from assumed healthy individuals to establish the reference interval. Fifty-nine sample results were compared with Siemens ADVIA Centaur (reference interval: 4.3 to 8.3 pmol/L) and sorted into a 3-by-3 matrix based on the method's reference intervals for kappa calculations.

**Results:** Day-to-day CV: 5.36% (3.45 pmol/L), 5.95% (8.38 pmol/L) and 5.93% (13.31 pmol/L). Analytical Sensitivity is 0.96 pmol/L. The assay is linear from 0.0 to 45.81 pmol/L. The calculated reference interval is 3.5 to 6.0 pmol/L. There is good agreement between the two methods (kappa: 0.66), but at high concentrations, DxI 800 gives lower readings and at low concentrations, DxI 800 gives higher readings,  $\text{DxI 800} = (0.66 \times \text{Centaur}) + 1.03$  (Deming's regression model).

**Discussion & Conclusion:** The Beckman Coulter DxI 800 shows good performance characteristics for quantifying free T3 concentrations in serum, with respect to precision, sensitivity and linearity. However, results are not interchangeable between the DxI 800 and Centaur, reflected in a lower reference interval for the DxI 800.

## OP-AH-12

### Evaluation of Free Prostate-Specific Assay on Beckman Coulter DxI 800

**SAZ AHMAD, J TSE, AB YAP, RC HAWKINS**

*Laboratory Medicine, Tan Tock Seng Hospital, Singapore*

**Background/Hypothesis:** Prostate-Specific (PSA) is a tumour marker for monitoring of prostate cancer. Measurement of the unbound form, Free Prostate-Specific (fPSA), enables the calculation of percentage free PSA (%f PSA). This has been shown to be useful in aiding biopsy decisions on patients with a total PSA measurement between 4 and 10 µg/L. A low percentage of fPSA, (e.g. <10%), increases the probability of cancer. This study evaluates the performance of fPSA measurement on the Beckman Coulter DxI 800 Immunoassay Analyser.

**Methods:** A sandwich immunochemiluminometric method was used to measure fPSA on the DxI 800. Three levels of manufacturer-supplied QC materials were analysed for 20 days to assess imprecision. Analytical sensitivity was determined using the Beckman Coulter QMIT method. Linearity was assessed using 6 levels of manufacturer-supplied calibrators, with the highest level diluted. DxI 800 %fPSA (DxI 800 fPSA/DxI 800 total PSA) was compared with Cobas e601 %fPSA (Cobas e601 fPSA/ Cobas e601 total PSA) in 63 specimens. The %fPSA calculated were compared with %fPSA sample results from Roche Cobas e601. Results were sorted into a 3-by-3 matrix classified as: <10%, 10% to 20% and >20% for the kappa calculation.

**Results:** Day-to-day CV is 3.78% (0.70 µg/L), 3.82% (1.89 µg/L) and 3.2% (12.81 µg/L). Analytical Sensitivity is 0.001µg/L. The assay is linear from 0.00 to 18.85 µg/L. DxI 800 results are slightly lower,  $DxI\ 800 = (0.89 * Cobas\ e601) - 1.66$  (Deming's regression model) but shows good agreement between methods (kappa = 0.69).

**Discussion & Conclusion:** The Beckman Coulter DxI 800 shows good performance characteristics for quantifying free PSA concentrations in serum, with respect to precision, sensitivity and linearity. It provides a good alternative to the free PSA assay on the Roche Cobas e601.

## OP-AH-13

### Setting Up a Method for Measurement of Ethylenediamine Tetraacetic Acid Concentration in Serum on Beckman Coulter DxC 800

**R ZHOU, ND SAIFDDIN, AB YAP, RC HAWKINS**

*Laboratory Medicine, Tan Tock Seng Hospital, Singapore*

**Background/Hypothesis:** Ethylenediamine tetraacetic acid (EDTA) has been widely used as an anticoagulant. Misleading analyte concentration can be measured in K<sub>2</sub>EDTA plasma due to presence of K<sup>+</sup> and/or chelation of metallic cations. The aim of this study was to develop a method for EDTA measurement on the Beckman Coulter DxC 800 analyzer.

**Methods:** At pH 4.8, sample EDTA will abstract copper ions from a violet coloured pyridylazonaphthol-copper complex (Pan-Cu) to yield a yellow copper free complex. The decrease in solution absorbance is proportional to the EDTA concentration in the sample. Two different protocols were evaluated: ED 1 (6 calibrators from 0 to 0.5 mmol/L) and ED 2 (5 calibrators from 0 to 0.25 mmol/L). Calibrators were prepared by spiking patient's serum with EDTA. Analytical sensitivity was assessed as mean + 2 SD of EDTA free serum. Imprecision was assessed at two levels using spiked patient samples (level 1: 0.05 mmol/L, level 2: 0.25 mmol/L)

**Results:** ED 1 was linear to 0.5 mmol/L and ED 2 was linear to 0.25mmol/L. Analytical sensitivity was 0.010 mmol/L and 0.051 mmol/L for ED 1 and ED 2, respectively. Imprecision of ED 1: 0.038 SD at level 1 and 0.007 SD at level 2; ED 2: 0.032 SD at level 1 and 0.006 SD at level 2. There was no significant difference in precision between both assays.

**Discussion & Conclusion:** Measurement of EDTA on the Beckman Coulter DxC 800 analyser is a simple, fast and precise assay with good linearity. A 6-point calibration gives the widest linearity and the lowest analytical sensitivity. This assay may be useful for laboratories that are interested in measuring possible EDTA contamination in clinical samples.

## OP-AH-14

### Creating an Atlas and Teaching Slides of Medically Important Fungi

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**Background/Hypothesis:** Main fungal identification methods used in clinical laboratories is by morphological studies of the cultured sample. Medical technologists are required to be trained to recognise and identify certain medically important fungi. Current resources in the Tan Tock Seng Hospital's Mycology laboratory are limited. Illustrations and images are mostly in black and white. Teaching slides are currently not available and the current staining method is flawed. Thus this project aims to produce an atlas containing coloured macroscopic and microscopic pictures of clinically significant fungi and teaching slides with a new stain.

**Methods:** Clinically significant fungi were chosen according to David H. Larone's *Medically Important Fungi: A Guide to Identification* (3rd Edition ed.). Fungal samples were then obtained from stored External Quality Assurance Service (EQAS) samples in Tan Tock Seng Hospital's mycology bank and grown on Saboraud's dextrose agar for colony morphology and potato dextrose agar for slide cultures. An experiment was also carried out to create a modified stain that can be used in the preparation of teaching slides.

**Results:** Surface and reverse pictures of the fungal colony on SDA and microscopic picture at 40x and 10x were captured and compiled in a manner for easy clinical usage. The new stain, Lactophenol aniline blue with gelatine, was produced to be used in the preparation of teaching slides.

**Discussion & Conclusion:** The atlas is a vast improvement of current materials used in mycology. It aids personnels in the identification of positive fungal cultures. The teaching slides are also a referencing tool for personnel and a major education tool for future staff and students.

## OP-AH-15

### **A Chronic Disease Management Programme, The Airways Programme in National Healthcare Group**

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*Clinical Programme, National Healthcare Group (HQ), Singapore*

**Background/Hypothesis:** Chronic Obstructive Pulmonary Disease (COPD) has been under recognised and stigmatised for many years. Disease exacerbations have devastating consequences on the quality of life (QoL) of COPD patients. The objectives of The Airways Programme (TAP), a disease management programme, are to reduce hospitalisation or readmission, mortality, average length of stay and improve quality of life (QoL) and self-management on a group of enrolled COPD patients in Tan Tock Seng Hospital (TTSH), National Healthcare Group (NHG).

**Methods:** TAP, a multidisciplinary team, commenced in April 2008. Appropriate COPD patients were recruited into programme by TAP Case managers and the patients enrolled were given education on various aspects of the disease, reinforced on medication compliance and follow-up adherence and managed with telephonic calls. Furthermore, the patients were encouraged to go for influenza and pneumococcal vaccination. The programme management also includes home visit for selected patients to reduce unnecessary readmission and six minute walk test (6MWT) was conducted for effort tolerance and St George's Respiratory Questionnaire (SGRQ) for QoL assessment.

**Results:** Among 355 active patients (86% males, 84% Chinese), age above 60 years (89%), (Smokers 21%, Ex-smokers 79%) were actively enrolled over 2 years (April 2008 to March 2010). The disease severity was ranked according to GOLD guideline with Stage 1 and 2 (37%) and Stage 3 and 4 (63%), respectively. Forty-two percent (n = 152) of patients completed both baseline, 6 month and 1 year SGRQ. Mean SGRQ score is 33.50 (SD = 18.07) amongst the enrolled active cases.

**Discussion & Conclusion:** TAP programme patients' average length of stay (ALOS) over 2 years is 4.4 days. Overall, there is no deterioration in QoL. The data collected will be used as a baseline for future comparison in the programme.

## OP-AH-16

### Viable Proficiency Testing Fungal Isolates

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**Background/Hypothesis:** Fungal isolates used for Proficiency Testing were kept in vials of sterile distilled water for a prolonged period of time. The objective of this project was to isolate the viable fungal isolates for storage purposes.

**Methods:** The first phase of the project involved the culturing of the fungal isolates onto Sabouraud Dextrose Agar plates. Growth of the isolates implied viability. Before we confirmed that the viable isolates were indeed the ones cultured from the vials (termed 'true viable isolates'), we ruled out vial or environmental contamination. This was done by noting the morphological characteristics of the viable isolates, both macroscopically and microscopically. Plates that showed no growth were incubated for up to 30 days before a revival experiment was conducted to conclude if the isolates were dead or of a weakened proliferative state. The revival experiment involved the use of 3 different enrichment media so that isolates with a weakened proliferative state could be enhanced to produce growth.

**Results:** Out of 101 fungal isolates which we have cultured, 63 of them were viable with 53 (52%) being true viable isolates and 10 (10%) being a result of vial contamination. Thirty (30%) were dead and 3 (3%) were of a weakened proliferative state. Five of the isolates (5%) were indeterminate.

**Discussion & Conclusion:** During the course of this project, we differentiated between the true viable isolates and the isolates that were actually contaminants. In addition, we successfully revived the fungal isolates of weakened proliferative states. Eventually, we transferred the viable isolates into cryovials that were kept frozen.

**OP-AH-17**

**Spirometry Screening Event on World Chronic Obstructive Pulmonary Disease Day 2009**

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*Clinical Programme, National Healthcare Group (HQ), Singapore*

**Background/Hypothesis:** Chronic Obstructive Pulmonary Disease (COPD) is currently under-diagnosed; the rising rate has become one of the leading causes of mortality worldwide. Early diagnosis of COPD can prevent costly treatment. Spirometry is a useful tool to screen COPD and may give an early diagnosis for appropriate treatment.

**Methods:** A Heartlands Healthcare Carnival event was held for World COPD day 2009 to raise awareness of COPD among Singaporeans. The event was advertised in the local press and media. The public were encouraged to attend. Individuals with smoking history, over 40 years of age, coughing on and off with excessive phlegm and breathlessness on mild exertion were advised to go for the spirometry screening test.

**Results:** Forty-one patients (34 males), mean age 58 (SD 11) years completed a questionnaire and had spirometry performed. The mean FEV1 is 84% (SD = 21%). Of these, 17% of those screened had COPD or early signs of the disease and none of them were on treatment at the time of testing.

**Discussion & Conclusion:** A public spirometry screening event helps to identify the number of people diagnosed with COPD or being at risk of developing this disease. The number of undiagnosed COPD in the general population is considerably high from the event. Through early detection with spirometry test, we can diagnose and treat COPD at an earlier stage to prevent further complication. When diagnosed at a later stage, treatment will be more costly.



## **OP-AH-18**

### **Field Testing for the Positive Mental Health Instrument**

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**Background/Hypothesis:** There is increasing awareness about the concept of Positive Mental Health (PMH) in Singapore and consequently, there is a need for a culturally appropriate instrument to measure this in the local population. This paper describes the essential steps in relation to the field testing for the development of such an instrument.

**Methods:** The study was conducted on Singapore citizens or permanent residents, of Chinese, Malay or Indian ethnicity, aged 21 to 65 years. The respondents completed a self administered questionnaire, in English. Two field methodologies were applied; door to door and street intercepts and regular quality control processes were implemented throughout the data collection phase. Items relating to multiple domains of PMH were identified via focus group discussions, conducted in the first phase of the study. These items contributed to the development of a questionnaire used to measure PMH.

**Results:** Data were collected between April and July 2010 and a total of 1873 questionnaires were completed. The mean age of participants was 40.5 years. Of which, 943 (50.3%) were males and 930 (49.7%) were female. The majority were Chinese (645, 34.4%), followed by Indians (619, 33%) and Malays (606, 32.4%). On a 7-point scale ranging from 'not a very happy person' to 'a very happy person'; 385 (20.6%) persons rated themselves as a 'very happy person' and 30 (1.7%) rated themselves as 'not a very happy person'. Data analyse for the item reduction is ongoing and following this, further testing will be conducted in the general population.

**Discussion & Conclusion:** Adopting a thorough methodology and the application of multiple psychometric data analyses are essential to the development of a culturally valid PMH instrument.

## OP-AH-19

### **The Experiences of Patients with Multiple Sclerosis who Participated in a 10-Week Group Exercise Programme: A Focus Group Study**

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**Background/Hypothesis:** Evidence shows that exercise has positive effects on physical outcomes in a Multiple Sclerosis (MS) population. However discrepancies exist in the literature regarding its effect on Quality of Life (QOL). Some quantitative methods of assessing QOL may be insensitive to assessing change over time and may not be a true indicator of a patient's experience of an exercise programme. The objective of this study was to explore the experiences of MS patients who participated in a ten-week group exercise programme.

**Methods:** A qualitative research design using focus group methodology was used. Focus groups were audio-taped and transcribed verbatim. At the conclusion of each focus group, a verbal synopsis was given by the assistant moderator to the participants for them to verify the interpretation of the data. A debrief between moderator and assistant moderator was held directly after each group in order capture the first impressions and highlight and contrast findings from previous focus groups.

**Results:** Three focus groups took place comprising of 14 participants. Three common themes arose from the groups. All discussed the psychological benefits they experienced including feelings of empowerment, hope and motivation. Physical benefits were described as increased energy levels and improved ability to perform functional tasks. Their increase in knowledge relating to appropriate exercises and how they should be performed was also significant.

**Discussion & Conclusion:** MS patients experience many psychological and physical improvements in response to group exercise which have an impact on their QOL and functional capacity. The group participation was found to be a vital component of the programme and had implications for adherence and motivation.

## OP-AH-20

### Intraoperative Neurophysiologic Monitoring in Spine Surgery

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**Background/Hypothesis:** The major challenge in spine surgery is to maintain functions of spinal cord/nerve roots. Intraoperative monitoring has been utilised to minimise neurological morbidity from operative manipulations. The goal of monitoring is to identify changes in spinal cord and peripheral nerve function prior to irreversible damages.

**Methods:** We have successfully developed standards to use somatosensory evoked potentials (SSEPs), transcranial electrical motor evoked potentials (tceMEPs) and electromyograms (EMGs) to assess the functional integrity of the nervous system protect patient's neurology function and help to avoid postoperative neurologic complications during spine surgery. Anaesthesia was routinely induced with intravenous propofol and remifentanyl, supplemented with inhaled nitrous oxide. The use of neuromuscular blockade was avoided after intubation.

**Results:** We have completed 348 spine surgeries with various monitoring techniques in National University Hospital in 2009. Our results were compared to the prevailing neurologic outcome prediction rate [Eur. Spine J. 2007; 16(Suppl 2): 188-196]. Our false-positive rate was 0.86% compared to the international rate of 1.38%. Our true-positive rate was 0.86% compared to the international rate of 5.52%. More importantly, our false-negative rate of 0.29% is less than the international record of 0.46%. The more significant part is that we had no postoperative neurologic complications in our 94 scoliosis.

**Discussion & Conclusion:** Neurophysiologic monitoring is a diagnostic tool for assessment of neurological function during spine surgery. These monitoring modalities provide valuable information and excellent protection at neurology functional level with high sensitivity and specificity.

## OP-AH-21

### The Hospital Anxiety and Depression Scale as a Screening Tool

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**Background/Hypothesis:** The aim of this study was to determine the optimal cutoff scores for the Hospital Anxiety and Depression Scale (HADS) when used in evaluating gynaecological cancer patients in the Singapore population.

**Methods:** A total of 143 gynaecological cancer patients (16.1% cervical cancer, 28.0% uterine cancer, 46.9% ovarian cancer, 9.1% other cancers; 27.3% Stage 1, 11.2% Stage 2, 19.6% Stage 3, 7.7% Stage 4, 2.1% Preinvasive, 32.2% Unknown) recruited from National University Hospital were assessed using the HADS.

**Results:** Statistical analysis was performed using ROC curves. A total of 73 patients (51%) had at least one mental disorder. The area under the curve for the total scale of the HADS is 0.83. With score of  $\geq 9.5$ , it is possible to detect 75% of the cases with a specificity of 0.74. Positive and negative predictive values (PPV and NPV) for cutoff point of 9.5 are 0.75 and 0.74, respectively.

**Discussion & Conclusion:** The current study highlighted the importance of determining an optimal cutoff point for the local population to avoid failures in identifying distressed patients resulting in under-treatment.

**OP-AH-22**

**Caregivers' Concerns and Participation among Community-Dwelling Stroke Survivors in a Chinese Population: a Preliminary Study**

**LC NG**

*Occupational Therapy, Tan Tock Seng Hospital, Singapore*

**Background/Hypothesis:** Caregivers' safety concerns could influence the extent of participation among care recipients and this area is often overlooked in rehabilitation. The purpose of the study is to develop a questionnaire on caregivers' safety concerns in mobility and investigate its relationship with participation in community-dwelling stroke survivors in a Chinese population.

**Methods:** A caregivers' concerns questionnaire (Safe-Q) in mobility was developed and a participation measure (PAR-PRO) was administered to a group of caregivers. Sociodemographic variables and caregiver burden were also collected.

**Results:** A total of 36 caregivers participated in the study. The highest frequency of concerns in mobility was "going out alone". Mean PAR-PRO score was  $10.9 \pm 5.86$ . Pearson's correlation between caregivers' concerns and care recipient's participation were not statistically significant ( $r = -0.087$ ,  $P = 0.636$ ). T-tests and ANOVA analyses revealed that both PAR-PRO and Safe-Q mobility were not affected sociodemographic variables of caregivers like educational level and perceived health.

**Discussion & Conclusion:** The near-zero correlation between participation and caregivers' concerns suggest that perceptions of caregivers and care recipients might differ in participation. Also, personal factors of the care recipients like the presence of comorbidities and communication disorders could have more influence on participation and hence diminished the effects of caregivers' concerns in mobility. It would be worth looking into other concerns like physical environment and perceived competency of care recipient have on participation.

## OP-AH-23

### Effectiveness of Physiotherapy Screening in Falls Prevention

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**Background/Hypothesis:** The Extended Diagnostic Treatment Unit (EDTU) in National University Hospital (NUH) is a 16-bed observation unit operated by emergency physicians. Since 18 February 2009, physiotherapy services were provided to neuro-geriatric patients with the aim of reducing readmissions to NUH due to falls. This retrospective study was done to determine the effectiveness of EDTU physiotherapy services.

**Methods:** Participants were recruited when emergency physicians refer them for physiotherapy assessment. The recruitment was conducted from 8 February 2009 to 16 April 2010. After recruitment, the participants were screened by a physiotherapist to determine their falls risk. Subsequently, the falls risk participants were given one or more of the following physiotherapy treatments: walking aid prescription, falls prevention education, caregiver training and referrals to post-discharge rehabilitation. The rate of readmission due to falls within one year was used to determine the effectiveness of EDTU physiotherapy services.

**Results:** The number of participants recruited was 17. After initial screening by the physiotherapist, 14 participants were determined to be at falls risk and given physiotherapy treatment. Using the NUH hospital records database (CPSS), the 14 falls risk participants were followed up one year after first admission to determine the readmission rate. Out of the 14 falls risk participants, 5 were readmitted (35.7%). However, only one patient was readmitted due to a second fall (7.1%).

**Discussion & Conclusion:** The low readmission rate of 7.1% suggests that physiotherapy services in EDTU show promise in reducing hospital re-admissions due to falls. However, a larger study with a more rigorous methodology will be needed to confirm this hypothesis.

**OP-AH-24**

**Socio Demographic Study of Female Psychiatric Patients Remanded for Psychiatric Assessment in 2008 at a Tertiary Psychiatric Hospital**

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**Background/Hypothesis:** This study aimed to establish an understanding of the socio demographic profile, psychiatric diagnoses and criminal charges of female patients remanded by the courts for psychiatric assessments at the Institute of Mental Health (IMH) in 2008. The number of female remand patients had increased significantly, ten-fold between 1987 and 2008. There was an urgent need to profile this group.

**Methods:** Data were mined from psychiatric reports and discharge summaries and analysed using SPSS version 17.

**Results:** Of the 103 patients reviewed, 31% were diagnosed with psychotic disorders, 36.8% with mood disorders, 22.5% with either Mental Retardation or Personality Disorder and 9.7% with no mental illness. Within the study population, 22.3% were diagnosed with substance misuse with benzodiazepine the most misused substance. Thirty-four percent had a previous remand at IMH and 18.6% had a violent charge (e.g. rioting, robbery, voluntarily causing hurt, possessing offensive weapons, outrage of modesty, obscene act, criminal intimidation, breach personal protection orders).

**Discussion & Conclusion:** The more prevalent diagnoses noted were psychotic disorders, mood disorders and substance misuse disorders. There were no significant association between substance misuse and violent charges among the studied population. Intensive case management interventions will be crucial to provide continuity of care and close follow-up to monitor patients' compliance to treatment will be necessary to prevent patients from reoffending.

## OP-AH-25

### Engaging Patients with Psychiatric Disorders in Treatment Compliance

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**Background/Hypothesis:** Psychiatric case management (CM) commenced in the psychiatric outpatient clinics of a tertiary hospital in October 2007. The majority of patients referred to the CM in the clinic were for non compliance to treatment issues. This paper illustrates the sociodemographic profile of these patients and the techniques used to engage patients in treatment compliance.

**Methods:** Data mining of patients referred to CM from Jan to June 2010 was done and results analysed with Microsoft Excel.

**Results:** One hundred and forty patients, 85 males (60.7%) and 55 female (39.3%), were referred. Ninety-eight percent of the patients were aged 40 years and above and only 2% were between 21 and 30 years old. Sixty-five percent of patients were diagnosed with schizophrenia, 8.6% depressive illness, 7.1% mental retardation, 2.1% bipolar disorder 7.1% anxiety disorders, 5.7% substance use disorders, 4.4% others. CM conducted assessments, built a therapeutic relationship and identified risks factors for relapse. Besides this, other clinical interventions included 140 psychoeducation sessions, 115 patient counselling sessions, 83 family counselling sessions and 201 telephonic case management. Both family members and caregivers were educated on identifying early warning signs of relapse (Relapse Drill Prevention Technique). Clinical outcome indicated that only 7 patients (5%) were readmitted after case management intervention.

**Discussion & Conclusion:** CMs need to build up good therapeutic relationship and communication, besides psychoeducating, counselling and providing continuous support to patients in order to engage them in treatment compliance.



## OP-AH-26

### Comparison of Outcome Measurement Methods for Extensor Tendon Injury-Literature Review and Clinical Application

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**Background/Hypothesis:** Outcome measurement used for extensor tendon injury studies had been varied leading to difficulties in comparing their results. This study looks into the frequency of use of different measurement methods in the previous studies and compares the results on clinical cases treated in Singapore National University Hospital.

**Methods:** An extensive literature search was conducted using Medline, PubMed, The Cochrane Library and Cinahl. Keywords such as "hand" or "wrist injuries" were combined with "rehabilitation", "surgery" or "therapy". "Extensor tendon" was finally added to exclude irrelevant patient population. Twelve Patients with 18 primary extensor tendon (zone III—VI) repaired digits treated in Hand Therapy clinic from September 2008 to June 2009 were reviewed. All measurements were taken at the 8th week postoperation with patient's wrist in neutral position.

**Results:** A total of 19 studies published from 1989 to 2008 were selected through literature review. Five frequently used systems were identified: Kleinert & Verdan—Total Active Motion (TAM) system (50%), Miller's (23%), Dargan's criteria (14%), Geldmacher's Evaluation Scheme (9%) and Strickland—Glogovac Formula (4%). In clinical application, the results of 18 digits were widely varied under different outcome measurement. The outcome of repaired digits was better under Strickland—Glogovac Formula (Excellent and Good, 100%) but much poorer under Miller's criteria (Fair and Poor, 94.4%).

**Discussion & Conclusion:** TAM system has been the most commonly used outcome measurement in the past 20 years. Miller's criteria appeared to be too strict whereas Strickland—Glogovac Formula seemed to be too lenient. Geldmacher's system was rarely used but it has been the most detailed method which measures deficits of individual joint. In order to reflect the true outcome of patients after specific surgery or therapy regime, it is essential to standardise the outcome measurement method for extensor tendon injury in future studies.

**OP-AH-27**

**The Implementation of Standardised Nutrition Practice for Liver Disease in an Acute-Care Teaching Hospital**

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**Background/Hypothesis:** Enteral and parenteral nutrition guidelines for liver disease have been published by the European Society of Parenteral and Enteral Nutrition (ESPEN). Controversies remain in some areas of nutrition support which may lead to variation in the actual clinical practice. This study aimed to develop a guide for clinicians at Royal North Shore Hospital, Sydney, to standardise nutrition management in liver disease.

**Methods:** Using qualitative research methodology, in the form of individual semi-structural interviews, gastroenterologists/hepatologists, dietitians and clinical nurse consultants were recruited across 4 metropolitan acute-care teaching hospitals in New South Wales, Australia. The content of the interviews was scribed and analysed using thematic content analysis.

**Results:** A recruitment rate of 85% (n = 17) was achieved in this study. Forty-seven percent (8/17) of the participants reported routinely following the nutrition guidelines from ESPEN. Protein restriction was still recommended by doctors for hepatic encephalopathy. The use of branched-chain amino acid supplementation was inconsistent. The most common reason being it was not routinely provided to all liver cirrhosis patients due to the high cost. None of the participants reported that a standardised nutrition referral protocol for liver disease was used.

**Discussion & Conclusion:** There is a need to have an evidence- and consensus-based approach to nutrition management of liver disease to promote optimal nutrition care. Thus, the formalised referral pathway and blueprint developed may assist this process.

## OP-AH-28

### Work Related Musculoskeletal Disorder among Physiotherapists in Klang Valley

#### **CTNG**

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**Background/Hypothesis:** Musculoskeletal disorder (MSKD) is the disorder of muscles, bones, tendons, nerves, arteries and veins that can be worsened by any body movement. It is the work related health disorder that affects physiotherapists most. The objectives of this study are to estimate the prevalence of work related musculoskeletal disorder (WRMD) among physiotherapist in Klang Valley and its relationship with body mass index (BMI), gender, age, years of working experience as physiotherapist, area of work and techniques used by physiotherapist.

**Methods:** Eighty-one physiotherapists working in Kuala Lumpur General Hospital (HKL), Medical Centre of National University of Malaysia (PPUKM) and Klang Hospital (HK) are involved. The respondents constituted of 22.22% (n = 18) male and 77.88% (n = 63) female. Of these, 82.70% (n = 67) of subjects are aged between 21 and 40 years and 17.30% (n = 14) of subjects are aged above 40 years. Among them, 9.9% (n = 8) of respondents have BMI less than 18, 59.3% (n = 48) have BMI between 18 and 25 and 30.9% (n = 25) of respondents have BMI more than 25. Standardised Nordic Questionnaire is used and 8 demographic questions are added.

**Results:** This study has found that the prevalence of musculoskeletal problems among physiotherapists in Klang Valley is 67.90%. Annual prevalence and weekly prevalence of WRMD among physiotherapists in Klang Valley are 71.60% and 55.60%, respectively. The body part most commonly affected by WRMD is low back, followed by neck and upper back. There is no significant relationship between BMI, gender, age, years of working experience, area of work, and techniques used by physiotherapist with prevalence of WRMD.

**Discussion & Conclusion:** Female physiotherapists with BMI more than 25 and aged less than 40 years is more commonly afflicted by WRMD. Awareness of physiotherapists regarding MSKD can be raised through this research. Appropriate actions can be taken by authorities like Ministry of Health and Malaysian Physiotherapist Association based on this research.

**OP-AH-29**

**Virtual Reality in Chronic Stroke Rehabilitation: A Systematic Review of Its Effectiveness for Hemiparetic Upper Limb Retraining**

**HX HUANG**

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**Background/Hypothesis:** Loss of upper limb function after the onset of stroke often results in a major disablement in one's daily living. This results in a great emphasis on upper limb retraining in stroke rehabilitation and evidence has shown that high intensity and repetitive rehabilitation is needed in upper limb retraining. In the recent years, there are a growing number of studies suggesting the use of virtual reality (VR) therapy in upper limb retraining to replace conventional therapy. This systematic review aims to investigate the effectiveness of the use of virtual reality in paretic upper extremity training in clients with chronic stroke.

**Methods:** A systematic review of studies published in the recent 10 years from 1999 to 2009, retrieved from MEDLINE, CINAHL, AMED and PsychoINFO was performed. Articles are selected if they are full text reports in English and investigate use of virtual reality together with/ without haptic device as the only medium for intervention for clients with chronic stroke.

**Results:** Outcome measures included the kinematics of the hand and functional assessments such as Box and Block test, Functional Test of the Hemiparetic UE, and Jebsen Test of Hand Function. Results based on 5 studies reviewed suggest that the use of virtual reality system aids the recovery of motor performance in the haemiplegic upper limb in a minimum of 12 to 15 sessions (45 minutes), but was found to be inconsistent in functional aspects and skill retention.

**Discussion & Conclusion:** The current evidence on the effectiveness of virtual reality therapy in haemiparetic upper extremity retraining for clients with chronic stroke is limited. More high quality RCT is needed to determine the effectiveness of the use of virtual rehabilitation in chronic stroke rehabilitation. Future studies should also investigate the potential usage of commercialised computer games and their effectiveness in stroke rehabilitation.

**OP-AH-30**

**Occupational Therapy and Functional Outcomes in Child Psychiatry: A Case Report of a School-Aged Child with Attention Deficit Hyperactivity Disorder**

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**Background/Hypothesis:** Children with attention deficit hyperactivity disorder (ADHD) may exhibit challenges with self-regulation, sensory integration and psychosocial development. These impair on their ability to function in self-care, school and play roles. Occupational therapists provide therapy to improve their role performances. This research presents a case report exploring the effects of occupational therapy provided for a 10-year-old boy diagnosed with ADHD. The treatment aims to address social, emotional and behavioural issues which interfered with his ability to assume age-appropriate roles and learning in a mainstream school.

**Methods:** At the beginning of therapy, 2 target functional outcomes were identified for the participant, in collaboration with his parents. The outcomes were operationalised and measured using the Goal Attainment Scale. Interventions, such as the Alert program, DIR/Floortime model, parenting strategies and clinical reasoning were applied by the occupational therapist in the clinic and followed up by his family at home. The participant was not on any concurrent interventions, such as medications, except reviews by the medical consultant.

**Results:** The participant responded well to occupational therapy in a one-to-one outpatient intervention. There were significant improvements in the targeted functional outcomes of self-regulation and self-esteem after a 9-month intervention. There was a 4-point improvement in self-regulation and a 3-point improvement in self-esteem on the Goal Attainment Scale. The participant also demonstrated decreased frequency of disruptive behaviours, with an increase in functional role performance.

**Discussion & Conclusion:** Findings supported the application of occupational therapy for children with social, emotional and behavioural issues. The Alert program, DIR/Floortime model, parenting strategies, clinical reasoning and professional experience were effective in improving role performances of school-aged children when used together.

## OP-AH-31

### An Evaluation of a Pilot Occupational Therapy Social Skills Group

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**Background/Hypothesis:** Social skills are essential for children in forming healthy peer relationships. Occupational therapists commonly provide remediation for children with socioemotional difficulties by providing social skills training. A new service of social skills group training has recently commenced for school-aged children treated in National University Hospital. The research aims to investigate the impact of a pilot social skills group on the communication and emotion management skills of school-aged children with socioemotional difficulties.

**Methods:** A pre-post test design was used, involving 7- to 8-year-old children diagnosed with either Autism Spectrum Disorder or Non-verbal Learning Difficulties. Sessions were held in the outpatient rehabilitation setting, by paediatric occupational therapists. The group of 4 children attended five 1-hour sessions over a period of 3 weeks. The outcome measure was a parent questionnaire developed by the therapists. Qualitative feedback from parents on the group program was also taken into consideration.

**Results:** The pilot group programme improved the social skills of children with socioemotional difficulties. Improvements were noted in both communication and emotion management skills. Most parents rated improvements in the components of cooperative play skills, friendship management and social thinking skills. An improvement of approximately 10% was noted in each of the components. In addition, parents gave positive feedback about the duration, frequency and content of the group programme.

**Discussion & Conclusion:** Findings supported the application of social skills group in an outpatient rehabilitation setting. A continuation of future groups should be made for school-aged children since social demands and quality of relationships increase rapidly during middle childhood. This research also provided preliminary evidence for the social skills group. Future research should examine the long-term impact of the social skills group.

**OP-AH-32**

**Tools Used in Psychiatric Case Management to Provide Enhance Clinical Preparation for Discharge to the Community**

**MS MAAROF**

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**Background/Hypothesis:** Telephonic case management and clinical pathways (CP) are utilised by case managers (CM) to deliver psycho-education, counselling, linkages, monitoring and coordination of care for patients. Also clinical rating scales, such as the Clinical Global Improvement (CGI) and Global Assessment of Functioning (GAF), are used to monitor patient recovery process. This paper examines the use of these tools in a cohort of CM patients admitted to an acute psychiatric ward of a tertiary psychiatric hospital.

**Methods:** Data were captured over a 6-month period (January 2010 to June 2010) into a database and analysed using Microsoft Excel Programme.

**Results:** One hundred and seventy-four patients were assessed and case managed. Thirty-seven percent was suffering from Schizophrenia, 25% Situational Reaction, 10% Depression, 10% Mental Deficiency, 9% Bipolar Disorder, 9% Drug dependence. CM care included the used of CP, psycho-education sessions (197), patient counselling sessions (108) and linkages to clinical services (207). The mean CGI score was 6.31 on admission and 1.74 upon discharge. The mean GAF score was 23.7 on admission and 66.4 upon discharge. An average of 65% to 70 % improvement were achieved on both scales were significant. Upon discharge, 248 telephonic CM calls were made and patients monitored closely for treatment compliance. Ninety percent attended their first appointment after discharge.

**Discussion & Conclusion:** The CGI and GAF scales reflect the improvement patients achieved in the ward and the CP provide a system of evidenced care. The use of these tools enhances the CM's clinical preparation to care for patients upon discharge.

## OP-AH-33

### Podiatric Nursing Diabetic Wound Clinic

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**Background/Hypothesis:** In Singapore National University Hospital, diabetic foot problems were accounted for 10% to 20% of emergency admissions and 27.2% resulted in major limb amputations. Majority of admissions required surgical intervention resulting large complicated wounds. High percentage of these cases returned with secondary complications due to insufficient wound care in the community. A new service is needed to care for these postoperative wounds. The study aim was to demonstrate a step-down outpatient podiatric nursing wound care service can improve the outcome of diabetic foot wounds cost-effectively.

**Methods:** A 2-year retrospective quasi-experimental study was performed. Subjects were identified as inpatients. All selected subjects received podiatric nursing wound care in an outpatient setting. Patient's wound-healing progress, complications and treatment costs were recorded in a database.

**Results:** Among the patients identified, 71% showed positive outcomes, 13% developed complications and 16% defaulted appointment. The study showed 43% ulcers healed completely and 28% was on continuous outpatient podiatric care in hospital.

**Discussion & Conclusion:** Diabetic foot ulcer clinic operated by podiatric trained nurses in a tertiary setting provides a high quality and cost-effective wound management to patients. It provides a high chance of wound healing and reduces the risks of infection and lower limb amputations.



## OP-AH-34

### Introduction of Cytogenomic Microarrays in Prenatal, Paediatric and Cancer Diagnostics

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**Background/Hypothesis:** To compare the detection rate by cytogenomic microarray analysis for chromosomal abnormalities in a set of prenatal, paediatric and cancer cases.

**Methods:** Ten samples encompassing all 3 disciplines were selected and DNA was isolated from amniotic fluid, peripheral blood or bone marrow. Cytogenomic microarrays (Affymetrix 2.7M Cytogenetics and Nimblegen 6x135K oligonucleotide CGX Array) targeting the whole genome with denser coverage of SNPs or oligonucleotides in cytogenetically significant regions were used for this trial. Samples were hybridised overnight, washed, scanned and the results were analysed using the Chromosome Analysis Suite (CHAS) or Genoglyphix software. Comparative cultures were set up for G banded chromosome analysis using standard procedures.

**Results:** All the abnormalities detected by traditional chromosomal karyotyping were picked up accurately by the microarrays. Copy number variations (CNV) could be resolved into known pathogenic deletions/duplications, known benign variants and variants of unknown significance by comparison with standard databases (e.g. Database of genomic variants, OMIM etc). CNV's detected by the microarray analysis correlated well with cytogenetics and further refined breakpoints, in addition to yielding extra information about relevant genes within and around region of interest. Loss of heterozygosity (LOH) was apparent by the allele distribution. However, balanced translocations and mosaicism below 15% were not detected by the microarrays.

**Discussion & Conclusion:** Cytogenomic microarrays were easy to perform and gave a clean hybridisation pattern. In case of prenatal and paediatric samples with fewer abnormalities, analysis was more straightforward. With cancer samples, despite the presence of a normal cell line, the microarrays were still able to pick up all the abnormalities, except where the abnormal cells were very low in number. In all sets of patients, additional invaluable information was obtained on LOH.

OP-AH-35

**The Contribution of Clinical Factors Including in-Hospital Complications and Left Ventricular Dysfunction on Cardiac Rehabilitation Uptake among Acute Myocardial Infarction Patients Who Underwent Urgent Coronary Interventions**

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**Background/Hypothesis:** The uptake of cardiac rehabilitation programme (CRP) after acute myocardial infarction (MI) depends on multiple factors, such as travel distance and work commitment. The contribution of clinical factors such as prior coronary intervention, intra-hospital complications, left ventricular (LV) dysfunction and comorbidities are less defined as predictors of CRP uptake. We aim to determine the contribution of clinical factors as dominant predictors of CRP uptake among acute MI patients who underwent urgent coronary interventions.

**Methods:** We conduct a retrospective analysis of all patients admitted to coronary care unit (CCU) for acute coronary syndrome (n = 697) between January and December 2007, among whom 653 were counselled for phase I CRP and 196 eligible for phase II CRP. Demographics, clinical data including MI and percutaneous coronary intervention details, existence of cardiogenic shock, comorbidities and CRP considerations were obtained, and compared between CRP groups. Univariate predictors of CRP were determined.

**Results:** Compared to controls consisting of those who are eligible but decline to participate in CRP (n = 162, mean age = 54 years), the CRP cohort (n = 34 or 17%) were statistically not different in age, gender, presence of inpatient complications (cardiogenic shock and acute renal failure), LV ejection fraction, comorbidities of hypertension, diabetes or chronic kidney disease, and prior revascularisation. CRP cohort were however more likely to be non-current smoker ( $P = 0.03$ ). The most common reasons to reject phase II CRP were conflict with work schedule (24%) and indecisiveness (20%).

**Discussion & Conclusion:** Intra-hospital complications, extent of LV dysfunction and composite comorbidities did not significantly impact on CRP uptake among patients with acute coronary syndrome who underwent urgent intervention, suggesting the importance of non-clinical factors such work schedule as the dominant determinant of CRP uptake.

OP-AH-36

**The Reliability of Five-Repetition-Sit-to-Stand Test and the Correlation with Muscle Strength and Balance Performance in Healthy Elderly**

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**Background/Hypothesis:** Five-Repetition-Sit-to-Stand Test is a common outcome measure used in elderly, however the reliability and validity of the Five-Repetition-Sit-to-Stand Test has not been comprehensively addressed in previous literature. It was hypothesised that the intra-rater, inter-rater and test-retest reliability would be high in experienced and inexperienced assessors, and there would be significant correlation between Five-Repetition-Sit-to-Stand Test and lower limb muscle strength and balance performance.

**Methods:** Twelve healthy elderly subjects were recruited through convenience sampling. Five-Repetition-Sit-to-Stand Test measures the time taken to complete 5 repetitions of sit-to-stand manoeuvre from the chair. Performance of 5 trials Five-Repetition-Sit-to-Stand Test was videotaped. These video clips were viewed and timed by 3 experienced assessors and 3 inexperienced assessors on 2 different days within the same week. Lower limb muscle strength of hip flexors, knee extensors, knee flexors, ankle dorsiflexors and ankle plantarflexors were tested with a hand-held dynamometer. Balance ability was assessed by the Limits of Stability test of computerized dynamic posturography and Berg Balance Scale.

**Results:** Excellent intra-rater (ICC: 0.914 to 0.933) and inter-rater reliability (ICC: 0.990) were found in healthy elderly for both experienced and inexperienced assessors. Excellent test-retest reliability (ICC range: 0.988 to 0.995) were also found. Five-Repetition-Sit-to-Stand Test scores was not found to be significantly associated with the lower limb muscle strength, Berg Balance Scale and Limits of Stability tests of the healthy elderly subjects.

**Discussion & Conclusion:** The Five-Repetition-Sit-to-Stand Test is a reliable measurement tools used by both experienced and inexperienced assessors. No correlation was found between Five-Repetition-Sit-to-Stand Test and lower limb muscle strength and balance performance of the healthy elderly subjects.

## OP-AH-37

### Malnutrition in Congestive Cardiac Failure Patients

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**Background/Hypothesis:** The aim of this study is to investigate the prevalence of malnutrition in congestive cardiac failure patients admitted to National University Hospital.

**Methods:** A cross-sectional retrospective study of 100 congestive cardiac failure patients admitted to National University Hospital between December 2009 and February 2010 was conducted. Baseline demographic data including age, gender, height and weight, and cardiovascular risk factors such as diabetes mellitus, hypertension and hyperlipidaemia were obtained. Biochemical parameters serum albumin and haemoglobin were included. The severity of heart failure was measured using the New York Heart Association functional classification and ejection fraction. Nutritional status was assessed using a 7-point Subjective Global Assessment. Body Mass Index was also calculated.

**Results:** Forty percent of the patients are malnourished. There were significant differences in age ( $63.5 \pm 14.0$  vs  $73.5 \pm 11.8$ ,  $P = 0.01$ ), Body Mass Index ( $25.6 \pm 5.2$  vs  $19.5 \pm 3.0$ ,  $P < 0.001$ ), and prevalence of diabetes mellitus (77.8% vs 22.2%,  $P < 0.001$ ) and hyperlipidaemia (65.1% vs 34.9%,  $P = 0.016$ ) between the well-nourished and malnourished patients. There were no significant differences in haemoglobin ( $P = 0.84$ ), serum albumin ( $P = 0.18$ ), ejection fraction ( $P = 0.75$ ) and New York Heart Association functional classification ( $P = 0.23$ ) between the well-nourished and malnourished patients.

**Discussion & Conclusion:** In addition to sodium and fluid restriction, congestive cardiac failure patients need special attention to prevent malnutrition and improve nutritional status due to the high prevalence of malnutrition. Future research should focus on managing symptoms that affect food intake, determining caloric and micronutrient adequacy, and effective nutritional intervention.

## OP-AH-38

### Physiotherapy Services in the Spine Out-Patient Clinic- An Interim Report

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**Background/Hypothesis:** A database has been used to register demographic, pain and disability related records of the spinal pain patients, who were treated in the spine outpatient clinic. An interim analysis has been conducted to investigate the usage of the physiotherapy service and its cost in the spinal pain.

**Methods:** Three hundred and ninety-three (53.7% male, 46.3% female) completed cases have been selected from the database. The frequency of area and duration of the spinal pain; different physiotherapy services and comparison in between sexes has been analysed using the Statistical Package for the Social Sciences (SPSS) 14 Student version.

**Results:** Among 393 patients, 59.5% reported chronic, 28.2% reported sub-acute and 12.2% reported acute type of spinal pain. Localised low back was the most common complaint (49.6%), followed by low back pain with leg pain and/ or paresthesia (20.4%), neck pain (19.8%) and neck pain with arm pain and/or paresthesia (10.2%). Exercise alone had been used in 37.9% of these patients and as an adjunct with exercises joint mobilization/manipulation (29%), traction (18.8%), interferential/electrical stimulation (14.2%), short wave therapy/ hot pack (14.8%), soft tissue manipulation (9.7%) and ultra sound (3.1%) were used. Traction and interferential/electrical stimulation had used more in the patients with radiating pain to leg or arm. The cost of the physiotherapy treatment data were missing for 8 patients who were excluded from the further analysis. The mean number of sessions was significantly higher in males (5.90) than females (4.99), thus the mean total costs of the physiotherapy services were S\$ 261.43 in males and S\$225.86 in females.

**Discussion & Conclusion:** The results indicate localised low back pain is the commonest spinal pain and chronic pain is the most prevalent in spine outpatient. Although males tend to seek more number of physiotherapy sessions than females, further research is needed to determine the underlying attributes.

**OP-AH-39**

**Depression, Adjustment Disorder and Emergency Cesarean Section**

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**Background/Hypothesis:** To find out if women diagnosed with adjustment disorder or major depressive disorder antenatally are more likely to undergo an emergency cesarean section compared to women with no mental illness antenatally.

**Methods:** A total of 1480 patients were recruited from the National University Hospital in Singapore. The Edinburgh Postnatal Depression Scale (EPDS) was administered at least once during their pregnancy. Patients who had at least one EPDS score of 5 and below and all the other EPDS scores under 10 were taken to have no mental illness. Patients scored 10 and above for at least one EPDS were either briefly assessed or clerked and given a diagnosis. Delivery data was gathered to find out what type of delivery they had undergone.

**Results:** Of the patients, 6.8% were diagnosed with adjustment disorder or major depressive disorder and 93.2% had no mental illness. Fifteen percent of patients with adjustment disorder or major depressive disorder underwent emergency cesarean section and 16.4% of patients with no mental illness underwent emergency cesarean section. The proportion of patients with adjustment disorder or major depressive disorder who underwent emergency cesarean section is not significantly different from the proportion of patients with no mental illness who went for emergency cesarean section,  $\chi^2 = 0.130$ ,  $P = 0.719$ .

**Discussion & Conclusion:** Women diagnosed with adjustment disorder or major depressive disorder antenatally are more unlikely to undergo an emergency cesarean section compared to women with no mental illness antenatally.

## OP-AH-40

### Association of Comorbid Depression, Glycemic Control and Quality of Life

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**Background/Hypothesis:** Research has shown that people with diabetes are twice as likely to develop depression as compared to the general population. Comorbid depression was also found to be associated with poor glycaemic control and quality of life. While the prevalence of comorbid depression or depressive symptoms in Singapore has been studied, there is no known evidence on how much this is related to diabetes control and patient well-being. This study hypothesises that depression or diabetes-specific distress is associated with higher HbA1c and lower quality of life.

**Methods:** Three hundred and ninety-six outpatients attending full diabetes assessment were interviewed with the Center for Epidemiologic Studies Depression Scale (CES-D), Problem Areas in Diabetes (PAID) and World Health Organization Quality of Life-Brief (WHOQOL-BREF). Their HbA1c results were also collected and statistically analysed with Spearman's rho.

**Results:** All 3 measures have high internal consistency (CES-D:  $\alpha = 0.90$ ; WHOQOL-BREF:  $\alpha = 0.93$ ; PAID:  $\alpha = 0.95$ ). CES-D and PAID were moderately correlated with each other (Spearman's rho = 0.52;  $P < 0.01$ ). It was found that CES-D and PAID have a small positive but significant relationship with HbA1c (Spearman's rho = 0.129,  $P < 0.05$ ; Spearman's rho = 0.125,  $P < 0.05$ ). Higher scores on CES-D and PAID were associated with lower scores on all 4 domains of WHOQOL-BREF - physical, psychological, social and environmental.

**Discussion & Conclusion:** Comorbid depression or diabetes-specific distress in patients disrupts their diabetes management and well-being. It is important to detect and provide early psychosocial intervention and treatment to reduce distress and depression in order to improve quality of life and outcome of diabetes.

## OP-AH-41

### Renal Stone Characteristics among Hospitalised Patients

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**Background/Hypothesis:** Renal stones are considered one of the more frequent disorders of the urinary tract. The prevalence of renal stones has been increasing. Ambient temperature, sunlight exposure, family history, total fluid intake and Body Mass Index have been cited as common risk factors. The characteristics of renal stones of patients in National University Health System are being explored in this study.

**Methods:** Results of calculi analysis performed in the Clinical Laboratory of National University Health System from 1 February to 31 July 2010 were extracted from the Laboratory Information System and analysed using descriptive statistical methods.

**Results:** Of the 222 patients included, the male to female ratio was roughly 3:1. The prevalence was higher among the Chinese (54.5%), followed by the Malay (16%), Indian (10%) and others (20%), and falls mainly in the age groups of 41 to 60 year old (47%) and those >60 year old (33%). Calcium (86%), oxalate (71%) and phosphate (34%) were the commonest stone constituents found. They were found almost equally common among all races and those aged more than 40 years. Comparing the prevalence of the less commonly detected stone components, ammonium has the highest occurrence among the Malay (11%), and magnesium among the Chinese (9%).

**Discussion & Conclusion:** The prevalence of renal stones in a given population varies with the age, gender and racial distribution and was concurred by this study. Current findings are consistent with the study performed by Baker et al in which higher incidence of kidney stones was found in men and in an older population. Renal stone analysis is important to understand the underlying pathophysiology of its formation and to enable the institution of proper intervention.



**OP-AH-42**

**Optimal Outpatient Titration of Heart Failure Medications by Pharmacists is Associated with Decreased Heart Failure-Related Re-Hospitalisation**

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**Background/Hypothesis:** Optimal heart failure (HF) management requires a multidisciplinary approach. There is strong evidence that maximising doses of key HF medications such as Angiotensin-Converting Enzyme Inhibitors (ACE-I), Angiotensin-Receptor Blockers (ARB) and Beta-Blockers (BB) lead to significant improvements in mortality and morbidity. However, many patients are not initiated on these medications or do not reach target doses, and hence may not enjoy the full benefit.

**Methods:** The Heart Failure Clinical Pharmacist Medication Titration Clinic (HFPC) was initiated to optimise dosing of ACE-I, ARB and BB with frequent follow-up and provision of education and counselling on these medications. Patients without contraindications to these medications were referred from inpatient and outpatient setting by the HF cardiologist. The Pharmacist titrates the medications according to fixed protocols with reference to the patient's vital signs, renal biochemistry, and overall clinical condition. This is vetted by the HF cardiologist running a concurrent clinic.

Two hundred and eighty-one patients were referred to HFPC from January to December 2008. One hundred and thirty-eight attended regular follow-up (Intervention group). The 143 who did not attend regular follow-up were assigned as the Control group. Readmission and Mortality rates at 6 months were measured.

**Results:** All patients received ACE-I, ARB, and/or BB within 30 days of recruitment. The HF-related rehospitalization at 6 months was 10.9% for the Intervention group, and 33.6% for the Control group. There was no significant difference in the all-cause mortality rate between the intervention (3.6%) and control (0.7%) groups ( $P > 0.05$ ).

**Discussion & Conclusion:** Outpatient titration of medications by pharmacists in the setting of a multidisciplinary Heart Failure Clinic is associated with reduced hospital readmissions. As the prevalence of HF and the burden of care increases, this is a novel and important model of care in the setting of limited healthcare resources.

## OP-AH-43

### Pathological Video Game Use among Youth

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**Background/Hypothesis:** The American Medical Association and American Psychiatric Association have noted the need for additional research on pathological video gaming or Internet use. Longitudinal studies, in particular, are needed to test predictions about the etiology, risk factors, course, and outcomes of video game "addiction". Hence, this study hopes to measure the prevalence and length of the problem, to identify risk and protective factors, whether pathological gaming is a primary or secondary problem, and to identify outcomes for those who become or stop being pathological gamers

**Methods:** A 2-year longitudinal panel study was conducted on general elementary and secondary school population in Singapore. Three thousand and thirty-four children in Grades 3 (n = 743), 4 (n = 711), 7 (n = 916) and 8 (n = 664) were interviewed. Several hypothesised risk and protective factors for becoming or overcoming video game addiction were taken in consideration, including pathological gaming, weekly amount of game play, impulsivity, social competence, depression, social phobia, anxiety and school performance.

**Results:** The prevalence of pathological gaming was similar to other countries (~9%). Greater amount of gaming, lower social competence, and impulsivity appeared to act as risk factors for becoming pathological gamers, whereas depression, anxiety, social phobias, and school performance appeared to act as outcomes of being a pathological gamer.

**Discussion & Conclusion:** This study adds important information to the discussion about whether video game "addiction" is similar to other addictive behaviours, demonstrating that it can last for years and is not solely a symptom of other comorbid disorders.

## OP-AH-44

### Correlation between Six Minute Walk Test and Exercise Stress Test

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**Background/Hypothesis:** The main objective is to determine the correlation between six minute walk test (SMWT) and exercise stress test (EST) in the post percutaneous coronary intervention (PCI) patients after phase two cardiac rehabilitation programme (CRP II).

**Methods:** Retrospective cohort study among the PCI patients, who has undergone SMWT and EST, is conducted in the Rehab centre, National University Hospital, Singapore. Various parameters were analysed to define the correlation between SMWT and EST.

**Results:** The results from 9 subjects (aged  $49.7 \pm 15.7$  years; height  $1.68 \pm 0.07$ m; weight  $76.63 \pm 15.73$ kg) showed the distance covered by SMWT was correlated to peak work ( $r = 0.028$ ) of EST. The systolic blood pressure (SBP) of SMWT was correlated to the achieved heart rate (HR%) ( $r = 0.039$ ) of EST; the scores of Modified Borg scale (MBS) ( $r = 0.004$ ) and the Saturation of peripheral oxygen (SpO<sub>2</sub>) ( $r = 0.026$ ) of SMWT were correlated to SBP of EST. Additionally, this study showed that there were significant difference in the distance covered ( $P = 0.001$ ) and the SpO<sub>2</sub> ( $P = 0.023$ ) of SMWT between pre and post CRP II.

**Discussion & Conclusion:** SMWT is one of the predictive markers for EST performance. Determining the correlation between SMWT and EST provides new information that is useful in prescribing the appropriate exercise, activities of daily living and self monitored home exercise programme for PCI patients. Furthermore, this study is able to improve the validity and reliability level of SMWT among the patients who cannot perform EST.

## OP-AH-45

### Activity Participation of Stroke Patients in Singapore: One Year after

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**Background/Hypothesis:** Restriction of participation in daily activities and social roles can occur after an acute stroke. This study aims to investigate the patterns of activity participation of stroke patients up to 1 year post-stroke using the Frenchay Activities Index (FAI).

**Methods:** Stroke patients recruited in this study were enrolled in the Early Supported Discharge (ESD) programme in the National University Hospital, Singapore, from July 2007 to July 2009. The FAI, used to measure instrumental activities of daily living participation, was determined at four time periods: pre-stroke (retrospectively), pre-ESD and post-ESD, and one year post-stroke.

**Results:** Of 158 patients eligible for one year follow-up, 99 patients (mean age = 65.9 years, 64.6% males, 35.4% females) were successfully contacted, 6 were deceased and 53 were lost to follow-up. At onset of stroke, mean FAI scores decreased from 37.43 pre-stroke to 16.09 and increased to 25.35 post-ESD. At one year post-stroke, mean FAI scores continue to increase to 31.47 ( $P < 0.001$ ) when analysed using SPSS paired sample T-test.

"Travel outings/car rides", "pursue hobbies" and "social outings" were the top 3 FAI items with the greatest decrease at one year post-stroke. It was found that 52.8% of previously employed patients were not working at one year post-stroke. "Reading books" was the only activity that showed an increase at one year post-stroke.

**Discussion & Conclusion:** While patients continued to improve on their activity participation level at one year post-stroke, they did not resume their pre-stroke participation level especially in employment and social/outdoor activities. These activities could have been substituted by other activities such as "reading books". In conclusion, FAI is a useful measurement tool for long-term participation follow-up.

**OP-AH-46**

**Adopting a Risk Management Approach in a Forensic Remand Setting**

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**Background/Hypothesis:** Risk management has been receiving increasing attention in the literature with regards to working with mentally ill offenders. There is a need to ensure limited resources are allocated to cases which were presented as high risk.

**Methods:** A review was made on the risk management approach adopted in a forensic remand setting in the Institute of Mental Health after a 5-month pilot test. Identified cases based on risk level were put up for discussion by any member of the multidisciplinary team, after which a management plan was put in place. Two case managers track the identified cases currently in the remand wards and those that were discharged from these wards. The team regularly meets to decide on whether to follow-up or to close the case.

**Results:** The review found that there are 17 active cases and 13 cases have been closed. Majority of the cases referred involved violent offences or potentially violent offences such as criminal intimidation (n = 5), breach of personal protection orders (n = 5) and voluntarily causing hurt (n = 3), and theft (n = 5).

**Discussion & Conclusion:** This paper describes the adoption of a risk management approach which incorporates multidisciplinary involvement in working with those who were remanded in a forensic remand setting. Such an approach seeks not only to address current risk concerns but also includes those that are potentially relevant post release in the community. Recommendations are made for future developments in this area.

## OP-AH-47

### Evaluation of Troponin I on Abbott Architect

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**Background/Hypothesis:** Cardiac Troponin I is the preferred biomarker to detect myocardial traumas due to high sensitivity and specificity with regards to cardiomyocyte as compared to other biomarkers such as creatine kinase (CK) and Myoglobin. We evaluated Troponin I analyzed on ARCHITECT-i System (Abbott USA) in NUH and compared to our current Troponin I ES Vitros 5600 (Ortho-Clinical Diagnostics J&J, USA).

**Methods:** Troponin I Architect is a chemiluminescent microparticle assay using monoclonal mouse antibody acridinium-labelled conjugate. Precision studies were done on QC materials. Interference studies were performed, using samples spiked with known haemoglobin (pooled EDTA red blood cells) and triglycerides (lipofundin, Braun, Germany) levels. Linearity and recovery studies were performed with known high and low concentrations of random pooled plasma. Functional sensitivity was performed by analysing 8 pooled specimens over 3 days. Reference range was validated on plasma from 11 volunteers with no clinical histories of major cardiovascular diseases.

**Results:** Precision studies revealed the interday CV = 3.7% (range, 2.0% to 5.9%, Troponin I range, 0.11 to 13.702µg/L, n = 12) while the intraday CV = 2.0% (range, 0.8% to 2.7%, Troponin I range= 0.11 to 13.101µg/L, n = 9). Interference studies showed positive interference at 1100mg/L in lipaemic samples and negative interference at 500mg/dL for haemolysed samples (lipaemia and haemolysis interference similar to manufacturer claim). Recovery ranged from 105% to 110% (Troponin I range, 0.008 to 12.390µg/L). Functional sensitivity at 10%CV, 15%CV and 20%CV were 0.021µg/L, 0.009µg/L and 0.005µg/L, respectively. Correlation data showed Troponin I Architect = 1.096, Troponin I ES - 0.001, R<sup>2</sup> = 0.999. Plasma from 11 volunteers showed a mean 0.001 ± 0.001µg/L with 0.004µg/L at 99th percentile.

**Discussion & Conclusion:** Troponin I Architect is precise, easy to perform and fast (18 minutes per test) using EDTA plasma.

## OP-BSTR-01

### **MicroRNA-224 is Upregulated in Hepatocellular Carcinoma Likely through Epigenetic Mechanisms**

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**Background/Hypothesis:** MicroRNA-224 is frequently upregulated in hepatocellular carcinoma (HCC) and implicated in crucial cellular processes such as cell proliferation and apoptosis. In this study, we aim to understand the molecular mechanism of miR-224 upregulation in HCC so as to gain new insights into its possible therapeutic intervention.

**Methods:** Reverse transcription quantitative PCR was used to compare the transcript expression of miRNA-224 and associated genes/miRNA, in normal liver, paired adjacent non-tumour and HCC tumour tissues. NeHepLxHT (immortalised untransformed hepatocytes) and HepG2 (HCC cells) were used to model normal liver cells and HCC tumour cells, respectively. Chromatin immunoprecipitation (ChIP) with specific acetylated H3 antibodies was used to evaluate the histone H3 acetylation status. Inhibitors of histone deacetylase (HDACi) were used to perturb the histone acetylation status.

**Results:** miRNA-224 is coordinately upregulated in HCC with one miRNA (miRNA-452) and three genes (MAGEA4, MAGEA5 and GABRE), located within the same 200 kb region along ChrXq28. The transcript expression of these ChrXq28 genes/miRNAs is significantly correlated in HCC tissues. Consistently, the expression of miRNA-224 and associated ChrXq28 genes/miRNAs is much higher in HepG2 than in NeHepLxHT cells. No significant genomic amplification is observed between HCC tumour and adjacent non-tumour OR between HepG2 and NeHepLxHT cells. ChIP with specific H3 antibodies showed higher H3 acetylation in ChrXq28 region in HepG2 cells than that in NeHepLxHT cells, positively correlating gene expression with H3 acetylation. Furthermore, HDACi drug treatment activates transcription of ChrXq28 genes/miRNAs in NeHepLxHT cells but not in HepG2 cells, suggesting epigenetic aberrations preceding cellular transformation.

**Discussion & Conclusion:** miRNA-224 upregulation in HCC is coordinated with transcriptional activation of ChrXq28 genes/miRNAs, through an epigenetic mechanism involving H3 acetylation.

## OP-BSTR-02

### Histone Methyltransferase Inhibitor Targets Acute Myeloid Leukemia Cells

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**Background/Hypothesis:** Targeting epigenetic abnormalities is an emerging therapeutic strategy in AML. Unlike inhibition of DNA methylation and histone deacetylase, inhibition of histone methylation, has been under-explored in AML.

**Methods:** A novel histone methyltransferase inhibitor, DZNep, was used to treat a panel of AML cell lines (in vitro and in mouse models), primary patient cells and leukemia stem cells (LSCs). Flow cytometry was used to determine apoptosis and reactive oxygen species (ROS) production. RNA interference (RNAi), gene expression profiling (GEP), and chromatin immunoprecipitation (ChIP) were used to study the molecular mechanism of DZNep.

**Results:** 3-deazaneplanocin A (DZNep) depleted enhancer of zeste homolog 2 (EZH2), a histone methyltransferase, and induced robust apoptosis in AML cell lines, both in vitro and in mouse model, in primary AML cells, and targeted LSCs while sparing normal haematopoietic stem cells. On GEP, polymerase chain reaction (PCR) and western blot, thioredoxin-interacting protein (TXNIP), a major redox control molecule, was one of the most upregulated molecules upon DZNep treatment. Either DZNep treatment or EZH2 knockdown reactivated TXNIP and increased ROS, leading to apoptosis. TXNIP over-expression also produced the same phenotype. Furthermore, TXNIP was downregulated in AML and a direct target of EZH2-mediated gene silencing. We also saw a signature of downregulation of endoplasmic reticulum (ER)-stress regulated pro-survival genes, suggesting a novel function of EZH2 in regulation of stress response.

**Discussion & Conclusion:** DZNep and EZH2 inhibition has therapeutic potential in AML, in which treatment has not changed in 20 years. We delineated that the effect of DZNep is specifically mediated through EZH2 and TXNIP, and highlighted the importance of histone methylation, redox regulation and ER stress in AML biology.



## OP-BSTR-03

### Cotransplantation of Ex Vivo Expanded and Unexpanded Cord Blood Units in Immunodeficient Mice

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**Background/Hypothesis:** *Ex vivo* expansion of cord blood (CB) hematopoietic stem cells (HSCs) and cotransplantation of two CB units extends applicability of CB transplants to adult population. This is the first study on cotransplantation of *ex vivo* expanded and unexpanded human CB units in immunodeficient mice, simulating conditions for *ex vivo* CB expansion clinical trials.

**Methods:** CB units were cultured in serum-free medium supplemented with Stem Cell Factor, Flt-3 ligand, Thrombopoietin and Insulin Growth Factor Binding Protein-2 with mesenchymal stromal co-culture. Cotransplantation of unexpanded and expanded CB cells was achieved by tail vein injection into 45 sublethally irradiated nonobese diabetic SCID-IL2 $\gamma^{-/-}$  (NSG) mice. Submandibular bleeding was performed monthly and mice were sacrificed 4 months following transplantation to analyse for human hematopoietic engraftment.

**Results:** CB expansion yielded 40-fold expansion of CD34<sup>+</sup> cells and 18-fold expansion of HSCs based on limiting dilution analysis of NSG engraftment. Mice receiving expanded grafts had 4.30% human cell repopulation, compared to 0.92% in mice receiving only unexpanded grafts at equivalent starting cell doses ( $P = 0.07$ ). *Ex vivo* expanded grafts with lower initiating cell doses also had equivalent engraftment to unexpanded grafts with higher cell dose (8.0% vs 7.9%,  $P = 0.93$ ). However, the unexpanded graft, richer in T-cells, predominated in final donor chimerism.

**Discussion & Conclusion:** *Ex vivo* expansion resulted in enhanced CB engraftment at equivalent starting cell doses, even though the unexpanded graft predominated in long-term hematopoiesis. The expanded graft with increased stem/progenitor cells enhanced initial engraftment despite eventual rejection by the unexpanded graft.

## OP-BSTR-04

### Elucidation of the Oncogenic Role and Therapeutic Implication of Phosphatase Of Regenerating Liver-3 in Acute Myelogenous Leukemia

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**Background/Hypothesis:** The oncogenic role of PRL-3, a tyrosine phosphatase involve in mediating metastasis and overexpressed in metastatic cancer, is unclear in haematologic malignancies.

**Methods:** ABT-869, a FLT3 inhibitor, and SAHA, a histone deacetylase inhibitors (HDAC) inhibitor, were used to treat FLT3 mutation acute myelogenous leukemia (AML) cell lines and primary AML patient cells. MTT and apoptosis assays were used to determine cell viability. Gene expression profiling (GEP), shRNA, Western Blot were used to study the molecular mechanism of combination therapy. IHC was employed to screen PRL-3 expression in bone marrow samples of AML patients.

**Results:** In our attempts to optimise therapeutic utility of ABT-869 in AML with FLT3 mutations, we observed potent synergistic in vitro therapeutic efficacy when combined with SAHA. We identified a core gene signature that was uniquely induced by the combination with PTP4A3 (PRL-3) one of the most downregulated genes. We showed that PRL-3 expression was downstream of FLT3 signalling and was partially reduced by inhibition of FLT3 signalling by ABT-869 treatment. Expression of PRL-3 conferred therapeutic resistance through Stat pathway-mediated upregulation of Mcl-1. Combination treatment with ABT-869 and SAHA completely abrogate PRL-3 leading to apoptosis of FLT3 mutant AML cells. Overexpression of PRL3 also led to cytokine independent growth in cytokine dependent AML cell lines. In addition, PRL-3 protein was identified in 47% of AML cases, but absent in myeloid cells in normal bone marrows. Treatment with PRL-3 specific antibodies in AML mouse model led to reduction in tumour burden.

**Discussion & Conclusion:** We identified a novel oncogenic role of PRL-3, which also mediate resistance to therapy, in AML. We further identify that PRL-3 may itself be a useful therapeutic target in AML.

## OP-BSTR-05

### **pfSingle-Nucleotide-Polymorphisms: An Integrated Portal for Identifying Potential Single-Nucleotide-Polymorphisms Biomarker of Cancer and Complex Diseases**

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**Background/Hypothesis:** Single-nucleotide-polymorphisms (SNP) can be potent candidates of biomarker for cancer and other complex diseases. Thus far, SNPs that change amino acid sequence of the possible causal genes are the primary focus and SNPs with other biological functions are largely ignored. What's more, there lacks a platform to help broaden the scope by looking into genes with similar functions, residing in the same biological pathways or newly reported to be associated with the disease by other association studies.

**Methods:** We integrated more than 40 resources/ algorithms which report various biological functions / disease associations at either SNP or gene level. This integration enabled us to look for potential SNP biomarkers beyond non-synonymous SNPs in causal genes.

**Results:** We developed a web-portal (pfSNP) that facilitates candidate SNP biomarker identification in several ways. Firstly, the query interface is not only user-friendly but also highly customisable such that different combinations of query criteria (SNP, gene, biological pathway and disease name) are possible using Boolean logic. Secondly, curated supporting information about SNP is accessible from the query result by a single click to facilitate knowledge synthesis and aid in the generation of hypotheses. Thirdly, gene/pathway level information is integrated into the query result to help knowledge discovery by the user.

**Discussion & Conclusion:** pfSNP web portal can be useful for identifying candidate SNP biomarkers. It can be accessed at the following URL (We will reveal the URL upon request). We are now implementing an auto-updating pipeline to keep it constantly updated and also preparing data-mining the database for identifying driver SNP/Mutation for different cancers.

**OP-BSTR-06**

**Cell Cycle Arrest upon Dengue Virus Infection is a Host Antiviral Response**

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**Background/Hypothesis:** Cell cycle arrest is observed during Dengue virus (DENV) infection as well as other flaviviruses. Our preliminary data showed that host cell cycle was only arrested by DENV in late infection phase. It is against the common hypothesis that DENV arrests cell cycle to augment the virus replication which should occur at early infection phase. This project aims to further unravel this mystery by investigating the genes involved during cell cycle arrest upon DENV infection.

**Methods:** Human Cell Cycle PCR array from SABiosciences was employed in this study to compare the expression level of 84 cell cycle related genes between DENV-infected and mock-infected cells. Human Embryonic Kidney (HEK)-293 cells were used and the RNA was harvested at 24hr and 48hr post-infection (p.i.).

**Results:** PCR array profiles revealed that more genes were regulated at 48hr p.i. than 24hr p.i. This array data tallied with cell cycle profile by fluorescent-activated cell sorting (FACS) analysis whereby the arrest was only obvious at 48hr p.i. Intriguingly the regulated genes were apoptosis-related rather than cell division-related. The apoptotic effect upon DENV infection was further confirmed with TUNNEL assay.

**Discussion & Conclusion:** The PCR array data indicated that cell cycle arrest observed at late infection phase was not caused by the activation of cell cycle division related genes. Instead, apoptotic genes were involved during the cell cycle arrest. The evidence inferred that host cells induced an antiviral mechanism by activating apoptotic genes and halting infected cells from further division. This study has unravelled a new host antiviral mechanism to suppress DENV infection.

**OP-BSTR-07**

**Cyclooxygenase 2 Inhibitors Induce Angiotensin II Receptor 2 Expression in the Bladder**

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**Background/Hypothesis:** Cyclooxygenase (Cox) enzyme, Cox 2 is highly expressed in carcinoma *in situ* and T1 bladder cancers and increases with stage and grade of the transitional cell carcinoma. Its presence is linked with bladder cancer recurrence and patients taking aspirin after Bacillus Calmette-Guerin (BCG) immunotherapy have increased tumour free survival. This study investigates the impact of the route of delivery of Cox-2 inhibitors in an orthotopic bladder cancer model.

**Methods:** The murine bladder cancer cell line MB49-PSA was implanted orthotopically in C57BL/6 mice and tumour growth was monitored by measuring urinary prostate specific antigen (PSA) levels weekly. Mice received oral nimesulide (5mg/kg) every 2 days (11 treatments) and control mice received 0.5%v/v DMSO. Intravesical siRNA targeting Cox-2 (siCox-2) and non-targeting control siRNA (siCon) (300nmoles/mouse) were instilled every 3 to 4 days (6 treatments) starting from day 5. Mice were monitored for up to 28 days. Bladders were harvested, weighed and analyzed using a TaqMan<sup>®</sup> Low Density Mouse Immune Panel. Gene expression in the bladder was further analysed by PCR.

**Results:** Bladder tumours were significantly reduced after therapy. Based on the PSA analysis, 53% of nimesulide and 33% of siCox-2 treated mice were cured. Both local and systemic treatment resulted in reduced Cox-2 expression in the bladder. While there were differences in bladder gene expression after both oral and intravesical therapy, Cox-2 inhibitor significantly upregulated Angiotensin II receptor 2 (Agtr2) in the bladder.

**Discussion & Conclusion:** Cox-2 inhibitors have anti-tumour activity against urinary bladder cancer. Local Cox-2 inhibition is as effective in reducing bladder tumour growth as systemic therapy. Gene expression profiling showed that nimesulide may have non-specific effects other than Cox-2 inhibition. However, both nimesulide and siCox-2 increased Atgr2 expression. Atgr2 induces apoptosis in prostate cancer and may do so in the bladder as well though this needs to be confirmed.

## OP-BSTR-08

### Identification of Epithelial-Mesenchymal Phenotypes of Human Ovarian Carcinoma

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**Background/Hypothesis:** Epithelial ovarian cancer (EOC) is the most fatal cancer of the female reproductive tract and its incidence is on the rise in Singapore. EOC is a heterogeneous entity which comprises different histological and biological subtypes. The complexity of different subtypes of EOC in high levels of genomic instability and genetic alterations has hindered the development of novel targeted therapeutics specific to disease subtypes. Therefore, better translational approach focusing on EOC progression and personalised medicine is mandatory. Hypothesis: epithelial-mesenchymal transition (EMT) describes a mechanism how epithelial cells acquire mesenchymal characteristics. EMT has been indicated to play a role in EOC progression and patient survival. In this study, we propose that EOC patients can be subclassified according to the epithelial-mesenchymal phenotypes.

**Methods:** Eighty-eight archived fresh frozen ovarian carcinoma tissue samples and 10 freshly isolated ovarian carcinoma spheroids from malignant effusions were analysed. Tumour RNAs were extracted and subjected for real-time quantitative PCR (QPCR) of known EMT genes by using Human EMT RT<sup>2</sup> Profiler™ PCR Arrays. The epithelial-mesenchymal phenotype of each sample was assigned by integrating the QPCR result with an EMT scoring matrix established from an in-house ovarian cancer EMT library.

**Results:** Epithelial-mesenchymal phenotypic scores were assigned to 98 ovarian carcinoma samples to indicate the relative position of each sample on the EMT spectrum established in-house. The prediction accuracy of the phenotypic scores was comparable with subtype classification performed by gene expression profiling.

**Discussion & Conclusion:** We have provided evidence that EOC patients can be stratified by the epithelial-mesenchymal score derived from the tumour biopsies reference to a well-annotated EMT library. This epithelial-mesenchymal phenotypic classification can be robustly achieved by a fast, simple and straightforward methodology.

## OP-BSTR-09

### Biallelic Deletions in Cancer Recurrently Target Innate Immune Response Pathways

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**Background/Hypothesis:** Biallelic deletion (BD), the simultaneous loss of homologous genomic regions in both strands, is a perfect mechanism of silencing genes. Subsequently, biological processes would be impaired, resulting in a favourable microenvironment for pathogenesis of many diseases, in particular cancer. Recent developments in array-based technologies allowed us to scrutinise genome-wide aberrations with finer resolution than those offered by conventional karyotype assay, providing us with the chance to assess pathologic consequences of BD.

**Methods:** Publicly available data compiled from >2700 samples covering 49 cancers assayed on a single platform (Affymetrix Mapping 250K Sty chip) were used. A genomic segment of a cancer sample with >6 probes was called BD if its logarithm (base 2) of copy number ratio against normal samples was  $\leq -0.75$ . All bioinformatic analyses were performed using R system and Bioconductor libraries.

**Results:** Overall, we observed >8000 BDs (3 BDs per sample) of which 89% harboured genes. Of all BDs, 62% were <1Mbp in length (51% of them contained genes) and would not have been found through conventional approach. Chromosomes 9 and 16 contained more BDs than expected whereas chromosomes 1 and 22 less BDs than expected. Focusing on 11 cancers with >50 samples, distinct patterns of recurring BDs were identified, some common to different cancers whereas others were distinct to specific cancers. When we examined biological pathways affected by BDs, we found that genes in innate immune response pathways were recurrently targeted while other well-known cancer related pathways were isolated to respective cancers.

**Discussion & Conclusion:** The intricate connection between immune-surveillance by innate immune responses and cancer has been greatly emphasized recently. Our results clearly underscore that BDs can play a significant role in dysregulating this mechanism in cancer, providing a genetic basis for this important pathogenic event in tumorigenesis.

## OP-BSTR-10

### Quadraplegic People: Infrared Tracking for Better Life

#### M PLAZA

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**Background/Hypothesis:** Using the knowledge and experience the University developed through research and development the research group began thinking of developing new products for people with quadriplegia due to spinal cord injury or other causes. The basic needs are the locomotion, activation of devices as light, television, doors remote control or communications. The present project intends to identify the basic needs of quadriplegic people and the possible solutions using technology of infrared tracking.

**Methods:** • To determine the primary needs of persons with limitations of movement • To study the possible solutions to obtain a certain percentage of independence • To use technology of infrared tracking to supply part of the needs of mobility and devices control. • To escalate the project to different grades of incapability • To realize a prototype that allows a person with a certain grade of incapability, to be able to have high level of independence. • A person using the final project to control a wheelchair, for example, only has to move your head about going straight ahead or turning left and the chair follows their command. However, they do not have to worry about colliding with obstacles because the wheelchair itself monitors and reacts to its environment.

**Results:** The final prototype improves the quality of life of quadriplegic people. The prototype must have the possibility of allowing the control of electrical wheel chairs, of some devices connected to a wireless control system, only by means of the movement of the head. The system has the capacity to adjust itself to the characteristics of each individual driver, and thereby is able to improve the efficiency with which it senses the driver's commands.

**Discussion & Conclusion:** The fact that is an infrared system allows being immune to electrical noise, as generated by the electric chairs and allows low costs and easy design of engineering. These characteristics are desirable to reduce costs and to make the project possible.



## OP-BSTR-11

### Augmented Reality: Laparoscopy Procedure Application

#### **M PLAZA**

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**Background/Hypothesis:** Laparoscopy procedure has been used in several pathologies interventions. The base of laparoscopy procedure is the video surgery, which for nature needs the training of the surgeon and the knowledge of the set of instruments, as well as his advantages and his limitations. Using augmented reality the surgeon does not use the image of monitor and in his place he sees, in his visual field, the internal image of the abdomen like an open traditional surgery.

**Methods:** • Bibliographical review. • Connect the system to the equipment of augmented reality. • Select the type of reflective or electronic technology (Optical See-Through or Video See-Through) • Creation of a prototype of augmented reality applied to laparoscopy training equipment. • Realize tests to determine the grade of satisfaction and of progress in the procedures of training of the medical personnel. • Improve the device in accordance with the results of the tests • Realize tests to determine the grade of satisfaction and of progress in the training procedures of medical personnel. • Improve the device in accordance with the results of the tests • Produce the final prototype.

**Results:** The final prototypes improve the surgery laparoscopy procedure, allowing the surgeon to realize interventions with the same visual characteristics of a traditional open surgery operation. This proposed system generates comfort and fluency in surgical laparoscopy procedures, improving the interface man-machine with benefits in procedure, helping to reduce, in combination with other parameters, latrogenias and intraoperative fails.

**Discussion & Conclusion:** Projecting the image on the human body with the same characteristics of an open surgery, we can have closer this methodology over to the traditional surgeries, achieving the advantages of the video surgery in a virtual traditional surgery. This proposed system generates comfort and fluency in the surgical procedure, improving the interface man-machine with benefits in the procedure

## OP-BSTR-12

### Establishing Academic Attainment Measures for Research

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**Background/Hypothesis:** The present study aims to establish standardised academic attainment measures (AAMs) for cognitive research in Singapore. This is especially needed when educational pathways are diverse, tailored to individual rates and modes of learning. Simply counting years of education (YOE) may not be reflective of true academic attainment. In the current study, candidate AAMs are selected based on their convergent validity with cognitive measures. Candidate AAMs are expected to show  $0.30 < r < 0.50$  concordances with standard neuropsychological measures (Kaufman & Lichtenberger, 2005).

**Methods:** Healthy English-speaking adult Chinese Singaporeans ( $n = 154$ ,  $M = 90$ ,  $F = 64$ ) without neurological deficits, significant history of substance use, or psychiatric disorders were recruited. Participants completed a standard neuropsychological battery measuring cognitive domains such as memory, attention and problem solving. Self-reported number of years, stages of education completed and Primary School Leaving Examination (PSLE) scores were recorded. Eight separate AAMs including YOE, PSLE scores, derivatives from weighting algorithms, based on mathematic functions, weight adjustment formulae and weighted probabilities were correlated with cognitive measures.

**Results:** Significant associations were found for each AAM and neuropsychological tests. Of the 8 AAMs, cumulative adjusted years (CAY) of education showed best concordance with associations ranging from  $0.276 < r < 0.457$  ( $P < 0.001$ ), while PSLE scores showed associations  $0.301 < r < 0.401$  ( $P < 0.001$ ) on 60% and 30% of the neuropsychological tests, respectively.

**Discussion & Conclusion:** This is the first time AAMs are constructed and demonstrated to have adequate concordance against neuropsychological tests in Singapore. The CAY and PSLE show potential in being used as proxies for academic attainments in future social science and clinical research generated locally.

## OP-BSTR-13

### Efficient Suppression of Thymic Stromal Lymphopoietin by Antisense Oligonucleotides

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**Background/Hypothesis:** Thymic stromal lymphopoietin (TSLP) is a cytokine highly expressed in the epidermis of lesional atopic dermatitis (AD) skin. It is an IL-7-like cytokine that triggers dendritic cell (DC)-mediated T helper (Th)2 inflammatory response, which is characteristic in AD. TSLP is also regarded as the "master switch" of allergic inflammation at the keratinocyte-DC interface in AD pathogenesis, and therefore, is a potential molecular target for AD therapy. Antisense oligonucleotides (AONs) are short single-stranded synthetic DNA or RNA molecules that can suppress protein translation upon binding to its RNA target. This study aims to design and investigate the effectiveness of AONs to suppress in-vivo TSLP expression.

**Methods:** Using our propriety AON design technology, novel AONs were designed and experimentally validated for TSLP suppression. They were transfected into human keratinocyte cells and their efficacy and efficiency were assessed by comparing the expression of TSLP mRNA in AON treated keratinocytes with that in untreated keratinocytes.

**Results:** Our novel AONs were able to efficiently suppress TSLP in keratinocyte cell culture. From the two designed AONs, one was capable of suppressing the TSLP expression by 100% while another one was capable of suppressing TSLP expression by 80%.

**Discussion & Conclusion:** AONs were able to effectively block TSLP expression in-vivo. Further studies should be conducted to explore the therapeutic potential of AON-mediated TSLP suppression in treating AD.

## OP-BSTR-14

### Characterisation of Foetal Keratinocytes for Skin Grafting

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**Background/Hypothesis:** Burns result in loss of skin covering, and result in substantial morbidity and mortality despite major advances over the past three decades. Autografts are ideal for regeneration of burn surfaces, but require a long culture period, during which patients are vulnerable to infections and fluid-electrolyte imbalances. The availability a plentiful supply of non-immunogenic allogeneic epidermal cell source may overcome this problem. We hypothesise that foetal skin may be able to act as a universal donor source for skin grafts, as it may be less immunogenic and is predicted to have a great proliferative potential. Here we characterised human foetal skin for possible use in allogeneic transplantation applications.

**Methods:** Histological and immunohistochemical assessments were conducted on foetal and adult skin biopsies to determine embryological changes, expression of MHC antigens, and the expression patterns of epidermal proteins. We isolated foetal keratinocytes and investigated their ability to stratify in in-vitro organotypic cultures. Colony-forming assays are performed to assess their proliferative potential.

**Results:** The expression profiles of several proteins were different in the foetal skin than in adult skin. Several keratins are present during foetal skin development but are absent in the adult epidermis. We also show that foetal keratinocytes can be cultured and expanded.

**Discussion & Conclusion:** We demonstrated distinct differences between foetal and adult skin progenitor cell types. Further optimisation of culture techniques of foetal keratinocyte population will allow for further investigation of their proliferative ability, with potential clinical applications. This study expands our understanding of skin development and opens new avenues for novel approaches in cell-based therapy for serious burns. In addition, investigations into the composition of foetal skin may contribute to the understanding of foetal scar-less wound healing and the development of an ideal skin graft.

## OP-BSTR-15

### Pathway-Based Analysis for Genome Wide Association Study and its Application on Myopia in Chinese Schoolchildren

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**Background/Hypothesis:** Genome-wide association study (GWAS) tends to mainly focus on single locus tests while potentially collective effects from multiple genes may exist. Considering the susceptibility genes likely to be involved in the same biological pathway, it is important to examine the existing GWAS data to its full potential by using pathway approach.

**Methods:** In this study, we evaluated pathway-based analysis using the Singapore Cohort study Of the Risk factors for Myopia (SCORM) GWAS data. The clinical phenotype is Sphere Equivalent for 1011 subjects. A total of 336,915 SNPs from the Illumina HumanHap, 550 array genotype data and 16,243 Refseq genes were included in the analysis. We used BioCarte, KEGG and Gene Ontology for pathway classifications. Gene score was computed by taking into account the test statistics from the most strongly associated SNP and linkage disequilibrium between markers. Gene set enrichment analysis was applied. Permutations on the genome wide level were performed to calculate the empiric *P* values and false discover rates.

**Results:** The significantly over-represented pathways identified were minimum, and are slightly influenced by various gene score calculations. The greatest discordance was observed when different pathway classifications are used. A total of 5 significant pathways revealed to be associated with myopia in the analysis of 521 pathways. Among those, top findings were acid metabolism pathway (FPR = 0.01, 43 genes) and lipoprotein metabolism pathway (FPR = 0.01, 56 genes), which were identified by using KEGG and Gene Ontology pathway classifications, respectively.

**Discussion & Conclusion:** Our current results suggest that the pathway analysis on GWAS data for myopia could shed light on the potential molecular processes and candidate genes involved in the disease aetiology, which was not observed through single-locus approach. However, interpretation of the data should be cautious by our limited knowledge of the pathway classification systems.

## OP-BSTR-16

### Classification and Treatment of Type 1 Diabetics

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**Background/Hypothesis:** In Type 1 Diabetics, it is crucial to keep the fasting blood glucose concentration in normoglycemic range (70 to 126 mg/dL) and under 180 mg/dL (but over 55 mg/dL) in postprandial condition. This can be achieved using exogenous insulin infusion in a manner that avoids hyperglycemia and the more dangerous hypoglycemia. To obtain effective BG regulation in Type 1 Diabetics, an efficient and practically implementable "class-specific" control algorithm is proposed in this work. In the absence of real patients, we employ a state-of-the-art mathematical model that adequately simulates the blood glucose dynamics in diabetics to develop a classification-based approach to group "patients" into different classes and demonstrate the success of tailored, "class-specific" algorithms.

**Methods:** The appraisal consists of Modified Intravenous Glucose Tolerance Test (MIVGTT) and Principal Component Analysis for classification. Then, Yale Insulin Infusion Protocol (YIIP) is tailored and applied to different patient classes. Applicability of this investigation through validation on different patient models is also investigated.

**Results:** Our research indicates that the type 1 diabetics can be classified into 9 classes. Using the tailored YIIP-based treatment on a "normal day" with meals, hypoglycemia (<50 mg/dL) can be successfully avoided for the entire cohort of the in silico patients without extra glucose.

**Discussion & Conclusion:** The work is entirely model-based. For any in silico patient, MIVGTT can be conducted and the patient class determined. Then, the tailored YIIP for the particular class can be used to treat the patient. We have investigated the robustness of the approach for certain intra-patient variability within the same patient class and obtained acceptable results. The developed algorithm appears to be simple, effective and practical for treating real Type 1 Diabetics patients. Clinical validation of the developed algorithm would be the subsequent steps.

## OP-BSTR-17

### An Applicability Study on the MATRICS Consensus Cognitive Battery in Singapore

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**Background/Hypothesis:** The MATRICS Consensus Cognitive Battery (MCCB) was developed by the US Measurement and Treatment Research to Improve Cognition in Schizophrenia (MATRICS) initiative to provide a reliable, valid and standard battery for clinical trials on cognitive enhancers in schizophrenia. The subtests selection was based on their utility as repeated measures, relationship to functional outcome, potential sensitivity to pharmacological agents, practicality and tolerability. Testing the applicability of the MCCB in Singaporean English speakers is particularly interesting, considering the Country's heterogeneous social composition and mixed English language acquisition patterns.

**Methods:** Healthy English speakers (n = 171) of both genders, from the Chinese, Malay and Indian communities, were recruited to form 3 age groups and 3 levels of education. Sample stratification was planned to match the US norming sample as closely as possible. Participants were administered the MCCB in the standard order, in a single session lasting approximately 60 minutes. Descriptive data, T scores, age, gender, education and ethnicity effects on performance were explored and compared with those reported in the US sample.

**Results:** Age, education and ethnicity differences significantly affected the scores throughout the battery's domains. Younger and highly educated participants outperformed the older, less educated ones. Singaporean sample's performance was lower than the US sample's, particularly for the verbal processing tasks, while performance in the non verbal ones was comparable across samples.

**Discussion & Conclusion:** Our results confirm previously collected evidence on the strong effect of both age and education on cognitive measures. We advise extra care when interpreting cognition as assessed via verbal processing tasks in populations with a mixed pattern of English language acquisition.

## OP-BSTR-18

### Gene Expression and Cytokine Profiling of Deleted in Esophageal Cancer1-Transfected Jurkat Cells: Elucidating the Role of Deleted in Esophageal Cancer1 in the Pathogenesis of Minimal Change Nephrotic Syndrome

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**Background/Hypothesis:** The deleted in esophageal cancer 1 (*DEC1*) gene expression was previously shown to be significantly upregulated in CD4+ T-cells of minimal change nephrotic syndrome (MCNS) patients in relapse compared to remission. In order to further elucidate the role of *DEC1* in MCNS relapse, we explored the differential gene and cytokine expression profiles of *DEC1*-transfected Jurkat cells.

**Methods:** Jurkat cells were transfected with *DEC1* gene following which RNA was isolated, reverse transcribed and hybridised into Agilent cDNA microarray. After normalisation and statistical analysis of the data, differentially expressed genes were analysed and classified using Ingenuity Pathways Analysis. For cytokine expression profiling of *DEC1*-transfected Jurkat cells, *DEC1*-transfected Jurkat cells and plasmid controls were cultured for 72 hours following which cytokine levels were assayed utilizing the multiplex suspension bead array system.

**Results:** Of 3326 differentially expressed genes, 546 genes showed expression above 2-fold. *DEC1*-transfected Jurkat cells differentially expressed molecules that regulate biological functions like cell signaling (37 molecules,  $P = 0.004$ ) and molecular transport (67 molecules,  $P = 0.004$ ). There was a greater than 1.5-fold increase in molecules involved in *NF- $\kappa$ B* signaling pathway and a greater than 2-fold increase in *GATA-3* expression, an inducing factor for Th2 polarization. Cytokine profiling demonstrated a 110% and 95% increase in IL-5 and IL-4 levels, respectively, in *DEC1*-transfected Jurkat cells, compared to plasmid controls.

**Discussion & Conclusion:** The above findings suggest that the mechanism of action of *DEC1* in the pathogenesis of MCNS may be mediated via the NF $\kappa$ B and GATA-3 pathways. *IL-4*, *IL-5* and *IL-13* are found in a gene cluster, regulated by GATA-3. The findings of increased IL-4 and IL-5 levels in *DEC1*-transfected Jurkat cells are in accordance with increased *GATA-3* gene expression, further supporting the role of Th2 polarisation in this disease.



## OP-BSTR-19

### Development of an Inserter for Selective Corneal Tissue Transplantation

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**Background/Hypothesis:** Endothelial keratoplasty (EK) is a new form of sutureless selective tissue corneal transplantation. Though it provides faster visual rehabilitation, it is associated with a steeper learning curve due to donor insertion compared to conventional full thickness transplantation. We aim to reduce endothelial damage during donor insertion to reduce postoperative complication rates.

**Methods:** Experimental study and prospective clinical case series. Thirty donor corneas and 100 patients undergoing DSAEK with glide insertion and 30 with endoglide were included. Donor cornea lenticules were prepared and a wet lab EK model established. Donor lenticules were inserted either by a fold ( $n = 15$ ) or glide insertion ( $n = 15$ ). Endothelial cell damage was assessed by scanning electron microscopy (SEM) ( $n = 20$ ) and trypan blue exclusion ( $n = 10$ ). Postoperative complications were documented and endothelial cell count was assessed by specular microscopy in the clinical patients.

**Results:** Endothelial cell viability and SEM demonstrated 2 different patterns of cell damage. Cell viability and scanning electron microscopy showed there was mean cell damage of 9% and 9.2% , respectively, following glide insertion and 32% and 38%, respectively, following the taco-folded insertion ( $P = 0.004$ ). The mean (SD) cell loss in the clinical patients following fold insertion was 61% (10%), glide insertion was 25.3% (4.3%) and endoglide 15% (5%) at 6 months

**Discussion & Conclusion:** Endothelial cell damage was higher in a wet lab model following folded insertion compared with glide insertion. Initial clinical results with both glide and endoglide insertion showed good endothelial cell loss at 6 months.

## OP-BSTR-20

### **Haptoglobin is a Reliable Biomarker for IntraOperative Triage of Epithelial Ovarian Cancer at Early Stage**

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**Background/Hypothesis:** Epithelial ovarian cancer (EOC) is the leading cause of gynaecological cancer related deaths worldwide, and prognosis can be greatly improved if cancer is detected at early stage. Intraoperative suspicion of malignancy for women going for ovarian cystectomy is critical for triage of patients for suitable surgical procedures. In this study, we aimed to evaluate the diagnostic accuracy of haptoglobin (HPT) in ovarian cyst fluid (oCF) as a biomarker for intraoperative triage of EOC in Southeast Asia population and to explore its possible clinical applications.

**Methods:** We measured HPT concentration in oCF from 116 benign tumors, 24 early stage and 31 late stage cancers using sandwich enzyme-linked immunosorbent assay (ELISA). We also tested the feasibility of using a rapid colorimetric assay which measures HPT in 5 minutes and could be potentially used in the operation theater for intraoperative cancer triage.

**Results:** Our data suggested that HPT level in oCF was significantly elevated in both early and late stage EOCs as compared to benign tumors ( $P < 0.001$ ). It showed significantly superior overall diagnostic accuracy over serum CA125 and risk of malignancy index in discriminating between benign and malignant tumors by the receiver operating characteristic curve ( $P < 0.05$ ). Using 2.85 mg/ml as the cut-off level, HPT in oCF achieved sensitivity of 98.2%, specificity of 97.4%, positive predictive value of 94.7% and negative predictive value of 99.1%. HPT measured by rapid colorimetric assay was almost as good as ELISA and both can be used as an alternative to frozen section diagnosis (especially in countries where frozen section is not available) or as low cost triage methods.

**Discussion & Conclusion:** HPT in oCF is a reliable marker for intraoperative diagnosis of EOC at early stage with high sensitivity for malignant tumors and a low false positive rate allowing for optimal surgical procedure to be carried out.

## OP-BSTR-21

### Efficient and Complete Molecular Influenza Surveillance

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**Background/Hypothesis:** The recent swine flu pandemic is an excellent example how bioinformatics can play a crucial and cost-effective role not only in the early molecular characterisation of a new virus, including drug susceptibility and vaccine efficacy, but also to follow its ongoing evolution.

**Methods:** By blending comparative genomics, phylogenetic and evolutionary conservation analysis, 3D structural modelling, protein structural interactions, geo-temporal occurrence and literature text mining with expert-derived curation, we have established a molecular surveillance pipeline that allows clinicians and researchers to rapidly screen influenza sequences of their patients/samples for potentially dangerous mutations (<http://flusurver.bii.a-star.edu.sg>).

**Results:** Shortly after the first sequences of the 2009 H1N1 virus became available, we demonstrated through a 3D structural model of the viral neuraminidase protein how the drug binding pocket of the new virus remained unaltered while its antigenic surface had changed. As modern sequencing technology and increased preparedness resulted in a significant worldwide increase of molecular sequence data from patient samples, we responded to the immediate need of expertise and tools for the subsequent steps of computational analysis to link sequence mutations to possible patient phenotypes. We are collaborating with clinicians and other research institutes, hospitals and health authorities. We closely monitor development of drug resistance, virulent mutations like haemagglutinin (HA) D239G that alters host receptor specificity, new emerging mutations such as HA E391K and further develop tools that predict changes in vaccine efficacy based on structural epitope changes.

**Discussion & Conclusion:** Our computational analyses and judgment on the possible phenotypic effect of viral mutations have been greatly valued in Singapore (GIS, TTSH, NPHL, MOH, HSA), Mexico (INMEGEN, INDRE) and Brazil (UFRJ, IAL).

## OP-BSTR-22

### **Innovations in LASIK Surgery: A Novel Method to Measure in Vivo Real-Time Intraocular Pressure Variations during Corneal Flap Creation**

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**Background/Hypothesis:** LASIK has emerged as the most popular method of choice among patients worldwide for refractive vision correction. In Singapore alone, thousands of patients are estimated to undergo LASIK each year. Post-LASIK complications may have a significant impact on vision including glaucoma and posterior segment complications attributed to the high intraocular pressure (IOP) observed (>100 mmHg) in the LASIK patients. At present, no clinical technique is available to monitor in vivo IOP fluctuations during surgery. In the present study, we provided a novel method to successfully measure the in vivo real-time IOP in a rabbit model undergoing LASIK flap creation.

**Methods:** Twenty-six rabbit eyes underwent LASIK flap creation using Moria M2 microkeratome and Visumax Femtosecond laser. In vivo real-time IOP profile was measured using a 30-gauge needle with catheter sensor inserted into the anterior chamber from the limbus during the surgery.

**Results:** We observed IOP variations during different phases of LASIK flap creation from docking of the instrument, start of surgery to the end of procedure, and later monitoring the post LASIK stabilisation. IOP fluctuations were significantly higher during globe suction and laser flap cutting using microkeratome, which is widely used in the LASIK clinics.

**Discussion & Conclusion:** This is the first description of in vivo real-time IOP readings during LASIK procedure. The present study emphasises the importance of IOP measurements to evaluate the long-term impact of raised IOP spike observed in the patients in the development of improving safety of contemporary LASIK surgery.

## OP-BSTR-23

### Comparison of Different Bioreactors for Generating Clinically Sized Tissue Engineered Bone Grafts

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**Background/Hypothesis:** Bioreactors provide a dynamic culture system for efficient exchange of nutrients and mechanical stimulus necessary for the generation of tissue engineered bone grafts (TEBG). Different types of bioreactors have been developed including a biaxial rotating (BXR) bioreactor by us; however, it is not known whether optimal bioreactors exist for bone TE (BTE) applications. We systematically compared this BXR bioreactor with three most commonly used systems: Spinner Flask, Perfusion and Rotating Wall Vessel bioreactors, for BTE application.

**Methods:** To ensure an unbiased comparison, all the bioreactors were optimised for their culture condition first. Then a systematic comparison was conducted to investigate efficacies of different bioreactors operating in their optimal condition to generate clinically sized TEBG.

**Results:** The BXR bioreactor achieved higher levels of cellularity (1.4-2.5x) in clinically sized scaffolds than other bioreactors operating in optimal settings. BXR bioreactor treated scaffolds experienced more robust osteogenic differentiation on von Kossa staining, ALP induction (1.2-1.6x) and calcium deposition (1.3-2.3x). We developed a MicroCT quantification method which showed more homogenous tissue distribution in BXR bioreactor-treated grafts than others.

**Discussion & Conclusion:** BXR bioreactor enabled superior cellular proliferation, spatial-distribution and osteogenic induction over other 3 bioreactors, which could be explained by its improved fluid dynamics. Moreover, we developed and validated a noninvasive quantitative microCT technique for analysing tissue formation and distribution, with great potential as a QC technique for clinical applications. In our further research work, TEBG generated by this BXR bioreactor have successfully treated critical sized femoral defect in a rat model. Currently, we are planning to conduct the first-in-human clinical trial using this BXR bioreactor later this year.

## OP-BSTR-24

### Identification of c/EBP $\alpha$ Protein Interactions and Its Role in Acute Myeloid Leukemia using Stable Isotope Labeling by Amino Acids in Cell Culture

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**Background/Hypothesis:** The transcription factor C/EBP $\alpha$  (CCAAT/enhancer binding protein alpha) is crucial for the differentiation of granulocytes. It is known that 7% to 10% of acute myeloid leukemia (AML) patients harbour a C/EBP $\alpha$  mutation. We aim to identify novel C/EBP $\alpha$  protein interactions to understand the role of this important tumour suppressor candidate's role in AML using a cutting-edge quantitative proteomic method called Stable Isotope Labeling by Amino acids in Cell culture (SILAC).

**Methods:** U937 myelomonocytic cell line stably transfected with inducible C/EBP $\alpha$  under a metallothionein promoter were grown in SILAC compatible media. A population of these cells was then treated with ATRA + Zn to induce differentiation and labelled with heavy isotopes, while the control untreated population was labeled with light isotopes. Next, both populations were mixed together; the proteins were isolated and analysed by mass spectrometry. Proteins found more in the Differentiated state will therefore have a High Heavy: Light ratio, whereas proteins found more in the Undifferentiated state will have a Low Heavy: Light ratio.

**Results:** Using SILAC, we were able to identify many interesting interacting partners C/EBP $\alpha$ . One novel interacting partner is CHOP. We found that CHOP may inhibit C/EBP $\alpha$ 's function in haematopoietic stem cell differentiation. By blocking its interaction with C/EBP $\alpha$ , it may be possible to restore leukemic stem cells differentiation; hence this may be a promising target for treatment of AML.

**Discussion & Conclusion:** The use of SILAC allows us to study dynamic protein-protein interactions (PPI) occurring in the cell, and how disruption of some of these PPI may affect transcriptional regulation and cell fate and differentiation.

**OP-BSTR-25**

**Functional Improvement of Cerebellar Degeneration after Intra-Cerebral Transplantation of Human Neural Stem Cells into Spinocerebellar Ataxia Type 3 Mice**

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**Background/Hypothesis:** Huntington and spinocerebellar ataxia types 1, 2, 3, 6, and 7 are examples of polyglutamine diseases characterised by progressive neuronal degeneration. Employing SCA3 mice as a model of cerebellar degeneration, we hypothesised that intracerebellar human neural stem cell (hNSC) transplantation will result in improvement of the clinical phenotype.

**Methods:** Multipotent regionally-derived cerebellum(C) and subventricular zone(S) hNSC (15 week gestation) were cultured as neurospheres (NS). Xenogeneic transplantation of 105 hNSC were injected into the cerebellum of P22-P28 SCA3 mice under cyclosporin immunosuppression (n = 14). At D8 and D53 post transplantation, rotarod studies at accelerating speed of 0 to 40RPM in 3min as well as steady speeds of 5 and 7RPM were performed. Mice were euthanised at both time-points for patch clamp analysis of electrophysiological properties.

**Results:** Transplantation of S and C-hNSC resulted in an improvement in accelerating rotarod latency (time taken to fall) of 26.9% and 38.5% over controls at D8. Improvements of 21.6% and 28.2% over controls at D53 were observed for steady-speed rotarod latency at 5RPM. In the case of 7RPM, improvements of 32.7% and 24.0% were observed over controls at D8 and 0% and 51.1% at D53, respectively. Multi-innervation of purkinje cells by climbing fibres indicates the receipt of both proper and improper signals by the purkinje cells and patch-clamp analysis conducted at D8 demonstrated a threefold improvement in reduction of multi-innervated purkinje cells; from 60% in the control to 20% in hNSC-injected mice. However, these differences were transient and were absent by D56 (ratio of 40%, 57.1% and 44.4%, respectively).

**Discussion & Conclusion:** Our data suggest functional improvement of cerebellar degeneration in SCA3 mice post xenogeneic hNSC transplantation, alluding to the utility of hNSC for the treatment of polyglutamine-related neurodegenerative disorders.

## OP-BSTR-26

### **Serum Amyloid A Activates Peroxisome Proliferator-Activated Receptor $\gamma$ through Extracellular-Regulated Kinase 1/2 and Cyclooxygenase-2 Expression in Hepatocytes**

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**Background/Hypothesis:** Serum amyloid A (SAA) is an acute phase protein whose expression increases markedly during inflammation. It is an attractive therapeutic target for the treatment of atherosclerosis. The objective of this study was to investigate the effects of SAA on peroxisome proliferator-activated receptor  $\gamma$  (PPAR $\gamma$ ) activation and its downstream effects in human hepatocytes (HepG2).

**Methods:** Quantitative real-time PCR, Western-blot, PPAR $\gamma$  transcriptional activity assay, 15d-PGJ2 EIA assay and cholesterol efflux assay were employed in this study to investigate the effects and mechanisms of SAA on PPAR $\gamma$  activation.

**Results:** We demonstrated that SAA could induce the PPAR $\gamma$  transcriptional activity by more than 2 folds and upregulate the expression of ABCA1 and ABCG1 by more than 2 folds. Preincubation of HepG2 cells with SAA enhanced cholesterol efflux to high density lipoprotein (HDL) and apoA-I by 23% and 100%, respectively. In addition, SAA increased intracellular 15-deoxy- $\Delta$ 12,14-prostaglandin J2 (15d-PGJ2), which is a potent natural ligand for PPAR $\gamma$ , by more than 3 folds. Pretreatment with ERK1/2 inhibitor and COX-2 inhibitor could partially inhibit the SAA effects on PPAR $\gamma$  and its target genes.

**Discussion & Conclusion:** Our data suggested that SAA activated PPAR $\gamma$  through ERK1/2 dependent COX-2 expression and subsequently enhanced the cholesterol efflux by inducing ABCA1 and ABCG1. Overall, our study has established, for the first time, a relationship between SAA and PPAR $\gamma$ . Additionally, the data from our study has also provided new insights into the role of SAA in cholesterol efflux and the development of atherosclerosis.



**OP-BSTR-27**

**Live and Lyophilized Mycobacterium Bovis, Bacillus Calmette-Guerin Differentially Regulates Cellular Reactive Oxygen Species in Human Bladder Cancer Cell Lines**

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**Background/Hypothesis:** Live and lyophilised (lyo) BCG has both been used in bladder cancer (BC) research. Lyo BCG preparations cause strong inflammatory responses in the bladder mucosa as it contain immunogenic soluble BCG proteins and disrupted mycobacterial cell wall components. Live BCG preparations constitute of whole viable BCG which release some secreted factors. Host responses induced by these preparations may differ. This study compared the BCG internalisation profile, reactive oxygen species (ROS) changes, lipid peroxidation and cytotoxicity between live and lyo BCG of the same strain.

**Methods:** Integrins  $\alpha 5$  and  $\beta 1$  expression was profiled in a panel of 5 human BC cell lines. Cells were incubated with 1:100 ratio of cells to bacteria. FITC labelled BCG were used for internalisation assay. Cellular ROS were monitored using H2DCFDA (10 $\mu$ g/ml). Cytotoxicity levels were measured by BrDU incorporation assay. Lipid peroxidation levels were analysed with the thiobarbituric acid reactive substances assay which measures malondialdehyde (MDA) levels.

**Results:** Cell lines that express higher integrin  $\alpha 5$  internalise live BCG better. At 2 hours, live BCG was internalised better than lyo BCG but by 24 hours, the levels were comparable. Live BCG increases while lyo BCG decreases cellular ROS levels. Interestingly, when direct BCG contact was blocked via transwell inserts, both preparations increased ROS. BCG induced ROS changes directly correlate with MDA levels in MGH cells. Lyo BCG induced cytotoxicity better than live BCG.

**Discussion & Conclusion:** There are BCG factors that are secreted by both BCG preparations that increase ROS. For lyo BCG, components exposed by lyophilisation have ROS quenching effect. The presence of soluble factors that can increase ROS and MDA may result in further DNA damage to residual tumour cells that are not eradicated by lyo BCG. BCG treatment in the presence of antioxidants may prevent ROS mediated DNA damage.

## OP-BSTR-28

### Human Foetal Liver Haematopoietic Stem Cells Demonstrate High and Sustained Transgene Expression Following Implantation in NOD/SCID/Il2rg<sup>-/-</sup> Mice

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**Background/Hypothesis:** Haematopoietic Stem Cells (HSC) targeted gene transfer is an attractive treatment option for a number of haematopoietic disorders caused by single gene defects. We hypothesised that foetal tissue-derived HSC is more amenable to transduction and hence a suitable candidate for targeted gene transfer. Here, we report the efficient transduction of primitive human CD34<sup>+</sup> foetal liver cells with a lentiviral vector encoding an A2UCOE-eGFP cassette, compared to cord blood-derived HSC.

**Methods:** CD34<sup>+</sup> cells were isolated from second trimester human liver (fHSC) and umbilical cord blood (UCB-HSC) by MACS, and subsequently infected with UCOE-GFP at a multiplicity of infection (MOI) from 1 to 20. FACS, CFU assays and vector copy number analyses were done to evaluate the effects of transduction on HSC character and efficiency of transduction respectively. Subsequently, cells infected at MOI 10 were transplanted into sublethally-irradiated neonatal NOD/SCID/Il2rg<sup>-/-</sup> mice via intracardiac injection, to study multilineage engraftment and secondary transplantation capacity of transduced HSC. In parallel, some cells were expanded in culture to study the continued expression of GFP over 21 days.

**Results:** fHSC were transduced with a maximal transduction rate of 85% at MOI 10. In contrast, transduction of UCB-HSC was poor, with only 2% transduced at MOI of 20. CFU assays demonstrated that transduced fHSC were able to differentiate toward multiple lineages. Finally, transduced fHSC were found to be capable of long-term multi-lineage engraftment of sublethally-irradiated mice, and retained expression of eGFP for more than 8 weeks post-transplantation. This correlates with in vitro data showing sustained expression of eGFP (64% at day 3, 61% at day 21) during continuous culture.

**Discussion & Conclusion:** Our data suggest that CD34<sup>+</sup> cells from human foetal liver represent a suitable source of HSC for targeted gene transfer, capable of efficient lentiviral transduction rates compared to UCB-HSC.

## OP-BSTR-29

### Suppression of miR-101 and miR-26b Lead to EZH2 Over-Expression Which is a Therapeutic Target in Natural Killer/T-Cell Lymphoma

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**Background/Hypothesis:** Natural Killer/T-cell Lymphoma (NKTL) is seen predominantly in Asia and associated with very poor prognosis. Little is known about its molecular biology resulting in a lack of novel therapeutic avenues. MicroRNAs are small non-coding RNA that negatively regulate gene expression and has been implicated in tumour biology. Aberrant histone modification is also implicated in tumorigenesis and inhibiting histone modifying enzymes are emerging therapeutic strategies in oncology.

**Methods:** We perform microRNA profiling using Agilent platform in 30 NKTL, 7 NKTL cell lines and 12 NK cells samples from normal donors. Gene expression profiling was performed on the Affymetric U133plus 2.0 platform. Immunohistochemistry (IHC) for EZH2 was performed on tissue microarray (TMA) of 33 NKTL and cell blocks from normal NK cells.

**Results:** On GEP, EZH2, a histone methyltransferase, was one of the most overexpressed genes in NKTL and NKTL cell lines compared to normal NK cells. This was validated on IHC where EZH2 is expressed in 97% of NKTL but not in normal NK cells. Aberrant expression of EZH2 is not due to mutation or amplification of EZH2 gene. We then look at the expression of miRNA predicted to regulate EZH2 expression by Targetscan software. Of these, miR-101 and miR-26b were significantly underexpressed in NKCL compared to normal NK cells and also have a significant inverse correlation with EZH2 expression. Expression of miR-101 in cell lines lead to reduced proliferation and apoptosis, and reduction in EZH2 expression. In addition, targeting EZH2 using DZNep, a histone methyltransferase inhibitor, lead to reduction in methylation of histones and apoptosis in NKTL cell lines.

**Discussion & Conclusion:** EZH2 is almost universally overexpressed in NKTL due to under-expression of regulating miRNA. EZH2 may be an important oncogene and therapeutic target in NKTL. This provides novel and therapeutically relevant insights into the molecular biology of NKTL.

## OP-BSTR-30

### Four Potential Markers for Enrichment of Foetal Nucleated Red Blood Cells for Non-Invasive Prenatal Diagnosis

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**Background/Hypothesis:** Current prenatal diagnosis involves invasive procedures that carry a 1% to 4% risk of miscarriage. Foetal nucleated red blood cells (FNRBCs) in the maternal blood are an attractive noninvasive source of whole foetal genome. We aimed to profile membrane proteins of FNRBCs and adult RBCs to find unique surface markers for cell sorting.

**Methods:** Membrane proteins extracted from pooled samples of FNRBCs from 1st trimester placental villi and adult RBCs were profiled by two-dimensional liquid chromatography coupled with matrix assisted laser desorption/ionization-time of flight/time of flight tandem mass spectrometry (2DLC-MALDI-TOF/TOF-MS). Unique FNRBC membrane proteins were identified by comparing between the membrane protein profiles of FNRBCs with RBCs. Cellular expressions were validated by immunocytochemistry (ICC).

**Results:** Three hundred and fifteen proteins were identified from FNRBC membranes. Comparison with adult RBC membrane proteome revealed 22 unique FNRBC proteins. ICC on FNRBCs and RBCs showed relatively equal distribution of seven proteins; Armadillo repeat containing X-linked protein 3, Solute carrier family 1 member 5, Cathelicidin antimicrobial peptide, Isoform A of solute carrier family 3, member 2, Cleft lip and palate transmembrane protein 1, C9orf5 and Olfactory receptor 11H4. Stronger expression of Azurocidin, CAAX prenyl protease 1 homolog and Abhydrolase domain was observed on FNRBCs compared to RBCs while the reverse trend was seen with Splice isoform B of Chloride channel protein 6.

**Discussion & Conclusion:** Identification of unique protein markers using proteomic strategy (2DLCMS/MS) and immunocytochemical validation has revealed 4 novel potential markers. Intracellular markers, Azurocidin and FACE1 are currently being optimised for fluorescence activated cell-sorting while the surface markers, ABHD12 and CLC6 are being investigated for positive selection of FNRBCs and depletion of RBCs, respectively.

**OP-CR-01**

**Multi-modal Quantitative Sensory Testing in Patients with Clinically Defined Cervical Zygapophysial Joint Pain: An Exploratory Study and Review of the Literature**

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**Background/Hypothesis:** Chronic neck pain, in spite of its prevalence, is poorly understood.

**Methods:** This study systematically evaluates 18 patients with chronic neck pain secondary to cervical zygapophysial joint pain with a comprehensive, multi-modal quantitative sensory testing (QST) protocol. This consists pressure pain threshold testing, thermal threshold testing, electrical pain threshold testing, temporal summation (also termed "wind-up response") using electrical stimulation and measurement of descending inhibitory modulation using the conditioned pain modulation (CPM) paradigm.

**Results:** Comparing with the non-painful side, non-painful reference area as well as pain-free control values; we find evidence of (1) ongoing descending tonic inhibition, (2) less effective inhibitory modulation in the trigeminal compared to the spinal sensory system and (3) segmental sensitisation over the chronic nociceptive source in the neck.

**Discussion & Conclusion:** The segmental wind-up observed over the chronic nociceptive source in the neck results in increased responsiveness to noxious peripheral stimuli. These patients will likely benefit from ablation of that nociceptive source via zygapophysial joint blocks or median branch neurotomy. This reinforces the potential of QST as a powerful predictive tool for both prognosis as well as outcomes after interventional procedures.

In addition to its multi-modal attributes designed for a wide range of somatosensory functions, this study is also the first to examine inhibitory pain modulation in patients with chronic cervical zygapophysial joint pain by use of the CPM paradigm in both the trigeminal and the spinal sensory systems.

**OP-CR-02**

**Nab-Paclitaxel (Abraxane, Albumin-Bound Particles) has Clinical Activity in the Treatment of Advanced Pancreatic Cancer Refractory to Gemcitabine**

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**Background/Hypothesis:** Treatment options for patients with advanced pancreatic cancer (PC) who fail therapy with Gemcitabine (G) are few. Secreted protein acidic and rich in cysteine (SPARC) expression may be a predictive marker of activity for Nab-P. We aimed to assess the feasibility and efficacy of Nab-P in G-refractory individuals and the use of SPARC as a predictive factor.

**Methods:** Phase II trial. Patients with advanced PC refractory to G and ECOG PS 0-2, received Nab-P 100 mg/m<sup>2</sup> on days 1, 8, and 15 of a 28-day cycle. Primary endpoint was 6-month overall survival (OS). Secondary endpoints were response rate (by RECIST criteria), progression-free survival (PFS), safety and toxicity profile, and SPARC expression.

**Results:** Nineteen eligible patients accrued. Median age was 61 years, 9 were male, 18 had stage IV disease, and 15 had a PS of 0-1. 6-month OS was 58% (95% CI: 33% to 76%), median OS: 7.3 months (95% CI: 2.8 to 13.3), median PFS: 1.6 months (95% CI: 1.5 to 3.4). One patient had a partial response (PR) and 6 had stable disease (SD) as their best response (3 of which lasted longer than 6 months). The remaining 12 patients (63%) had progressive disease (PD). Five patients are alive with a median follow-up of 12.7 months, including one on cycle 15 of therapy. After 2 cycles, the median CA 19-9 level decreased by 52% in patients who had SD or PR, versus 18% in patients with PD. Non-haematological toxicities were generally mild with grade 1 or 2 nausea, anorexia, hypocalcemia and vomiting occurring in 63%, 47%, 37% and 26% of patients, respectively. Grade 3 or 4 neutropenia, neutropenic fever and anemia occurred in 32%, 11% and 11% of patients, respectively. There were no cases of grade 3 or 4 neuropathy. SPARC expression did not correlate with clinical outcomes.

**Discussion & Conclusion:** Nab-P is active in pancreatic cancer refractory to G. A randomised phase III trial is ongoing to confirm the efficacy of Nab-Paclitaxel in pancreatic cancer and the usefulness of SPARC as a predictor of its activity.

## OP-CR-03

### Blood Pressure and Retinal Vascular Caliber in Young Children

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**Background/Hypothesis:** Prior studies have reported the relationship between blood pressure and retinal vascular calibre among adults and children beyond 6 years old. However, it is still unclear whether this association is consistent in very early life.

**Methods:** We examined a population-based, cross-sectional study of Singapore Chinese preschoolers (6 to 72 months, n = 3009) conducted from 2006 to 2008. A total of 460 digital retinal photographs were taken in children (4 to 6 years) and both retinal arteriolar and venular calibre were measured by the computer imaging programme.

**Results:** The mean retinal arteriolar and venular calibres were 155.95  $\mu$ m and 219.51  $\mu$ m in boys, and 161.97  $\mu$ m and 224.29  $\mu$ m in girls, respectively. Children with higher quintiles of systolic blood pressure had narrower retinal arterioles than those with lower quintiles by 5.21  $\mu$ m (156.28 $\pm$ 14.058 vs 161.49 $\pm$ 17.12  $\mu$ m,  $P = 0.01$ ). After adjusting for age, gender, father's education, body mass index, birth weight, axial length and fellow retinal vessel, each 10 mm Hg increase of systolic blood pressure was associated with retinal arteriole narrowing by 1.93- $\mu$ m (95% CI: 0.50 to 3.38,  $P = 0.01$ ) and retinal venular widening by 2.06- $\mu$ m (95% CI: 0.12 to 3.99,  $P = 0.04$ ). Diastolic blood pressure and mean artery blood pressure were not associated with retinal arteriolar or venular calibre.

**Discussion & Conclusion:** We conclude that higher childhood systolic blood pressure is associated with narrower retinal arterioles and wider retinal venules. This finding suggests that the impact on the microvasculature of elevated blood pressure may exist in very early stage of life.



## OP-CR-04

### Is T-Tube Placement Still Necessary after a Common Bile Duct Exploration?

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**Background/Hypothesis:** T-tube insertion after common bile duct exploration used to be common practice, but in recent years, there have been other alternatives. We aim to study if these alternatives are superior to T-tube insertion.

**Methods:** A retrospective study on outcomes of common bile duct explorations with different drainage methods between January 2006 and April 2009.

**Results:** Among 49 common bile duct explorations performed, 23 (47%) were laparoscopic, and 26 (53%) were during open surgery. T-tubes were inserted in 15 patients (30.6%); 5 (10.2%) had biliary stenting; 9 (18.4%) had their previously inserted endoscopic retrograde cholangiopancreatography stent left in-situ, and 20 (40.8%) had primary closure without stenting. Exploration approach was either transcystic (51%) or transductal (49%). There were no mortalities. All explorations were successful and there were no cases of retained stones. Comparing T-tube (Group I, n = 15) against the others (Group II, n = 34), Group I had a longer length of hospital stay ( $P = 0.005$ ), and longer time to regain independent ambulation ( $P = 0.046$ ). Differences in operative duration, average pain score on postoperative day 1, time to regain bowel sounds and time to first fluid intake did not reach statistical significance. Group I and II had a complication rate of 33.3% (5/15) and 20.6% (7/34), respectively ( $P = 0.339$ ). On subanalysis of open explorations, there was no significant difference between the T-tube group and the others.

**Discussion & Conclusion:** T-tube insertion after common bile duct exploration is associated with longer hospital stay and longer recovery of independent ambulation compared to other methods of closure. Hence, T-tube insertion should not be routinely done. We suggest that the decision for biliary drainage be based on the amount of instrumentation performed, and that T-tubes should preferably be avoided unless biliary drainage is deemed necessary and internal stenting is not feasible.



**OP-CR-05**

**Characteristics, Treatment and Outcome of Elderly Breast Cancer Patients Diagnosed in Singapore**

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**Background/Hypothesis:** In Asia, the combination of ageing population and increasing breast cancer incidence rates has led to a rapid growth in the number of elderly breast cancer patients. This study was designed to improve our insights into breast cancer characteristics and outcome of elderly Asian women with breast cancer.

**Methods:** We identified all 2195 women aged  $\geq 40$  years diagnosed with breast cancer between 1990 and 2007 at the National University Hospital in Singapore. Patient and tumour characteristics, treatment and outcome were compared between women diagnosed before and after the age of 65 years.

**Results:** Older breast cancer patients were less often detected at early stages and presented more often with distant metastases at diagnosis. Their tumours were more often estrogen receptor positive. Older women were less likely to have undergone axillary clearance, radiotherapy post breast conserving surgery and chemotherapy for lymph node positive disease. Overall, older women had lower relative survival than younger women; however these differences largely disappeared after stage stratification.

**Discussion & Conclusion:** Similar to Western reports, older women presented with more advanced disease at diagnosis and were less likely to receive standard treatment. Nevertheless, contrary to Caucasian women, older age was not associated with worse survival within different stage strata.

**OP-CR-06**

**Peripheral Brain-Derived Neurotrophic Factor mRNA - A Potential Biomarker of Clinical Response in First Episode Schizophrenia**

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**Background/Hypothesis:** Brain-derived neurotrophic factor (BDNF) maintains neuronal function and its expression have been found to be reduced in postmortem brains and in serum of schizophrenic patients. In this study, we hypothesised that BDNF mRNA transcripts in peripheral blood were downregulated in patients with first episode schizophrenia, and that differential regulation might indicate clinical response to antipsychotic treatment.

**Methods:** Twelve patients with minimally treated first episode schizophrenia, and 12 healthy controls matched for gender, ethnicity and age were recruited. Symptoms were rated on the positive and negative syndrome scale (PANSS). Clinical response was defined a priori as a 40% improvement in PANSS total score. Venous blood was collected at recruitment, and again after 1-month of antipsychotic treatment. RNA was extracted from whole blood. Microarray analysis was performed and normalised data was analysed.

**Results:** Out of the 12 patient subjects, 7 showed a clinical response at 1 month follow-up. BDNF mRNA levels of patients at baseline were 2.7 times lower than controls, but this difference was not statistically significant. There was a statistically significant 5.3 fold upregulation of BDNF mRNA in the responder group when compared against their baseline ( $P = 0.015$ ). In the non-responder group, there was no significant difference in BDNF mRNA level after 1 month of antipsychotic treatment.

**Discussion & Conclusion:** These preliminary findings suggest that elevated peripheral BDNF expression could be a potential biomarker for clinical response in schizophrenia. Having a minimally treated group of first episode schizophrenic patients is a main strength of this study, but the small sample size was a limiting factor. Identifying and validating BDNF as a peripheral biomarker in schizophrenia has important clinical ramifications. Not only does it suggest that perturbations are not confined to the brain, it could also be monitored peripherally and have clinical utility.

**OP-CR-07**

**Family History as a Predictor of Early-Onset Myopia**

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**Background/Hypothesis:** To investigate the risk factors for myopia, including near work and outdoor activity, in Singapore Chinese preschool children.

**Methods:** A cross-sectional study, with disproportionate random sampling by 6-month age groups, of 3009 Singapore Chinese children aged 6 to 72 months was performed. Information on family history, near work and outdoor activity was obtained. Spherical equivalent refraction (SER) was assessed.

**Results:** Children with 2 myopic parents were more likely to be myopic (adjusted OR = 1.91; 95% CI: 1.38 to 2.63) and to have a more myopic SER (regression coefficient = -0.35; 95% CI: -0.47 to -0.22) than children without myopic parents. For each 1 cm taller height, the SER was more myopic by 0.01 dioptres. Neither near work nor outdoor activity was associated with preschool myopia.

**Discussion & Conclusion:** A family history of myopia was the strongest factor associated with preschool myopia. In contrast, neither near work nor outdoor activity was found to be associated with early myopia. These data suggest that genetic factors may play a more substantial role in the development of early-onset myopia than key environmental factors.

**OP-CR-08**

**A Randomised, Double-Blind Multi-Centre Trial Comparing Vasopressin and Adrenaline in Patients with Cardiac Arrest at the Emergency Department**

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**Background/Hypothesis:** Recently vasopressin has been used in patients with cardiac arrest. In human studies on vasopressin, clinical trials have produced conflicting results. We aimed to compare outcomes with vasopressin and adrenaline in the treatment of cardiac arrest patients seen at the Emergency Department (ED).

**Methods:** This is a multi-centre double-blind randomised clinical trial involving 4 hospitals. All patients with cardiac arrest as confirmed by the absence of pulse, unresponsiveness and apnea, and age above 16 were eligible. The exclusion criteria were traumatic cardiac arrest or when cardio-pulmonary resuscitation (CPR) was contraindicated. Eligible patients were administered with either adrenaline (1mg) or vasopressin (40IU); further treatment proceeded as per standard advanced cardiac life support guidelines.

**Results:** We recruited 727 eligible patients whose baseline characteristics in both groups were comparable. After adjustment for race, medical history, bystander CPR and prior adrenaline given, significantly more patients survived to hospital admission with vasopressin (22.2%) compared to adrenaline (16.7%) [ $P = 0.047$ ; RR (95% CI) = 1.43 (1.02-2.04)]. Patients whose presenting rhythm was pulseless electrical activity given vasopressin had almost twice the survival to admission (37.9%) than adrenaline (19.4%) [ $P = 0.016$ ; RR (95% CI) = 1.30 (1.04 - 1.62)]. Patients whose downtime (time of collapse to time of arrival at ED) was between 15 and 30 minutes (adrenaline = 16.4%, vasopressin = 30.9%;  $P = 0.048$ ) and 30 to 45 minutes (adrenaline = 10.6%, vasopressin = 19.7%;  $P = 0.05$ ) had significantly higher survival to admission with vasopressin than adrenaline.

**Discussion & Conclusion:** Vasopressin seems to improve survival to admission compared to adrenaline in patients with prolonged cardiac arrest, especially in the group with collapse to arrival in ED interval between 15 minutes to 45 minutes. However it did not improve long-term survival for cardiac arrest.

## OP-CR-09

### Glycated Haemoglobin as a Diagnostic Tool for Diabetes Mellitus

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**Background/Hypothesis:** The American Diabetes Association (ADA) has recommended the use of glycated haemoglobin (HbA1c) as an alternative test for diabetes mellitus with a threshold of  $\geq 6.5\%$  in the 2010 ADA clinical practice recommendations. HbA1c is currently not used as a method for diagnosing diabetes mellitus in Singapore and the project aims to study the concordance between using HbA1c and the current methods to diagnose diabetes mellitus in the local population.

**Methods:** Data of patients who had HbA1c, fasting plasma glucose (FPG) and oral glucose tolerance test (OGTT) tests done in the same seating between January 2007 and March 2010 at Tan Tock Seng Hospital Diabetes Centre were collected and analysed. The records of 250 patients were used, and HbA1c values were compared with FPG and OGTT values using receiver operating characteristic (ROC) curves.

**Results:** The area under the curve (AUC) in the ROC curve was 0.899 for detecting abnormal FPG and 0.788 for detecting abnormal OGTT. The optimal cut-off value for HbA1c for our study was found to be 6.5% for detecting abnormal FPG and 6.4% for detecting abnormal OGTT. The Kappa agreement measure for HbA1c  $\geq 6.5\%$  and abnormal FPG was 0.615 (sensitivity 80%, specificity 85%); HbA1c  $\geq 6.5\%$  and abnormal OGTT was 0.441 (sensitivity 57.3%, specificity 85.7%).

**Discussion & Conclusion:** HbA1c shows good concordance with the current methods of diagnosing diabetes mellitus in local patients and should be considered as an alternative for diagnosing diabetes mellitus locally. The cut-off value of 6.5% recommended by the ADA correlates well with the FPG and OGTT cut-offs for diabetes mellitus in local patients.

**OP-CR-10**

**This abstract has been removed.**

## OP-CR-11

### **Mohs Micrographic Surgery: Experience of a Tertiary Skin Cancer Referral Centre in Singapore**

**WP TAN**

*Dermatology, National Skin Centre, Singapore*

**Background/Hypothesis:** Mohs micrographic surgery (MMS) is a stepwise methodical technique allowing the most complete and accurate method of microscopically checking all the surgical margins of the resected tissue. In this report, we describe our experience with 120 patients in whom MMS was performed.

**Methods:** A retrospective case records review of patients treated at the National Skin Centre with MMS between 1 January 2008 and 31 December 2008 was conducted.

**Results:** A total of 129 tumours in 120 patients were removed by MMS during this period. The most common tumour was basal cell carcinoma, accounting for 85.3%, followed by squamous cell carcinoma (11.6%), and the remaining were two cases each of sebaceous carcinoma and extramammary Paget's disease. The indications for MMS included recurrent or persistent tumours after previous excisions, site and/or size of tumours and aggressive histological subtypes of tumours. Complications of surgery occurred in only 7 of the 129 tumours treated (5.4%). None recurred after a follow-up of at least 2 years.

**Discussion & Conclusion:** MMS is a safe and reliable method of treatment for a variety of skin tumours. Superior cure rates are achieved compared to other skin cancer treatment modalities because it uses the most complete and accurate method for microscopically checking all of the surgical margins of the resected tissue, whilst keeping resection of surrounding normal tissue to a minimum.

## OP-CR-12

### **Mohs Micrographic Surgery for Dermatofibrosarcoma Protuberans: Experience of a Large UK Referral Centre**

**WP TAN**

*Dermatology, National Skin Centre, Singapore*

**Background/Hypothesis:** Dermatofibrosarcoma protuberans (DFSP) has conventionally been treated with wide local excisions. Mohs micrographic surgery has been advocated more recently. We describe our departmental experience with DFSP treated with Mohs micrographic surgery (MMS).

**Methods:** This was a case review of 35 patients with DFSP treated between 1998 and 2009 with MMS using paraffin-embedded sections.

**Results:** Seventeen patients required one horizontal layer to clear their tumour, 10 patients needed 2 and 8 patients needed 3 layers or more. The median preoperative clinical size was 6 cm<sup>2</sup> (range, 0.75 to 54.8) and the median postoperative wound size was 46.8 cm<sup>2</sup> (range, 4 to 145.2). Tumour recurrence has not been observed in any of our patients after a median follow-up duration of 29.5 months (range, 6-146).

**Discussion & Conclusion:** We present 35 DFSP patients, none of whom showed persistent tumour after treatment with "slow" MMS using paraffin sections. We advocate MMS as the treatment of choice for DFSP, especially for recurrent tumours and on the head and neck region where tissue conservation is particularly important.



## OP-CR-13

### Is Whole Body Computed Tomography Good for Trauma Casualties?

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*General Surgery, Tan Tock Seng Hospital, Singapore*

**Background/Hypothesis:** The benefits of Whole body Computed Tomography (WBCT) include faster diagnosis, fewer missed injuries and mortality benefits. Critics of WBCT cite high radiation exposure, degradation of doctors' clinical acumen and rising healthcare cost as pitfalls. We set out to investigate the differences in outcome between WBCT and Organ Specific CT (OSCT) at a major trauma centre in Singapore - Tan Tock Seng Hospital.

**Methods:** Patients are triaged and stabilised by the resuscitation team at Accident and Emergency (A&E). Unstable patients who need surgery are sent to the operating room without scans. Of the stable ones, some get OSCT to complement the clinical assessment, X rays and sonographic findings. Others get WBCT as part of the initial workup. The decision is based on the resuscitation team's assessment.

Patients admitted from Jan 2008 to Dec 2009 were selected. Inclusion criteria - multi-organ trauma patients admitted to the General Surgery Department who had either OSCT or WBCT. Those with isolated head injuries or purely orthopedic injuries were excluded.

**Results:** Two hundred and sixty-six patients met the inclusion criteria. Fifty-four had WBCT while 212 underwent OSCT.

The mean probability of survival (TRISS) for OSCT is 94.8% and actual survival is 97.2%. The PS for WBCT is 77.7% and actual survival is 83.3%.

Of 212 OSCT, 17.9% (38) needed a repeat trip to the CT scan to complete the diagnostic work up. Of these, 31.6% (12) had either missed injuries or needed a change in management because of the additional information from the CT scan.

**Discussion & Conclusion:** Our study suggests a mortality benefit associated with WBCT, similar to findings by Wagner et al, Lancet 2009. Doctors needed more information in 17.9% of OSCT patients and had to send them for additional scans to complete the workup. This means unnecessary movement of critically ill patients. Moreover, 31.6% of patients who needed the additional scans have missed injuries. Our centre is seeking grants for a randomised trial to further prove that WBCT is indeed superior.

## OP-CR-14

### White Matter Abnormalities in Patients with Remitted First-Episode Mania

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**Background/Hypothesis:** Abnormalities of brain white matter have been noted in structural Magnetic Resonance Imaging (MRI) and diffusion tensor imaging studies of bipolar disorder but there are fewer investigations specifically examining white matter integrity early in the course of illness. In this study, we employ diffusion tensor imaging to elucidate white matter changes in adult patients with remitted first-episode mania and hypothesise that first-episode mania was associated with decreased fractional anisotropy in cortical (frontal), subcortical (thalamus, striatum) white matter as well as white matter tracts (cingulum, corpus callosum).

**Methods:** Diffusion-tensor images were acquired from 16 patients with remitted first-episode mania and 16 healthy controls matched for age, gender, handedness and years of education. Fractional anisotropy, radial and axial diffusivities were analysed using Tract-Based Spatial Statistics.

**Results:** Patients with bipolar disorder have lower fractional anisotropy and higher radial diffusivity in the left anterior frontal white matter, right posterior thalamic radiation, left cingulum, bilateral sagittal striatum. In addition, increased radial diffusivity is found in the left corpus callosum of patients.

**Discussion & Conclusion:** Our findings highlight that white matter abnormalities are present by the time of remission of first-episode mania. The widespread occurrence of these white matter abnormalities both in first-episode mania and chronic bipolar disorder suggest that disruption of white matter cortical-subcortical networks as well as projection, associative and commissural tracts is a hallmark of the illness.

## OP-CR-15

### Efficient Identification of Candidaemia Isolates in the Microbiology Laboratory

**MSC YAP<sup>1</sup>, JZG TAN<sup>2</sup>**

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**Background/Hypothesis:** The fungi taxonomy consists of yeasts, moulds and dimorphic fungi. Yeast infection, also known as Candidiasis, is the most common form of human fungal infection which may lead to critical, life-threatening conditions. This is because yeasts are opportunists with the ability to colonise human hosts. They are unicellular eukaryotic microorganisms with the ability to grow at 37°C which reproduce by budding.

**Methods:** Diagnostic microbiology makes use of many methods for yeast identification. Some common ones are the Germ Tube Test, Cornmeal agar Test, Chromogenic Agar Test, Sugar Fermentation and Urease Test, Vitek Automation and the API 20C AUX commercial kit test. These methods involve both, biochemical and enzymatic reactions, of the yeast isolates.

**Results:** Our study aims to obtain the most rapid, accurate and cost-effective test or combination of tests. This was done using 46 yeast isolates from clinical samples and testing them using the above listed methods. Their performances were then compared.

**Discussion & Conclusion:** Results revealed that no single test can accomplish our aims. A combination approach is required and test selection should account for the site and severity of infection. We will further analyse the various methods used in this study and suggest the best possible workflows for the identification of yeast isolates.

**OP-CR-16**

**The Relation between Weight and Clinical Symptoms in Children with Attention Deficit Hyperactive Disorder**

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**Background/Hypothesis:** In a review, Cortese et al concluded that attention deficit hyperactive disorder (ADHD) was linked to increased rates of obesity. However, we recently reported a bi-modal distribution in the body mass indices (BMI) of ADHD children, suggesting two distinct ADHD subtypes based on BMI. Here, we compare the metabolic and psychiatric profiles of ADHD children according to their BMI clusters.

**Methods:** Participants were 46 patients aged 9-16 recruited from a psychiatric clinic. All participants met diagnostic criteria for ADHD on the Diagnostic Interview Schedule for Children. BMI, resting heart rate, and blood pressure were recorded. As measures of externalising behaviour, the child behavior checklist (CBCL) and reactive-proactive aggression questionnaire (RPQ) were used.

**Results:** Participants' BMI peaked bi-modally at 15 to 18 and 20 to 23. A median split at BMI = 19 was used to form a lower (L-BMI) and higher BMI group (H-BMI).

In a multivariate analysis of variance, H-BMI participants had significantly higher systolic and diastolic blood pressure than L-BMI participants and were more likely to react aggressively (higher RPQ reactive-aggression scores). There was a non-significant trend for H-BMI participants to show more delinquency (higher CBCL rule-breaking scores and comorbidity for oppositional defiant or conduct disorder). However, H- and L-BMI participants did not differ on ADHD-specific measures (CBCL inattention scores and classification for ADHD inattentive vs hyperactivity subtypes) nor on resting heart rates.

**Discussion & Conclusion:** Our findings suggest ADHD children with higher BMI may have a more severe clinical profile. They show increased resting blood pressure, react more aggressively, and may be more delinquent. It could be that ADHD and having higher BMI share a common pathway (e.g. dopaminergic or noradrenergic) or are indicators of a common problem (e.g. metabolic syndrome); if so, treatment choice could be individualised according to BMI cluster.

## OP-CR-17

### The Use of Cinacalcet in Achieving Bone and Mineral Metabolism Targets in Chronic Kidney Disease

**MPK WONG, TG NG**

*Renal Medicine, Tan Tock Seng Hospital, Singapore*

**Background/Hypothesis:** Cinacalcet has been used in treating secondary hyperparathyroidism without causing the complications of hypercalcaemia and hyperphosphataemia. The National Kidney Foundation/Kidney Disease Outcomes Quality Initiative (NKF/KDOQI) recommended target guidelines for bone and mineral metabolism are serum calcium (Ca) 8.4 to 9.5mg/dL, serum phosphate (PO<sub>4</sub>) 3.5 to 5.5mg/dL, calcium x phosphate product (CaxP) <55mg<sup>2</sup>/dL<sup>2</sup> and intact parathyroid hormone (iPTH) 16.5 to 33.0pmol/L. This retrospective study was performed to demonstrate an improvement in target attainment in dialysis patients with secondary or tertiary hyperparathyroidism initiated on Cinacalcet.

**Methods:** Prevalent dialysis patients initiated on Cinacalcet between 1 June 2007 and 28 February 2009 were enrolled. Data was collected prior to initiating Cinacalcet and up to 6 months after initiation.

**Results:** Eighteen patients (38.9% males; 72.2% haemodialysis patients; median dialysis vintage = 4 years) were enrolled. At baseline, 88.9% of patients achieved none of the guidelines, with most patients having hypercalcaemia (median = 10.9mg/dL), hyperphosphataemia (median = 6.81mg/dL), elevated CaxP (median = 77.28mg<sup>2</sup>/dL<sup>2</sup>) and severely uncontrolled levels of iPTH (median = 123.05pmol/L). All patients were commenced initially on Cinacalcet 30mg once a day, with a median dose of 30mg (range, 15 to 90mg) at 6 months. The proportion of patients achieving the guidelines increased from 5.56%, 11.11% and 11.11% for baseline Ca, PO<sub>4</sub> and CaxP, respectively to 30%, 50% and 70% at 6 months. There was no difference between baseline and 6 month iPTH target achievement. At 6 months, there was a 10% increase in the achievement of 1 target, and a 24.43% increase in achieving either 2 or 3 targets. There were no drug withdrawals secondary to adverse effects.

**Discussion & Conclusion:** This study demonstrates that treatment with Cinacalcet is beneficial in improving bone and mineral metabolism NKF/KDOQI recommended targets in dialysis patients with either secondary or tertiary hyperparathyroidism.

## OP-CR-18

### Gastric Cancer in Young Patients

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<sup>2</sup>*General Surgery, Tan Tock Seng Hospital, Singapore*

**Background/Hypothesis:** Stomach Cancer has had an overall decreasing incidence worldwide. Anecdotally, young patients who present with CA stomach seem to have a worse prognosis compared to older patients. Possible reasons include young patients being more likely to ignore symptoms or having doctors who dismiss their symptoms as benign. As a result, these patients present at a later stage and have a more advanced illness with poorer prognosis. Tumour cells which can evade healthy immune systems also tend to be more aggressive.

**Methods:** For the purposes of this study, the Tan Tock Seng Hospital (TTSH) upper gastrointestinal (GI) cancer database of patients who underwent surgery was studied. All patients under the age of 40 who were operated on in the last 5 years were included. Nineteen patients met the criteria.

**Results:** The mean age at surgery was 33.8 years. The patients ranged in age from 21 to 40 years old. The racial profile of the patients was as follows: 13 Chinese, 3 Malay, 2 Indian and 1 Others. At presentation, 10 patients had stage IV disease, 3 patients had stage III disease, 4 had stage II disease and 2 had stage I disease. Six patients were known smokers and 5 were known to have H. pylori. All the patients had a histological diagnosis of adenocarcinoma, with 6 having the signet ring subtype. One had the mucinous subtype, 2 were tubular and the rest was unknown. Most of the patients had poor tubular differentiation. At last follow-up, 8 patients had passed away, 3 were still alive and the rest were of unknown status.

**Discussion & Conclusion:** It is important not to dismiss suspicious symptoms in young people. Many young patients with gastric cancer do present at an advanced stage of disease with a correspondingly poor prognosis and high mortality rates. It is also possible that these young patients have cancer cells lines with aggressive phenotypes. Examining the genotypes of cancer cells in young patients may yield findings which could assist in personalising cancer treatment for such patients, improving outcomes.

## OP-CR-19

### Angioembolisation of Pelvic Bleeders - Predictors of Morbidity and Mortality

**JR ZHANG, HY LO, LT TEO, KYT YEO**

*General Surgery, Tan Tock Seng Hospital, Singapore*

**Background/Hypothesis:** Retroperitoneal bleeding secondary to pelvic fractures is a major cause of morbidity and mortality in trauma patients. The trend is to manage these bleeding using angioembolization, even for patients undergoing laparotomy for other injuries. Instead, an intraoperative angiogram is done to localise the bleeding and embolisation done as treatment or prophylaxis. This study aims to conduct a single centre retrospective critical analysis of the patients who underwent angioembolisation for pelvic fractures. Success rates for this protocol and predictors for recurrent bleeding are analysed.

**Methods:** The registry of all pelvic bleeders admitted from January 2006 to December 2009 was reviewed. All patients who suffered pelvic fractures and underwent angiogram are included. The clinical data of patient premorbid condition and data suggestive of continued bleeding were recorded. Outcomes include rates of morbidity that resulted from rebleeds such as repeat angiograms, expanding haematoma and repeated transfusion requirements. Statistical analysis was done using multivariate analysis with SPSS.

**Results:** At time of abstract submission, the detailed results are still pending. Initial analysis of the data indicates a high success rate of this protocol. The predictors for recurrent bleeding include raised PT, complex pelvic fracture requiring fixation, and a high ISS score.

**Discussion & Conclusion:** In our series, patients with coagulopathy, complex pelvic fractures requiring fixation and high ISS score predicts for a worse outcome with higher risk of rebleeding after pelvic angioembolisation. A lower threshold to investigate a rebleed or closer monitoring is recommended for such patients. Our study is limited by its size and is only good as a descriptive study. It remains to be compared to other centres with similar infrastructure and volume as these could be confounding factors that will affect clinical practice.

**OP-CR-20**

**Urgent Oesophagogastrroduodenoscopy is Associated with Lower Mortality in High-Risk but Not Low-Risk Non-Variceal Upper Gastrointestinal Bleeding**

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**Background/Hypothesis:** International consensus recommended early Oesophagogastrroduodenoscopy (OGD) <24hrs, noting no benefit for OGD<12hrs vs OGD>12hrs in *unselected* NVUGIB patients. Data on urgent OGD in *selected* subgroup of patients with high risk Non-Variceal Upper Gastrointestinal Bleeding (NVUGIB) are limited. We aim to determine whether in a subgroup of high risk patients with NVUGIB, as triaged by high Glasgow-Blatchford score (GBS), OGD earlier than the currently recommended 24hrs was associated with lower in-hospital mortality.

**Methods:** All adult patients who received OGD for indications of coffee-ground vomitus, haematemesis, or melena, excluding variceal and lower gastrointestinal bleeding, at a university hospital over 18 months were enrolled.

**Results:** Nine hundred and thirty-four patients were included. Area under receiver-operating-characteristics curve (AUROC) for GBS was 0.813 for predicting all-cause in-hospital mortality, with cut-off at GBS  $\geq 12$  having 90% specificity. Specificity of 90% was chosen for the GBS cut-off for determining high risk patients because if we had chosen the usual cut-off based on optimal sensitivity and specificity, the population selected would be moderate-to-high risk rather than the high risk group which we were targeting. In low risk patients with GBS <12, presentation-to-endoscopy time (PET) in those who died and those who survived was similar. In high risk patients with GBS  $\geq 12$ , PET was significantly longer in those who died than those who survived. On multivariate analysis, in high risk patients, only PET was associated with in-hospital mortality. For high risk patients, AUROC for PET and outcome of in-hospital mortality was 0.803, with cut-off for a sensitivity of 100% at 13 hours. Sensitivity of 100% was used for determining optimal timing for OGD in the high risk group because the ideal target was minimal or no mortality. In-hospital mortality was higher in those with PET >13 hrs (44% versus 0%,  $P < 0.001$ ) in high risk patients.

**Discussion & Conclusion:** PET <13 hrs was associated with lower mortality in high risk but not low risk NVUGIB.



## OP-CR-21

### Raman Endoscopy for *in Vivo* Diagnosis of Gastric Precancer and Cancer at Gastroscopy

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**Background/Hypothesis:** Raman spectroscopy is a vibrational spectroscopic technique capable of probing the changes of biochemical compositions and conformations occurring in tissue. The main aims of this research are to develop a novel image-guided Raman endoscopic technique and to evaluate its diagnostic potential for improving early diagnosis and detection of gastric precancer and cancer *in vivo*.

**Methods:** With our successful development of an integrated Raman endoscopy and multimodal wide-field imaging modalities (white-light reflectance (WLR), narrow-band imaging (NBI), autofluorescence imaging (AFI)), a total of 161 *in vivo* gastric sites have been measured from 67 gastric patients during clinical gastroscopy. Histopathological examination showed that 106 Raman spectra were from normal tissue, 17 spectra were from dysplasia and 38 spectra were from neoplasia. The partial least squares (PLS) discriminant analysis (DA) was employed to develop multiclass diagnostic algorithms for tissue diagnosis and classification.

**Results:** High quality *in vivo* Raman spectra can be acquired in real-time (within 0.5 sec) from the stomach during clinical endoscopy. Significant differences in Raman spectra between normal, dysplastic and neoplastic gastric tissue are observed. The PLS-DA modeling on the *in vivo* gastric Raman spectra achieves the diagnostic sensitivities of 98.1%, 100.0%, and 86.8%; and specificities of 94.5%, 91.9%, and 95.8%, respectively, for identifying precancer and cancer from normal gastric tissue *in vivo*.

**Discussion & Conclusion:** This is the first demonstration that *in vivo* Raman endoscopy technique can be used to reveal the biomolecular changes of gastric tissue associated with carcinogenic transformation during clinical gastroscopic examination. The results suggest that the image-guided Raman endoscopy technique could become a clinically useful endoscopic tool for noninvasive, *in vivo* diagnosis of premalignancies in the stomach at the molecular level.

## OP-CR-22

### Does the Type of Foreign Body Affect the Level of Impaction after Accidental Ingestion?

**SY TAY, SDC LO**

*Otorhinolaryngology, Tan Tock Seng Hospital, Singapore*

**Background/Hypothesis:** Foreign body ingestion and impaction in the upper aerodigestive tract is associated with significant morbidity and mortality if not detected and removed. Clinical history plays an essential role in the initial management. The aim of this study is to determine whether knowledge of the type of foreign body aids the prediction of the anatomical level of impaction within the pharyngo-oesophagus.

**Methods:** A retrospective chart review of all consecutive patients with suspected foreign body ingestion who underwent rigid oesophagoscopy between 2007 and 2009 in a tertiary otorhinolaryngology centre was conducted. Presenting history and radiological findings were compared against operative findings.

**Results:** Of the 123 cases, 12 different types of foreign bodies have been encountered. Fishbone was the most common (72%), affecting mainly the elderly. Chicken and duck bone impaction were jointly second most common and observed only in Chinese females, of a younger age group. Majority of the foreign bodies were lodged at the cricopharynx (28%), with fish bones having the tendency to lodge at a more proximal anatomical position compared to chicken and duck bone. Duration of symptoms prior to seeking medical help is not related to foreign body type.

**Discussion & Conclusion:** The results of the current study support the importance of accurate history taking, which may aid seeking abnormality on radiological images and during oesophagoscopy in suspected foreign body impaction.

## OP-CR-23

### Computed Tomography Scan in Suspected Foreign Body Ingestion

**SY TAY, SDC LO**

*Otorhinolaryngology, Tan Tock Seng Hospital, Singapore*

**Background/Hypothesis:** Foreign body ingestion and impaction in the upper aerodigestive tract is associated with significant morbidity and mortality if not detected and removed. The conventional imaging modality for this condition has been lateral neck X-ray. The aim of this study is to determine the role of computed tomography scan (CT Scan) in the management of this condition in Singapore.

**Methods:** A retrospective chart review of all consecutive patients with suspected foreign body ingestion who underwent rigid oesophagoscopy between 2007 and 2009 in a tertiary otorhinolaryngology centre was conducted. Lateral neck X-ray and CT scan findings were compared against intraoperative findings.

**Results:** A total of 123 patients were included. CT scan was significantly superior to X-ray (Sensitivity 100% and 70%, respectively), with none of the patients having undergone unnecessary surgery. Chicken and duck bone constitute the majority of cases with false negative lateral neck X-ray, subsequent demonstrated on CT scan and diagnosed during oesophagoscopy. CT scan cannot differentiate the different types of foreign body. Five patients despite their positive X-ray proceeded to CT scan, the indications for further detailed imaging in these cases are discussed in detail.

**Discussion & Conclusion:** The results of the current study support the role of CT scan in identifying foreign body impaction in suspected cases with negative X-ray. Cost and radiation risk prevent it from being the first line investigation modality. However, its high sensitivity has proven very useful in identifying missed foreign bodies on X-rays and reducing unnecessary oesophagoscopies.

## OP-CR-24

### Outcome of Foreign Body Ingestion - A Single Centre Experience in Singapore

**SY TAY, SDC LO**

*Otorhinolaryngology, Tan Tock Seng Hospital, Singapore*

**Background/Hypothesis:** Foreign body ingestion in the upper aerodigestive tract is associated with significant morbidity and mortality if not detected and removed. The aim of this study is to determine the current practice and surgical outcome of this condition.

**Methods:** A retrospective study was conducted on all consecutive patients with suspected foreign body ingestion who underwent rigid oesophagoscopy between 2007 and 2009 in a tertiary otorhinolaryngology centre. Patient demographics, presenting symptoms, radiological investigations, operative findings and outcome were determined.

**Results:** A total of 123 patients were included (median age = 56 years, range: 20 to 96 years). Majority were Chinese (n = 109; 55 male, 68 female). Most presented within 2 days of ingestion (86%) (range, 0 to 7 days). Twelve foreign body types were encountered, with fishbone commonest (72%). Majority of the foreign bodies were lodged at the cricopharynx (28%), the distribution spreads from the tongue to the oesophagus 40cm from incisor. Lateral neck X-ray was performed in all patients, aided by Computed Tomography (CT) scan in selective cases (n = 38). The average hospitalisation duration was 2 days (range, 1 to 10 days). With no mortality, 2.4% had complications (22 missed oesophagoscopies, 1 oesophageal perforation and 1 abscess formation).

**Discussion & Conclusion:** Fish is a popular dish in Singaporean Chinese diet, and a major cause of foreign body ingestion. Most pharyngo-oesophageal foreign bodies are diagnosed by thorough history, examination, X-ray and aided by CT scans in selective cases. Rigid oesophagoscopy is a reliable and safe procedure in retrieving foreign bodies.

OP-CR-25

**A Retrospective Analysis of Fusidic Acid Resistance in *Staphylococcus Aureus* among Dermatology Inpatients: Positive Correlation with Topical Fusidic Acid Use**

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**Background/Hypothesis:** The emergence of fusidic acid resistant *Staphylococcus aureus* (FRSA) has been linked to topical use of fusidic acid in the treatment of dermatological problems. This study tested the hypothesis that preceding topical fusidic acid use in patients is a risk factor for the development of fusidic acid resistance.

**Methods:** This is a retrospective cohort study of dermatology patients from National Skin Centre who were admitted for inpatient care from 2006 to 2008 and found to have positive bacterial cultures for *Staphylococcus aureus*.

Bacterial cultures were performed from swabs of lesional skin, blood or anterior nares as ordered at the discretion of the managing physician. Fusidic acid resistant *S. aureus* (FRSA) cases were defined as patients with isolated *S. aureus* either resistant or intermediate in susceptibility. These were compared with randomly selected fusidic acid susceptible (FSSA) cases in a 1:4 ratio to maximise statistical power. All available medical records were reviewed and potential risk factors for development of resistance were analysed, in particular, topical use of fusidic acid in the preceding 12 months.

**Results:** Thirty-seven patients with fusidic acid resistant *S. aureus* were compared with 148 patients with fusidic acid susceptible *S. aureus*. Thirteen out of 37 patients (35.1%) in the FRSA group had used fusidic acid topically compared to 11 out of 148 patients (7.4%) in the FSSA group. On univariate analysis, prior use of topical fusidic acid whether alone or in combination with topical steroids in the preceding 12 months (OR 6.75, 95% CI: 2.71 to 16.80  $P = 0.000$ ), was a significant risk factor for fusidic acid resistance.

**Discussion & Conclusion:** Despite limitations of a retrospective study dependent on accuracy of medical records and patient recall bias, there is positive correlation between topical fusidic acid usage and *S. aureus* fusidic acid resistance. This is the first study from Asia to show such a correlation. Judicious use of topical fusidic acid is recommended.

## OP-CR-26

### Case-Series of 5 Patients with Blunt Subclavian Artery Injuries at Tan Tock Seng Hospital

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**Background/Hypothesis:** Subclavian artery injuries are relatively uncommon but when it occurs, early recognition and treatment can play an important role in the eventual outcome.

**Methods:** A recent spate of 4 cases of subclavian artery injuries presenting within a period of 1 month prompted us to review our experience in managing blunt traumatic subclavian injuries over the past year. One additional case was identified from 18 months earlier. We present these 5 cases and examine the mechanism of injuries as well as the subsequent management.

**Discussion & Conclusion:** Injuries to the subclavian vessels are often the result of fairly large traumatic forces and are usually caused by rapid deceleration of the neck, chest and upper extremities. There are often associated injuries as well, such as, rib and clavicular fractures, pulmonary contusion, pneumothorax and brachial plexus injuries.

Recognition of subclavian artery injuries requires a high index of suspicion and arteriography has been suggested as the best means of identification of arch and great vessel trauma. Arteriography helps to identify as well as to assist in the planning of surgical repair.

In the setting of a trauma, access to the subclavian artery is often hindered by the presence of a stiff cervical collar if the neck cannot be safely cleared from injury. As such, access via an infraclavicular approach or via a median sternotomy may have to be considered.

Patients presenting after trauma often require concomitant management of the other affected systems.

With early control and repair of the artery, vascular morbidity is usually low but long-term disability is often the result of neuropathy from the concomitant damage to the brachial plexus.

**OP-CR-27**

**Applications of Hyperbaric Oxygen Therapy in Otorhinolaryngology**

**CY FUNG, S LO**

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**Background/Hypothesis:** Hyperbaric oxygen therapy (HBOT) has a wide range of use in clinical medicine. Its beneficial effects have been described in a number of Otorhinolaryngology conditions. There is increasing evidence to support its safety and efficacy in these conditions. This article aims to review the current evidence available and provide an update on the current and potential use of HBOT in Otorhinolaryngology.

**Methods:** Systematic review of Cochrane database, PubMed, and Medline using keywords associated with otorhinolaryngology conditions.

**Results:** More than 53 articles were identified including 28 randomised studies. There are evidences to support the use of HBOT in osteoradionecrosis and flap and graft salvage in randomized controlled trials. Level II to III evidences are available to demonstrate the beneficial effects of HBOT on malignant otitis externa and pharyngocutaneous fistula. There are currently no evidence to support its use in sudden sensorineural hearing loss and Bell's Palsy.

**Discussion & Conclusion:** HBOT has many potential uses in otorhinolaryngology, but more quality studies will be required to further support its use.

**OP-CR-28**

**Use of Complementary and Alternative Medicine in Head and Neck Cancer Patients in Singapore**

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**Background/Hypothesis:** To identify the prevalence and usage pattern of complementary and alternative medicine (CAM) within a cohort of head and neck cancer patients.

**Methods:** Fifty-five consecutive head and neck cancer patients attending the Alexandra Hospital otorhinolaryngology head and neck surgery clinic between May 2008 and November 2009 were surveyed using a questionnaire via telephone interview.

**Results:** The prevalence of CAM use was 49.1%. The most commonly used CAMs were traditional Chinese medicine (66.7%), vitamins (14.8%) and cod liver oil (11.1%). Patients used CAM mostly for physical health and well-being (48.1%) or to provide symptomatic relief for the cancer or its treatment (29.6%). Of the patients, 55.6% failed to inform their primary physician of their CAM usage. Sixty-three percent of patients perceived their CAM therapies to be effective. Information about CAM was obtained most commonly from friends (40.7%), followed by family (33.3%) and CAM practitioners (14.8%).

**Discussion & Conclusion:** The high prevalence of CAM use in head and neck cancer patients emphasises the need for otolaryngologists to educate themselves on CAM and its interactions. Physicians should routinely ask patients about their use of CAM, in order to facilitate communication and provide appropriate advice regarding the use of such therapies.



## OP-CR-29

### Disparities in Paediatric Asthma Control

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**Background/Hypothesis:** Asthma, one of the commonest chronic childhood illnesses, is the 19th leading cause of disease burden in Singapore. The National High Risk Asthma Shared Care Programme (NASC) was established in 2001, to address this problem. To date, there are more than 3000 paediatric patients enrolled, of which about 20% have partially controlled or uncontrolled asthma, according to the Global Initiative for Asthma (GINA) guidelines. Our study aims to elucidate the reasons accounting for failure to gain asthma control.

**Methods:** Retrospective analysis of the programme's database of 3526 patients enrolled between 2001 and 2008. As the field on level of control was only included in 2008, 364 patients were identified and 292 with complete data for the first 3 visits were included in the analysis. The patients were then divided into 2 groups: "controlled asthma" and "inadequately controlled asthma", based on the GINA guidelines, at the 3rd visit.

**Results:** At the third visit, 36.1% had inadequately controlled asthma. This is associated with increased school absenteeism, limitation of physical activity, and increased parental work loss. A greater proportion of patients with controlled asthma (76.4%) have a positive family history of asthma, compared to those with inadequately controlled asthma (71.1%) ( $P = 0.046$ ). Of patients on Beclomethasone Dipropionate, Budesonide and Fluticasone, 2.33%, 50.0% and 29.6%, respectively, achieved satisfactory control and did not require step-up therapy. Compliance to the use of preventer medication is associated with good control. Patients with controlled asthma are more likely to have food and animal dander as possible triggers for their asthma attacks.

**Discussion & Conclusion:** Factors determining good asthma control in this cohort include a positive family history of asthma, Budesonide therapy, compliance to preventer therapy and a personal history of food and animal dander as possible trigger factors for asthma attacks.

**OP-CR-30**

**Single Port and Conventional Laparoscopic Cholecystectomy: Prospective Case-Control Study of 100 Cases**

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**Background/Hypothesis:** Minimally invasive conventional laparoscopic cholecystectomy (CLC) is the gold standard for cholecystectomy, requiring 1 umbilical and 3 abdominal incisions. The newer Single Port Laparoscopic Cholecystectomy (SPLC) requires only one umbilical incision. We aim to study if SPLC offers better outcome than CLC.

**Methods:** Elective cholecystectomy patients were prospectively offered SPLC or CLC. Selection criteria was symptomatic gallstones and exclusion criteria was suspected malignancies and cholecystoenteric fistulas. Fifty SPLC patients were recruited, matched (age, sex, race) to 50 CLC control patients and followed up. Various outcomes were statistically compared.

**Results:** Mean operative time was 79 and 57 minutes ( $P = 0.001$ ); and mean duration needed to return to normal activities was 5.8 and 6.9 days ( $P = 0.064$ ), in SPLC and CLC respectively. The mean pain score at 24 hours and 5 days and analgesia required was lower in SPLC ( $P > 0.05$ ). SPLC had higher overall satisfaction and cosmetic satisfaction scores. Complications and conversion to open technique was zero in both. Five out of 50 SPLCs required an additional port because of technically unfavourable variant anatomy.

**Discussion & Conclusion:** SPLC has statistically significant ( $P < 0.05$ ) faster recovery to normal activities, better cosmetic and overall satisfaction. SPLC may have lesser postoperative pain and analgesia required ( $P > 0.05$ ). Its drawbacks are longer operative time and that additional port insertions maybe required. With today's demand for minimally invasive surgery, SPLC has cosmetic and recovery benefits over CLC without higher complication rates and can be considered in a carefully selected cohort.

**OP-CR-31**

**Correlation between High Density Lipoprotein-Cholesterol and Remodeling Index in Patients with Coronary Artery Disease: An Intravascular Ultrasound Study**

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**Background/Hypothesis:** Serum level of high density lipoprotein (HDL)-cholesterol is associated with risk of coronary artery disease by an undefined mechanism. High coronary artery remodeling index is a marker of plaque instability. We correlated the serum level of cholesterol with coronary artery remodeling index of patients with coronary artery disease.

**Methods:** A total of 120 patients with de novo lesions located in native coronary artery were studied. Remodeling index was based on intravascular ultrasound (IVUS) interrogation of the lesions using the static approach, and was defined as external elastic membrane (EEM) area at lesion/average EEM area at proximal and distal reference segments.

**Results:** The average remodeling index was 0.9 (SD = 0.2). The remodeling index was not associated with any of the demographic and coronary risk factors. Stable angina was associated with a low remodeling index. Remodeling index correlated with white blood cell count and HDL-cholesterol, but not with total cholesterol, LDL-cholesterol and triglyceride. In the multiple linear regression analysis, HDL-cholesterol and procedure indication were the only 2 significant predictors of remodeling index. An increase of 1 mg/dL of HDL-cholesterol resulted in a decrease of 0.003 (95% CI: 0.0001 to 0.007,  $P = 0.046$ ) in remodeling index, after adjusting for procedural indications. When stratified according to diabetic status, the negative correlation persisted in non-diabetic ( $P = 0.023$ ), but not in diabetic, patients ( $P = 0.707$ ).

**Discussion & Conclusion:** We found a negative correlation between HDL-cholesterol level and remodeling index, providing a mechanistic explanation for high cardiac event rate in patients with low HDL-cholesterol. Diabetic status may have an influence on the observed relationship.

**OP-CR-32**

**Combined Single-Nucleotide-Polymorphisms-Based Carrier Screening/Prenatal Diagnosis for Alpha-Thalassaemia**

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**Background/Hypothesis:** Alpha-thalassaemia carrier screening includes mean corpuscular volume and haemoglobin electrophoresis. The last is expensive, and some cases would still be missed. We aimed to develop a PCR-based genotyping assay that could be used for both parental screening and prenatal diagnosis of  $\alpha$ -thalassaemia.

**Methods:** Allele-specific primer extension using universal-tag sequences was performed and target amplicons hybridised onto fluorescent-tagged-microspheres detectable by Luminex xMAP flow-cytometers. Six single nucleotide polymorphisms (SNPs) comprising 4 targets: rs2077088 (THAI/FIL), rs2974771, rs2858942, rs3760046(SEA/THAI/FIL) and 2 controls were analysed in 30 couples. In biparental  $\alpha$ -thalassaemia-1 cases, foetal DNA was analysed using the same microsphere-based assay. Adult and foetal samples were validated with Gap-PCR. Thirty local healthy DNA samples were sequenced for heterozygosity calculation.

**Results:** Nine out of 60 DNA (30 couples) analysed showed single signal for each SNP targeting SEA/THAI/FIL, suggesting either homozygosity ( $P = 0.244$ ) or hemizyosity ( $P = 0.756$ ). Homozygosity at all 3 SNPs ( $P = 0.244$ ) was obtained from expected heterozygosities: rs2974771 (0.472), rs2858942(0.480), rs3760046(0.111) and the inclusion of rs2077088 (0.285) for THAI/FIL-only lowers the likelihood to 0.175. Of the 9 carriers, 5 were maternal-only and 4 were paternal/maternal pairs ( $n = 2$  at-risk). Foetal DNA from the at-risk pregnancies was analysed. One foetus showed amplification of all 3 target SNPs (HbBart's excluded), while the other foetus showed complete absence of target SNPs (HbBart's). Gap-PCR confirmed all genotypes.

**Discussion & Conclusion:** PCR-based genotyping using SNPs on microsphere arrays can accurately screen parents for  $\alpha$ -thalassaemia-1. It can also be used for rapid diagnosis of HbBart's (SEA/SEA) in foetal DNA samples by confirming the complete absence of target SNPs.

## OP-CR-33

### Effect of Microbiology on Prognosis of Deep Neck Infections

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**Background/Hypothesis:** Deep neck infections occur in the deep fascial spaces of the neck. Such infections have high rates of morbidity and mortality and may lead to life-threatening complications. This study aimed to investigate factors that might affect the prognosis of deep neck space infections, particularly focusing on microbiology. This would help to determine which patients should be monitored more closely or treated more aggressively.

**Methods:** The study was a retrospective study of the medical records of 85 patients who underwent surgical incision and drainage of deep neck infections from January 2001 to February 2010. Information on potential prognostic factors were collected, including age, gender, race, spaces involved, clinical features, investigation results, comorbidities, and bacteriology results. The outcome for each patient was measured in terms of the length of hospital stay, presence of life-threatening complications, or death.

**Results:** The median length of hospital stay was longer for patients who had nosocomial infections ( $P = 0.038$ ), positive cultures ( $P = 0.003$ ), older age ( $P < 0.001$ ), diabetes ( $P = 0.009$ ), immunocompromised states ( $P = 0.006$ ) and a greater number of deep neck spaces involved ( $P = 0.002$ ). However, the number of organisms, aerobicity, and antibiotic resistance did not produce any statistically significant difference in the outcome. Complications were more common in patients with nosocomial infections ( $P = 0.037$ ), and those with more fascial spaces involved ( $P = 0.041$ ). There was also an increased risk of death in diabetics ( $P = 0.050$ ) and those with more fascial spaces involved ( $P = 0.033$ ).

**Discussion & Conclusion:** Nosocomial organisms, positive bacterial cultures, older age, diabetes, immunocompromised states, and greater number of involved spaces are risk factors for worse outcomes in patients with deep neck space infections. Hence, such patients may need to be treated more aggressively and monitored closely for complications.

**OP-CR-34**

**The Correlation of Visceral Adipose Tissue with Waist Circumference Is Not Different between Chinese and Indian Men**

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**Background/Hypothesis:** The metabolic syndrome is a major public-health challenge with a prevalence of 17.9% in Singapore. Central obesity as measured by the waist circumference (WC) has been defined by the International Diabetes Federation to be its essential factor and had recommended lower cut-offs to define central obesity in Asians, but that was not based on actual examination of the relationship between WC and visceral adipose tissue (VAT). We set out to explore in 60 Chinese and 60 Indian men 1) whether there was any difference between the relationship between WC and VAT in Chinese and Indian men; 2) the relationship between VAT and features of metabolic syndrome; 3) at which vertebral level should computed tomogram to be done for VAT measurement.

**Methods:** Sixty Chinese and 60 Indian men were recruited. A detailed medical history was taken. Anthropometric measures and blood pressure were taken. Fasting glucose, insulin and lipids were measured. VAT was measured by a 16-slice multi-detector CT scanner from the diaphragm to the pelvis.

**Results:** The single cut VAT at L2/3 corresponds better to total VAT volume as well as features of MS than at L4/5 which is typically used for Caucasian populations. The L2/3 VAT area was well correlated with the waist circumference in both Chinese ( $r = 0.484$ ,  $P < 0.001$ ) and Indian subjects ( $r = 0.366$ ,  $P = 0.004$ ). However there was no significant difference between the 2 races, with  $P = 0.2$  for the interaction term by race. VAT measurements correlated with all features of MS much better than WC did.

**Discussion & Conclusion:** VAT measured at L2/3 level corresponded best with total VAT volume. VAT correlated much better than WC. For both Chinese and Indian men, the higher the waist, the higher the amount of visceral fat. The message to both populations is clear: central obesity leads to more visceral fat and thus the development of metabolic syndrome, diabetes and increases cardiovascular risk.

## OP-CR-35

### Falls and Mortality among Seniors with Community-Acquired Pneumonia

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**Background/Hypothesis:** Falls are common among seniors with acute medical illness. However, the relationship between falls and mortality in this context has not been studied. We set out to determine whether presentation of falls is an independent predictor of mortality among older persons hospitalised for community-acquired pneumonia (CAP).

**Methods:** We conducted a retrospective analysis of data on patients aged 65 years and older admitted with a primary diagnosis of CAP to 3 acute care hospitals in 2007. We extracted demographic, clinical, and chest radiograph information from inpatient medical records. We used the Pneumonia Severity Index (PSI) class as an index of illness severity. The outcome of interest was 30-day mortality. Multivariable logistic regression was used to quantify the association between presentation of falls and 30-day mortality after adjustment for potential confounders.

**Results:** Out of 1010 patients, 111 (11.0%) had presented with falls in the 2 weeks prior to admission. Higher 30-day mortality was observed among those who had falls (25.2%) compared with those who did not (19.1%). Even after adjusting for PSI class, premorbid ambulatory function, ethnic group, hospital, and department, patients who presented with falls had significantly higher 30-day mortality than those who did not (OR 2.01, 95% CI: 1.18 to 3.43).

**Discussion & Conclusion:** The presenting symptom of falls is independently associated with short-term mortality among seniors hospitalised for CAP. The reason for this relationship is unclear, but it may be that falls reflect greater severity of illness or increased frailty that is unmeasured. Further research is needed to determine whether this is so, whether this association also occurs across other acute medical illnesses, and whether targeted intervention for fallers with acute medical illness improves mortality.

## OP-CR-36

### The Use of Prokinetic Drugs in Nasogastric Tube-Feeding Patients with High Gastric Aspirate Volume

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**Background/Hypothesis:** Prokinetic drugs are used as first-line therapy for management of high gastric aspirate (GA). There are currently no established international guidelines regarding the use of prokinetic drugs in nasogastric (NG)-tube fed patients with high GA. The aim of this study is to investigate the use and effectiveness of prokinetic drugs in NG-tube fed patients with GA.

**Methods:** This is a prospective observational study in patients aged 21 and above on NG-tube feeding with GA and are treated with prokinetic drugs. Patients admitted with prokinetic drugs are excluded from the study. Patient demographics, choice of prokinetics and other relevant medication, gastric aspirate volume and feeding regime are recorded until the point of discharge or cessation of NG-tube feeding.

**Results:** Sixty patients were recruited into the study (29 males; mean age = 72.6 years). Fifty-eight patients (96.7%) and 2 patients were treated with domperidone and metoclopramide as prokinetic for elevated GA respectively. Thirty-four out of 44 patients (77.3%) responded well to domperidone 10mg three times daily with 50% reduction in GA over  $1.4 \pm 0.8$  days and reached nil GA in  $2.3 \pm 1.8$  days. Eight out of 34 patients (23.5%) had reduction in their feeding regime prior to 50% reduction in GAV and 10 out of 34 patients (29.4%) had reduction in their feeding regime before nil GAV was reached. Five out of 34 patients (14.7%) were initiated on concomitant acid suppression therapy. The achievement of 1.4 days for 50% reduction in GA was found not to be confounded by feed reduction ( $P = 0.366$ ) or concomitant acid suppression therapy ( $P = 0.160$ ).

**Discussion & Conclusion:** Domperidone is the prokinetic of choice in our institution and it was found to be useful in reducing gastric aspirate in NG-tube fed patients. In comparison to metoclopramide, domperidone has a better side effect profile as it does not cross the blood brain barrier.



## OP-CR-37

### Is Obesity a Risk Factor for Cataract Surgery?

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**Background/Hypothesis:** To determine the relationship between obesity and risk of cataract extraction in older Chinese people in Singapore.

**Methods:** The Singapore Chinese Health Study (SCHS) is a prospective cohort of 63,257 middle-aged and older Chinese men and women enrolled between 1993 and 1998. Body mass index (BMI) was measured and information on lifestyle factors and medical conditions was collected through standardized interviews at baseline. Data on all cataract operations performed for "senile cataract" (ICD-9, Clinical Modification code 366.1) between 1990 and 2008 were retrieved from MediClaims, a population-based, nation-wide, government-administered medical savings fund, from which incident cases of cataract extraction among participants were identified.

**Results:** There were 13,603 participants who underwent cataract extraction in the cohort. In multivariate analyses, higher BMI was associated with higher risk of cataract extraction, with hazard ratios (HR) of 1.16 (95% CI: 1.08 to 1.25, comparing BMI  $\geq 28$  versus  $< 20$ ). The relationship between higher BMI and cataract extraction was present even among persons without diabetes (HR 1.19, 95% CI: 1.10 to 1.30, comparing BMI  $\geq 28$  versus  $< 20$ ,  $P$  for trend  $< 0.001$ ) and without diabetes or hypertension (HR 1.19, 95% CI: 1.08 to 1.32),  $P$  for trend  $< 0.001$ ).

**Discussion & Conclusion:** Higher BMI is associated with increased risk of cataract extraction, even in persons without diabetes.

**OP-CR-38**

**Treatment of Trichotillomania-Associated Pseudofolliculitis Improves Outcome of Trichotillomania**

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**Background/Hypothesis:** Trichotillomania is classified by the American Psychiatric Association Diagnostics and Statistics Manual for Mental Health Disorders, Fourth Edition as an impulse-control disorder. The underlying psychiatric comorbidity or functional impairment is well recognised by clinicians. Patients with trichotillomania pull their scalp hairs, resulting in damaged, distorted hair follicles, and broken hair shafts within the skin. The local irritation and inflammation resulting from reaction to the broken, impacted hair shafts and malaligned regrowing hairs can lead to pseudofolliculitis, much the same as a patient who waxes or shaves her legs gets itchy papules of pseudofolliculitis. Pseudofolliculitis becomes an organic reason for scalp itch and discomfort, and contributes further to the vicious cycle of itch and scratching in trichotillomania. This phenomenon has not been well documented. Treatment of trichotillomania would be more effective if the pseudofolliculitis component is addressed.

**Methods:** We describe a series of 5 patients with trichotillomania and pseudofolliculitis.

**Results:** Most of these patients improved after topical or oral antibiotics, and topical steroid lotion. Hair regrowth was also visibly better, with patients reporting improvement of symptoms of itch. All these patients were not placed on antidepressants nor antipsychotics.

**Discussion & Conclusion:** We highlight the association between trichotillomania and pseudofolliculitis. Treatment of trichotillomania is more effective if the underlying pseudofolliculitis component is addressed.

## OP-CR-39

### Spinal Myoclonus in a C5 Tetraplegic : Case Report and Review of Literature

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**Background/Hypothesis:** Spinal myoclonus, also called focal or segmental myoclonus, is due to a tumour, infection, injury, or degenerative process of the spinal cord. The condition is characterised by involuntary rhythmic muscle contractions, usually at a rate of more than one per second, trauma to the spinal cord is considered to be one of the most frequent causes of focal myoclonus. A 19-year-old Chinese female sustained a C5 & C6 fracture and spinal cord compression following a road traffic accident. Anterior C5 corpectomy and fusion was done. Motor power was grade 3 in the proximal upper limbs and grade 0 in remaining limbs. At 5 months post injury, we noted hip muscle tightness that progressed to a rhythmic jerking movement of both lower limbs.

**Methods:** Multi-channel EMG done on the paraspinals, rectus femoris, vastus lateralis, vastus medialis, lateral and medial hamstrings, gluteus maximus and soleus and radiological investigations were done.

**Results:** EMG showed simultaneous contractions in all the above muscles at a rate of approximately 0.5 Hz. Radiological investigations did not show any urinary stones or heterotopic ossification. Magnetic resonance imaging (MRI) whole spine done showed a post traumatic syrinx at the C5 level that measured 1x0.4cm, with no other abnormalities noted.

**Discussion & Conclusion:** Our impression was that the jerking movements were due to spinal myoclonus. Clonazepam was started with symptomatic relief. A review of literature showed that spinal myoclonus may have a precipitating cause which upon treatment, relieves symptoms. One possible consideration was the post traumatic syrinx. Further investigations for other possible causes would help.

**OP-CR-40**

**Effect of Radiofrequency of the Inferior Turbinates by Surgitron® Dual Frequency on Olfaction and Taste**

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**Background/Hypothesis:** Radiofrequency of the inferior turbinates (RFIT) is a popular treatment modality for persistent nasal blockage secondary to hypertrophic inferior turbinates. It is highly effective, minimally invasive with low complication rates, and can be performed in an outpatient clinic without the need for hospitalisation, general anaesthesia and with minimal downtime. The aim of this study is to investigate the effects of RFIT on olfaction and taste sensation

**Methods:** A prospective observational study at an otolaryngology department of tertiary referral hospital in Singapore has been undertaken. Patients were assessed before and up to 2 months after RFIT (by Surgitron® Dual Frequency RF/120 IEC) using Sniffin' Sticks extended test battery and basic taste test. Other factors evaluated include and skin prick test, symptoms score using visual analogue scale (VAS) and sino-nasal outcome test (SNOT22), clinical examination, and acoustic rhinometry.

**Results:** Fifteen patients (13 men, 2 women) were included. Mean age was 28.5 years. Skin prick test was allergy positive for all but 2 patients. There was a statistically significant improvement of VAS for symptoms of blockage ( $P < 0.001$ ), SNOT22 scores ( $P < 0.01$ ), and acoustic rhinometry results ( $P < 0.01$ ). Patients with hyposmia ( $n = 9$ ) showed improvement at one week ( $P < 0.05$ ), but not at 8 weeks after RFIT ( $P > 0.05$ ). Four patients (2 normal, 2 hyposmic) showed insignificant reduction in their smell scores ( $P > 0.05$ ). There was no significant alteration of taste in any of the subjects ( $P > 0.05$ ).

**Discussion & Conclusion:** RFIT is a safe and simple procedure that relieves symptoms of nasal blockage in patients with hypertrophic inferior turbinates. This study shows no evidence to suggest that RFIT have negative impact on olfaction although its benefits for patients with hyposmia are yet to be determined.

**OP-CR-41**

**Presbycusis and Vestibular Dysfunction in the Singapore Elderly Population**

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**Background/Hypothesis:** Amongst the elderly population, the prevalences of presbycusis and vestibular dysfunction have been reported by several population-based studies. There is no strong evidence in the literature to support an association between vestibular and cochlear dysfunction amongst the elderly. The aim of the current study is to determine the prevalence of vestibular dysfunction amongst the Singapore elderly, and its association with presbycusis and age.

**Methods:** This is a cross-sectional study undertaken in a tertiary Otorhinolaryngology institute and in the community. All consecutive healthy adults aged 40 and above who can walk and stand independently, and all participants of the institution's community presbycusis screening programme, were invited to participate. The main outcome measures consist of demographic data, otological assessment including pure-tone audiometry, and vestibular assessment with modified Clinical Test of Sensory Interaction on Balance.

**Results:** Prevalence of vestibular dysfunction and presbycusis in our study population of 216 subjects are 30.1% and 55.6%, respectively. (Median = 60, range, 40 to 86). Adjusted odds of vestibular dysfunction increases significantly by 6.2% with every year of life ( $P < 0.05$ ) and 3.14 times with the presence of presbycusis ( $P < 0.05$ ).

**Discussion & Conclusion:** Whilst the implications of presbycusis in healthcare has been extensively researched, vestibular dysfunction and its associated morbidity amongst the elderly has not been investigated thus far. Vestibular dysfunction is independently associated with age and with presbycusis. As such, the benefits of screening the elderly with presbycusis for vestibular dysfunction, which may be ameliorated with vestibular rehabilitation, warrants further research.

## OP-CR-42

### Risk Factors of Vestibular Dysfunction in the Elderly

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**Background/Hypothesis:** Balance dysfunction can be incapacitating and can lead to adverse outcomes such as falls. The inner ear vestibular system is an essential contributor to balance control, yet very little is known about the risk factors contributing to vestibular dysfunction (VD). The aim of this study is to determine the risk factors of VD in the elderly population.

**Methods:** A cross-sectional study has been undertaken in a tertiary Otorhinolaryngology institute and in the community. All consecutive healthy adults aged 40 and above who can walk and stand independently, and all participants of the institution's community presbycusis screening programme are invited to participate. The main outcome measures consist of sociodemographic data, medical history, vestibular assessment with modified Clinical Test of Sensory Interaction on Balance.

**Results:** Two hundred and sixteen subjects were assessed (92% Chinese). Diabetes ( $n = 30$ ) was initially associated with a significantly increased odds of having VD (odds ratio 3.76,  $P < 0.05$ ), but after adjusting for age and presbycusis, the odds decreased and was no longer significant ( $P = 0.068$ ). Hypertension ( $n = 85$ ), hypercholesterolaemia ( $n = 75$ ), cardiac disease ( $n = 14$ ), stroke ( $n = 7$ ), and smoking ( $n = 55$ ) have all demonstrated increased odds for VD, though insignificant ( $P > 0.05$ ). Tinnitus ( $n = 54$ ) and non-specific dizziness ( $n = 68$ ) had reduced odds of having VD but again insignificant ( $P > 0.05$ ). Vertigo ( $n = 33$ ) and history of fall ( $n = 22$ ) increased odds of VD but insignificant ( $P > 0.05$ ).

**Discussion & Conclusion:** This study has not shown sociodemographic and medical risk factors of VD. However, the trends exhibited are generally in agreement with larger scale studies from the US and UK.

## OP-CR-43

### Does Physiological Ageing of the Inner Ear Functions Increase the Risk of Falls?

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**Background/Hypothesis:** The magnitude of fall risk associated with vestibular dysfunction in the elderly has been poorly researched. The objective of this study is to determine whether vestibular dysfunction and presbycusis as a result of ageing is associated with increased risk of falls.

**Methods:** A cross-sectional study has been undertaken. One hundred consecutive healthy adults aged 40 and above who participated in our community presbycusis screening programme were invited to participate in this study. The outcome measures consisted of demographic data, pure-tone audiometry, vestibular assessment with modified Clinical Test of Sensory Interaction on Balance, and fall risk assessment by Berg's Balance Scale (BBS).

**Results:** A BBS score of 54 reflects at least a 6% increased risk of falls ( $n = 30$ ). Every subsequent point drop is associated with a further 6% to 8% increase in fall risk. A higher mean age is associated with an increased fall risk (BBS<54: 71 years old, CI: 67.8 to 73.9; BBS≥54: 60 years old, CI: 57.8 to 31.7). Odds of having a BBS score below 54 is 4.8 times higher among those with vestibular dysfunction ( $n = 27$ ) and 2.4 times for presbycusis ( $n = 45$ ). Multivariate analysis shows that the association of fall with both vestibular dysfunction and presbycusis were not significant (both  $P > 0.05$ ). However, there is a 14% increase in odds of BBS score below 54 for every additional life year ( $P < 0.05$ ).

**Discussion & Conclusion:** The current study demonstrates no link between vestibular dysfunction and presbycusis with risk of falls in the ageing population. Further studies are necessary to determine the underlying mechanism of age-related increase in risk of fall.

## OP-CR-44

### Asymptomatic Vestibular Dysfunction in the Elderly and Risk of Falls

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**Background/Hypothesis:** The risk of falls in elderly asymptomatic for vestibular dysfunction (VD) has not been determined. This study aims to estimate fall risk in asymptomatic elderly with VD.

**Methods:** This is a cross-sectional study of 100 consecutive healthy adults aged 40 and above who participated in our institution's community presbycusis screening programmes. The outcome measures consisted of demographic data, past medical history, pure-tone audiometry, vestibular assessment with modified Clinical Test of Sensory Interaction on Balance, and fall risk assessment by Berg's Balance Scale (BBS).

**Results:** The prevalence of VD in our study is 27%. A BBS score of 54 reflects at least a 6% increased fall risk. Every subsequent point drop was associated with a further 6% to 8% increase in fall risk. In subjects without presbycusis (55%), dizziness (77%), vertigo (89%), or tinnitus (89%), the odds of BBS score less than 54 is 14.6, 4.26, 3.64 and 3.87 times higher respectively if VD is present ( $P < 0.05$ ). These odds are 5.02 higher among those without falls (79%), 4.99 if never hospitalised for a fall (89%), and 5.35 in those without falls affecting mobility for at least 3 days (82%;  $P < 0.05$ ). Without dizziness, vertigo, tinnitus, history of falls and presbycusis combined (29%), the odds are 28 times higher if VD is present ( $P < 0.05$ ); age was found not to be a confounder. Among the various comorbidities (e.g. diabetes, hypertension, high cholesterol, heart disease and smoking history), the presence of VD does not predict fall.

**Discussion & Conclusion:** The presence of VD, even without symptoms, increases the risk of fall in healthy adults aged 40 or above. The cost-effectiveness and need to identify VD in the asymptomatic aged population to prevent falls and associated morbidity requires further studies to elucidate.



**OP-CR-45**

**Fungal Rhinosinusitis: Prevalence and Spectrum in Singapore.**

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**Background/Hypothesis:** Fungal rhinosinusitis is a general term which describes a spectrum of pathologically, immunologically, and clinically different disease entities affecting the paranasal sinuses where fungus is thought to be the major potential aetiology. The exact underlying mechanisms which fungus can elicit various sinus diseases are not fully understood. The objective of this article is to determine the incidence and spectrum of fungal rhinosinusitis affecting adults in Singapore and compare our findings with other countries.

**Methods:** A respective review of the clinical charts, radiological and laboratory results, and operative reports of all patients who underwent endoscopic sinus surgery at an ENT Department of a tertiary referral institute in Singapore over a 5-year period was undertaken.

**Results:** Forty-four patients fit the criteria for the diagnosis of fungal sinusitis, accounting for an incidence of 8.3% among patients undergoing endoscopic sinus surgery for rhinosinusitis. Twenty (45.5%) were allergic fungal rhinosinusitis and 24 (54.5%) were fungal balls. Invasive fungal rhinosinusitis has not been encountered. Clinical presentation, investigations, and management of both groups of patients are discussed.

**Discussion & Conclusion:** Fungal sinusitis is not uncommon in Singapore. Fungal ball is the commonest form, followed by allergic fungal rhinosinusitis. The invasive type was not encountered in this series, possibly due to early detection and management of sinusitis in the high risk group of immunocompromised patients in our institute.

## OP-CR-46

### Family Caregivers' Choice of Care Setting for Persons with Dementia

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**Background/Hypothesis:** To examine the factors associated with a family caregiver's choice of care setting (own home versus nursing home) to care for a relative with dementia.

**Methods:** Cross-sectional study of main caregivers from a dementia clinic and the local Alzheimer's Association. Main caregivers were family members aged  $\geq 18$  years primarily responsible for the decision-making and care for the person with dementia (PWD) for  $\geq 6$  months. Caregivers completed a questionnaire that collated information on demographics, choice of care setting, as well as measures of caregiver variables (Gain in Alzheimer's care Instrument, General Health Questionnaire, Short Sense of Competence Questionnaire, Zarit Burden Interview) and PWD factors (stage of dementia and Revised Memory and Behavioural Problems Checklist). Multiple logistic regression was performed to identify variables associated with the outcome of interest.

**Results:** The study sample comprised 266 caregivers. The majority were Chinese (94.7%), female (73.6%), children of the PWD (69.2%). Significant proportions of them were working (61.3%) and assisted in their caregiving role (52.8%) by a foreign domestic worker. Most caregivers (85.7%) preferred to look after the PWD at home with only 14.3% opting for nursing home. Caregivers who preferred nursing home were more likely to be working (Odds Ratio [OR] = 6.36, CI: 2.12 to 19.1), had no domestic maid (OR = 3.27, CI: 1.46 to 7.33), experienced lower caregiver gain (OR = 0.935, CI: 0.882 to 0.992) and more behavioural problems in PWD (OR = 1.01, CI: 1.01 to 1.02).

**Discussion & Conclusion:** The presence of a dedicated caregiver at home, either the family caregiver or a domestic maid, was protective in preventing institutionalisation. Strategies in dementia care must first address the fundamental requisite of provision of such a carer. Caregiver gain is also protective and provides an effective target for intervention. Singapore's reliance on foreign domestic worker is unique. Research on its impact on the care of PWD is needed.

**OP-CR-47**

**Spatial Analysis of Ambulance Response Times Related to Pre-Hospital Cardiac Arrests in the City State of Singapore**

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**Background/Hypothesis:** The role of ambulance response timing with respect to pre-hospital cardiac arrests is clearly important. Driving this is the fact that early initiation of treatment has an important effect on outcomes and survival. The main aim of this study was to establish the spatial variation in ambulance response times for pre-hospital cardiac arrests in the city-state Singapore.

**Methods:** The study design was observational and ecological in nature. Data on pre-hospital cardiac arrests were collected from a nationally representative database between October 2001 and October 2004. We used the Conditional Autoregressive (CAR) model to analyse the data. Within the Bayesian framework of analysis, we used a Weibull regression model that took into account spatial random effects. The regression model was used to study the independent effects of each covariate.

**Results:** Our results showed that there was spatial heterogeneity in the ambulance response times in Singapore. Generally, areas in the far outskirts (suburbs), such as Boon Lay (in the west) and Sembawang (in the north) fared badly in terms of ambulance response times. The findings remained largely unchanged even after we adjusted for key covariates. Ambulance response time was also associated with better traffic conditions, weekend out-of-hospital cardiac arrests (OHCA) and pre-hospital cardiac arrests occurring during non-peak driving hours. For instance, the hazard ratio for good ambulance response time when traffic was light was 2.35 (95% CI: 1.97 to 2.81) and 1.72 (95% CI: 1.51 to 1.97) when moderate as compared to heavy traffic.

**Discussion & Conclusion:** We found a clear spatial gradient for ambulance response times with far-outlying areas exhibiting poorer response times, which persisted after we had accounted for significant covariates. Our study highlights the utility of this novel approach which may be helpful for planning EMS and public emergency responses.

## OP-CR-48

### Ethnicity Modulates Obesity-Related Metabolic Pathways

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**Background/Hypothesis:** Obesity is an important risk factor for metabolic and cardiovascular diseases. However, the manifestations of these diseases in relation to obesity may differ in various ethnic groups. In this study, we examine whether ethnicity modulates the relationship between obesity and 3 established pathways (insulin resistance, inflammation and adiponectin) that are involved in the pathogenesis of diabetes mellitus and CVD.

**Methods:** A cross-sectional population study of 5422 Chinese, Malays and Asian-Indians participants living in Singapore. Insulin resistance (IR) was assessed by the HOMA, and C-reactive protein (CRP) and adiponectin by ELISA method. Linear regression lines were plotted for ln(IR), ln(CRP) or ln(adiponectin) against body mass index (BMI). The cross-product interaction term, ethnicity\*BMI was included as an independent variable to test for ethnic differences in the relationship between BMI and IR, CRP or adiponectin.

**Results:** In both uni- and multi-variate analyses, BMI was positively associated with IR and CRP, but negatively with adiponectin. Compared with Chinese or Malays, Asian-Indians had higher BMI, IR and CRP but lower adiponectin levels. However, the gradients of the regression lines for Chinese were significantly steeper than that of Malays or Asian-Indians, for the relationship between IR, CRP and adiponectin to BMI.

**Discussion & Conclusion:** Our findings confirm that Malays and Asian-Indians have more unfavourable risk profiles when matched for age and BMI. However, the impact of obesity on the risk of metabolic and cardiovascular diseases is greater in Chinese compared with other ethnic groups. It is possible that, with increasing adiposity, Chinese will surpass other ethnic groups in terms of the burden of these diseases.

**OP-CR-49**

**Haemorrhage in Subcondylar Mandible Fractures: An Anatomical Perspective**

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**Background/Hypothesis:** Mandible fractures are common occurrences in patients who have sustained blunt facial trauma. The commonest unilateral fracture in the mandible occurs at the subcondylar region, while the commonest bilateral fractures occur at the condylar heads. The intrinsic biomechanical weakness of the condyle and subcondylar regions predisposes this to fractures. The internal maxillary artery lies in close relation to the medial cortex at the subcondylar region and is at risk of injury during the initial trauma or subsequent surgery. The internal maxillary artery is the largest terminal branch of the external carotid artery and control of haemorrhage can be a technical challenge.

**Methods:** The authors describe a case in which internal maxillary artery haemorrhage was encountered during operative fixation of the subcondylar mandible fracture

**Results:** Direct surgical ligation of the internal maxillary artery was successfully done after control of the external carotid artery was performed through a neck incision.

**Discussion & Conclusion:** Given the close anatomical relationship between the medial mandible cortex and the internal maxillary artery, injury to this artery is likely to be an underappreciated phenomenon. The authors discuss the detailed anatomy in this region and the recommended management in such cases.

**OP-CR-50**

**Regular Myocardial Perfusion Imaging for Detection of Inducible Myocardial Ischaemia in Asymptomatic Kidney Transplant Recipients**

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**Background/Hypothesis:** Regular myocardial perfusion imaging (MPI) for pre-emptive detection of inducible myocardial ischaemia (IMI) in asymptomatic kidney transplant recipients (KTRs) has not been evaluated. We hypothesise that regular MPI in KTRs allows identification and early intervention in patients with high risk of major adverse cardiovascular events (MACE).

**Methods:** Two hundred and thirteen KTRs who were transplanted from 2000 to 2008, with no prior coronary heart disease (CHD), were subjected to 2 to 3 yearly MPI. CHD risk factors, MPI results, and incidence of MACE were analysed up till occurrence of IMI; abnormal coronary angiogram with stenosis >50%; MACE (includes myocardial infarction, heart failure, coronary revascularisation); graft loss and death. Follow-up duration ranged from 1.5 to 10 years.

**Results:** The cohort consists of 58% males, median age 44 years, who received cyclosporine (48%) or tacrolimus (50%), with corticosteroids, with or without mycophenolate. Thirty-eight patients had IMI, median 3 years post transplant. Cumulative % of patients with IMI at 3, 5, 10 years, were 11.9%, 15.4%, and 17.8%, respectively, with corresponding cumulative % incidence of MACE at 3%, 3.5%, and 5.2%. 23.1% of patients with new onset diabetes after transplantation (NODAT) had IMI, median 2 years after onset of NODAT. Of these, 30.5% had diabetes mellitus which was associated with moderate/severe IMI ( $P = 0.03$ , chi-square). Depressed post stress ejection fraction ( $P = 0.00$ , logistic regression) and moderate/severe IMI ( $P = 0.00$ , chi-square) were associated with MACE and abnormal coronary angiogram. Negative predictive value of MPI for MACE was 98.3%; but positive predictive value was 21.1%, which improved to 42.9% if only moderate/severe IMI was considered.

**Discussion & Conclusion:** Regular MPI is not an effective screening tool for MACE in asymptomatic KTR. There is an early occurrence of MACE in patients with NODAT, and within 3 years post kidney transplant. This selected population might benefit from early post-transplant cardiovascular evaluation.

## OP-CR-51

### Rhinoscleroma: A Case Series

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**Background/Hypothesis:** Rhinoscleroma is a chronic, slowly progressive, inflammatory disease of the upper respiratory tract. Rhinoscleroma is endemic to regions of Africa, Southeast Asia, Mexico, Central and South America, and Central and Eastern Europe. This disease is associated with *Klebsiella rhinoscleromatis* infection.

**Methods:** We present the clinical and pathological features of 4 patients with rhinoscleroma at National Skin Centre, Singapore, diagnosed between 1997 and 2010.

**Results:** All our patients presented with only cutaneous involvement of the disease and diagnosis was clinched via histological examination. The patients were treated with a combination of antibiotics including ciprofloxacin and doxycycline. One patient had additional co-trimoxazole, dapsone and rifampicin treatment, as well as intralesional gentamicin injections. Of the 4 patients, 2 were lost to follow-up, and 2 patients currently on follow-up have shown good response to antibiotic treatment.

**Discussion & Conclusion:** Rhinoscleroma is a diagnostic challenge as it is not endemic in Singapore or Malaysia. We wish to highlight this condition to raise awareness and aid in early diagnosis of patients. Without treatment, this condition can result in significant complications including involvement of the lower airways. Early diagnosis and appropriate treatment reduces morbidity caused by the disease.

## OP-CR-52

### Evaluation of Standardised Teaching in Computed Tomography Measurement of Orbital Fractures

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**Background/Hypothesis:** Orbital defect size determination from computed tomography (CT) scans affects the decision to operate and postoperative outcomes. We hypothesised that a standardised teaching will improve the sensitivity of orbital fracture detection and accuracy of orbital fracture measurements on CT.

**Methods:** Forty cases with orbital fractures were randomly selected from a National University Hospital database from January 2000 to February 2010. Five readers with no prior experience in CT interpretation of orbital fractures underwent training by a senior oculoplastic surgeon. The readers subsequently interpreted 20 cases and compared the results to a pre-teaching set, with verification of the measurements by the expert reader.

**Results:** The overall sensitivity of orbital fracture detection increased after teaching from 74.7% to 78.7%. The greatest increase in sensitivity was for the orbital roof fractures. The overall sensitivity of orbital fracture detection was highest for orbital floor fractures, both before and after teaching. The proportion of fractures correctly detected within 2 mm of the expert reader's measurements increased from 22.3% pre-teaching to 25.1% post-teaching. This increase was greatest for the lateral dimension of orbital floor fractures. The sensitivities of orbital roof and medial wall fracture detection were the lowest both before and after teaching, which necessitates greater emphasis in the teaching of the detection of these fractures on CT.

**Discussion & Conclusion:** Standardised teachings in CT measurements of orbital fractures have resulted in an improvement in the accuracy of orbital fracture measurements and the overall sensitivity of orbital fracture detection. These may be useful for orbital CT interpretations, particularly in identifying fracture landmarks used for fracture dimension measurements. Knowledge of the size of orbital fracture defect will influence the need for surgery and the postoperative outcome.



## OP-CR-53

### Clinical Study: A Case Series of 20 Patients with T4 Thyroid Carcinomas

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**Background/Hypothesis:** Thyroid cancer is the tenth commonest cancer in Singaporean females. This study aims to examine the characteristics of patients who present with T4 tumours.

**Methods:** Twenty patients with T4 tumours detected on postoperative histology from 1998 to 2009 in Tan Tock Seng Hospital were retrospectively studied. They were compared for demographics, presentation of disease, pathology of disease, management and survival rates.

**Results:** The study population comprised 13 females and 7 males. Age ranged from 26.6 to 83.4 (median age = 64.4 years). Sixteen presented with a neck mass, 9 with a hoarse voice, 6 with compressive symptoms and 2 with distant metastasis (one to the lung and sternum, the other to the liver). Twelve had palpable cervical lymph nodes. On final histology, there were 12 papillary, 6 anaplastic, 1 medullary and 1 follicular carcinoma. Eight had to undergo tracheal resection with significant residual morbidity; there were 2 deaths, 3 with residual carcinomas, and only 3 who were cured. There were 6 deaths in total, 5 due to thyroid carcinoma (3 anaplastic, 2 papillary carcinomas). Three were alive with disease when last followed up. Eleven remained disease free.

**Discussion & Conclusion:** Despite the limited sample size of T4 thyroid cancer patients, there are a significantly higher proportion of males (35.0% vs 23.0%) and higher median age (64.4 vs 49.5) in T4 carcinomas as compared to thyroid carcinomas of all T stages. T4 tumours are also more likely to be anaplastic (30.0% vs 6.8%). Despite being classified as T4 tumours postoperatively, clinical staging only detected half of these. Mortality is 30.0% vs 8.5%.

## OP-CR-54

### Usage of Navigation Techniques in Improving Outcomes after Orbital Fracture Surgery

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**Background/Hypothesis:** The presence of postoperative complications in orbital fracture surgery often necessitates a corrective second operation, which costs SGD\$5500. Usage of navigational techniques reduces postoperative complications and minimises the need for a second operation, providing economic savings and improving surgical outcomes for the patient. The aim of this study is to determine if navigational techniques improve surgical outcomes after orbital fracture surgery.

**Methods:** Eighteen patients who underwent surgery with the aid of BrainLab were selected from a database of patients with orbital wall fractures. Another 18 matched controls were selected from the same database. Both groups were matched for age, sex, ethnicity, type of orbital injury sustained and severity of other injuries. Type of injury sustained was measured by location of wall fracture and severity of fracture. Severity of other injuries was measured by Glasgow Coma Scale and presence of pre-operative clinical characteristics including diplopia and enophthalmos. Surgical outcome was determined by presence of post-operative complications such as diplopia, enophthalmos, limited gaze, infra-orbital nerve hypoesthesia and visual loss.

**Results:** Out of the 18 patients from the study group, 9 patients developed complications (50%) 1 month post-surgery. Two out of the 9 patients had persistent complications 12 months post-surgery (11%). Of the 18 patients from the control group, 14 had complications (78%) 1 month post-surgery. Seven out of the 18 patients had persistent complications 12 months post-surgery (39%).

**Discussion & Conclusion:** As seen from the results, the proportion of patients with complications initially at 1 month is fewer in the study group (50%) compared to the control (78%). Although there were improvements in both groups over the 12 months, the study group has a fewer proportion of patients with complications (11%) compared to the control (39%) at the end of study. This small study shows that the usage of navigation techniques improves surgical outcomes for patients with orbital fractures by minimising duration of surgery and postoperative complications. A larger study is currently being conducted.

## OP-CR-55

### Dental Development of Cleft Lip and Palate Children in Singapore

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**Background/Hypothesis:** Cleft lip and palate (CLP) is the most common craniofacial abnormality and the fourth most common birth defect in Singapore. It has been widely reported that children with CLP are commonly associated with delayed dental development and asymmetrical rate of tooth formation. However, to date, there has been no study carried out to investigate the dental development of CLP children in Singapore. The hypothesis of this study is that CLP children have a delayed dental development and higher frequency of asymmetrical tooth-pair formation than non-CLP children in Singapore.

**Methods:** Forty-five unilateral CLP children of ages 5 to 9 years old and a non-CLP control group matched for age, gender and race were investigated. Dental records and radiographs were studied. The patient's dental age and formation stage of every individual permanent tooth were determined using the Demirjian's method (1973).

**Results:** The mean chronological age for CLP and non-CLP children was  $6.5 \pm 0.9$  years. The mean dental age for CLP and non-CLP children was  $6.9 \pm 0.8$  years and  $7.5 \pm 0.9$  years, respectively. Thus, the dental development in CLP group was delayed by a mean of  $0.6 \pm 0.7$  year compared to the control group and this delay was found to be statistically significant ( $P < 0.0001$ ). No significant gender difference ( $P > 0.05$ ) in dental development was found in both the CLP and control groups. Of 596 pairs of teeth in the CLP group, 133 pairs (22.3%) developed asymmetrically. This was significantly ( $P < 0.0001$ ) more than the findings of 36 asymmetrically developing tooth pairs found in 621 tooth pairs (5.8%) of the control group.

**Discussion & Conclusion:** CLP children demonstrated delayed dental development and higher frequency of asymmetrical tooth-pair formation than non-CLP children in Singapore.

## OP-CR-56

### Management of Osteoporosis: A Local Survey

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**Background/Hypothesis:** Osteoporosis is a major problem in an ageing society like Singapore. Fractures in these patients often result in serious morbidity and mortality. Effective prevention and treatment of osteoporosis is of great public health concern and general physicians (GPs) play a crucial role in managing patients in the community. This study aims to evaluate the use of pharmacological therapy in treating osteoporosis by GPs.

**Methods:** A self-administered questionnaire was sent out to GPs linked to the National Healthcare Group cluster. The survey collected information on the background characteristics of the GPs and their practices in osteoporosis management. Statistical analysis was performed with SPSS version 16.

**Results:** Responses of 107 GPs who participated in the survey were analysed. The modal (33.7%) age range of our participants was 51 to 60 years of age. Clinical Practice Guidelines (CPG) was the most widely used (60.4%) source of reference for recommendations on osteoporosis treatment. Bisphosphonates was the drug of choice (98.1%) with Alendronate being the most commonly (75.2%) prescribed. Only 13.1% of GPs would treat patients with bisphosphonates for more than 5 years. Although 96.0% (n = 97) of GPs would do a Bone Mineral Density (BMD) scan before starting patients on bisphosphonates, only about half (59.8%,  $P = 0.0538$ ) would do a BMD scan after. Most GPs (92.9%) would consider a drug holiday but there is no consensus in the indications for doing so.

**Discussion & Conclusion:** As osteoporosis therapy is constantly updated, more can be done to increase awareness and uptake of guidelines in GPs. Timely revisions of CPG may be necessary. An objective evaluation of osteoporosis management nation-wide should be considered to identify discrepancies and steer directions for research targeted at achieving cost-saving and efficacious therapy for patients especially in the primary care setting.

**OP-CR-57**

**Employment and Early Intervention Psychosis: Early Psychosis and Intervention Programme Experience**

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**Background/Hypothesis:** Early intervention in psychosis is associated with better outcomes. This led to the inception of the early psychosis and intervention programme (EPIP) in Singapore, a 2-year intervention programme, which has since been associated with better clinical and psychosocial outcomes. The aim of the study was to determine the socio-demographic and clinical predictors of employment in a cohort of patients with first-episode psychosis.

**Methods:** This was a naturalistic database study over a period of 2 years. All patients with first-episode psychosis accepted into EPIP who had their employment status captured at baseline and endpoint (Year 2) were included. Employment status was classified into 3 groups: those who were competitively employed, in non-labour force work, or unemployed. Multinomial regression was used to determine the predictors of employment status at baseline and at 2 years.

**Results:** Two hundred and seventy patients were included in the final analysis.

Age, marital status, as well as duration of untreated psychosis (DUP) were factors that were significantly associated with employment status at baseline. At the end of 2 years, age, marital status and highest level of education were significantly associated with employment status. The significant association between DUP and employment status was not found at 2 years. Those with higher global assessment of functioning (GAF) scores at endpoint were also more likely to be employed.

**Discussion & Conclusion:** Greater emphasis on early intervention psychosis is imperative because prolonged untreated illness has considerable association with employment status. A patient's age, marital status and GAF scores are also useful indicators for employment opportunities.

**OP-CR-58**

**Evaluation of Newborn Screening Practices among Paediatricians Practising in the Private Sector in Singapore**

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**Background/Hypothesis:** Universal screening for disease prevention is available as part of holistic care for all newborns. Newborn screening tests, including those for hearing impairment and inborn errors of metabolism (IEM) are carried out in many centres locally with differing screening rates ranging from 24% to 100%. Our study aims to explore the private sector paediatricians' understanding of screening for hearing impairment and IEMs as well as their hearing screening practices to identify factors that may impact the differing screening rates.

**Methods:** An email was sent to several private paediatricians who are involved in newborn care, inviting them to participate in an online survey questionnaire on their knowledge with regards to hearing impairment and IEM and their hearing screening practices. The results were collated and analysed.

**Results:** About two-thirds of the paediatricians surveyed regularly conduct neonatal screening. Knowledge with regards to the strategy and techniques of screening for hearing impairment and IEM amongst practicing paediatricians was adequate. However other factors such as the high cost of the IEM test (60%) and the long turn-around time (20%) were cited as concerns.

**Discussion & Conclusion:** Knowledge of screening for hearing impairment and IEM amongst private paediatricians was adequate and appropriate practices as per managing guidelines were adhered to. However, for IEM screening, the perceived expense incurred and the long turn-around time may account for the suboptimal screening rates. Addressing the cited concerns may help to improve screening rates so that universal screening will eventually be available for all newborns in Singapore.

## OP-CR-59

### **Staphylococcus Species Peritonitis: Reconsideration of Antibiotic Treatment?**

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**Background/Hypothesis:** Gram positive peritonitis remains a frequent complication of peritoneal dialysis (PD) in children. This study aimed at evaluating the incidence of methicillin-resistance rates in *Staphylococcus* species peritonitis in paediatric patients on automated PD (APD).

**Methods:** Data was retrospectively collected from all APD patients with peritonitis from January 2006 to December 2009. A diagnosis of peritonitis was made based on cloudy effluent with white blood cell count  $>100/\mu\text{L}$  ( $>50\%$  neutrophils). Culture and sensitivity was performed on effluent samples from all episodes. Statistical analysis was performed using 2-tailed independent t-test and chi-square tests.

**Results:** Sixty-four patients (mean age  $17.5 \pm 10.2$  years) underwent APD over the study period of 153.9 patient-years. Fifty percent of patients had at least one episode of peritonitis. During this period, there were a total of 61 episodes which included 2 culture-negative episodes, giving a peritonitis rate of 0.40 episodes per patient-year. Gram-positive peritonitis occurred in 63.2%, with *Staphylococcus aureus* in 10.2% and *Staphylococcus epidermidis* in 37.3%. The overall methicillin-resistance rate of *Staphylococcus* species was 23.7%. Specifically, 59.1% of *Staphylococcus aureus* were methicillin-resistant, while 16.6% of *Staphylococcus epidermidis* were methicillin-resistant.

**Discussion & Conclusion:** *Staphylococcus* species is a common cause of peritonitis in our patients, with a methicillin-resistance rate of  $>20\%$ . We therefore recommend a change in our current empiric first line antibiotics intraperitoneal cefazolin to intraperitoneal vancomycin.

**OP-CR-60**

**Mean Serum Uric Acid Levels Predict Left Ventricular Hypertrophy in Children with Chronic Kidney Disease**

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**Background/Hypothesis:** Cardiovascular events are important causes of morbidity and mortality in paediatric patients with chronic kidney disease (CKD). This study aimed at determining the significant factors present during the period of CKD stages 2 to 5 in paediatric patients, that may affect cardiovascular status at the time of end-stage renal disease (ESRD) defined as initiation of dialysis or pre-emptive transplantation.

**Methods:** Forty-six patients, mean age  $9.70 \pm 6.48$  years at time of diagnosis of CKD and mean CKD duration of  $3.65 \pm 3.74$  years were retrospectively reviewed. The following parameters were studied: age, sex, time-averaged systolic blood pressure index, diastolic blood pressure index, haemoglobin, serum calcium, phosphate, uric acid and intact parathyroid hormone levels. 2D ECHO parameters obtained at time of ESRD included: left ventricular mass index (LVMI), ejection fraction (EF) and fractional shortening (FS). Pearson's correlation analysis was employed. Multivariate linear regression analysis was done with LVMI as the dependent variable.

**Results:** Of the patients, 54.3% had at least one 2DECHO abnormality at onset of ESRD. Severe LVMI ( $>51 \text{ g/m}^2.7$ ) was present in 21.7%. There was significant correlation between SBPi and LVMI ( $r = 0.33$ ,  $P = 0.027$ ), DBPi and both FS ( $r = -0.40$ ,  $P = 0.006$ ) and EF ( $r = -0.42$ ,  $P = 0.004$ ), and uric acid and LVMI ( $r = 0.46$ ,  $P = 0.001$ ). Multivariate linear regression analysis showed that time-averaged uric acid ( $P = 0.002$ ) was a significant predictor of LVMI.

**Discussion & Conclusion:** Subclinical cardiovascular changes occur early in the progression of CKD. Time-averaged serum uric acid independent of elevated blood pressures, appeared to be an important predictor of LVMI at onset of ESRD. This may be related to the long-term proinflammatory effects on vascular cells. Therefore control of uric acid in CKD patients may have a role in improving long-term cardiovascular outcomes.



## OP-CR-61

### Identification Methods in Candidiasis Diagnosis

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**Background/Hypothesis:** Candidiasis is a fungal infection caused by yeasts belonging to the the genus *Candida*. It can cause localised and systemic infection or exist as part of the normal flora in some parts of the human body. Numerous lab identification methods are available, with each test having its own advantages and limitations. To analyse 5 methods for the identification of *Candida* species and evaluate which test or test combinations can be used to achieve accurate results, with optimal turn-around-time, cost-effectiveness and ease of use.

**Methods:** Forty-three *Candida* strains (*C. albicans*, *C. tropicalis*, *C. parapsilosis*, *C. krusei*, *C. glabrata*, *C. guilliermondii*, *C. dubliniensis*) from blood, sterile fluids and mucosal sources were obtained and tested using 5 methods, namely the (1) Germ Tube Test, (2) Chromogenic agar, (3) 1% Carbohydrate (glucose, lactose, maltose, sucrose) fermentation test, (4) Vitek and (5) API 20C AUX. The Cornmeal dalmau plate culture and urease were used as supplementary tests. The performances of these tests were then compared.

**Results:** In our study, the Germ tube test is the most rapid and cost-effective way to screen for *C. albicans*. Chromogenic agar is able to identify *C. albicans* and *C. tropicalis*, but may require up to 48 hours incubation. For the other *Candida species*, API and Vitek performed superior to the sugar fermentation tests, with the Vitek test being more rapid and less labour-intensive.

**Discussion & Conclusion:** *C.albicans*, the most commonly isolated *Candida* species, can be rapidly and reliably screened using the Germ tube test, while a combination test panel approach is utilised for other *Candida* species. Test selection depends on the sample source, clinical significance and diagnosis of the patients.

**OP-CR-62**

**Sensory Deficit Following Greater Auricular Nerve Sacrifice in Parotidectomy Patients**

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**Background/Hypothesis:** The greater auricular nerve (GAN) provides sensory innervation to the skin overlying the lateral face and upper neck and is often sacrificed during parotidectomy. This results in anaesthesia or paraesthesia in the area of supply. Only the pattern of loss of pin-prick sensation has been described in the literature. We conducted a study to determine the patterns of loss of sensations of 3 sensory modalities - pin-prick (PP), fine-touch (FT) and temperature (TP) at 1 week post-parotidectomy. The findings will aid in predicting the loss of sensation post-parotidectomy, facilitate clinical decision-making and patient counselling.

**Methods:** Sensory testing was conducted on 18 subjects who have undergone superficial and total parotidectomies at 1 week postoperation. A 10-gram monofilament, a wisp of cotton wool and a steel rod heated to 70°C were applied to the skin over the head and neck in a grid comprising 1cm by 1 cm units to assess sensations of PP, FT and TP, respectively at each follow-up. Sensory loss was classified into 4 grades – (1) Mild anaesthesia, (2) Moderate anaesthesia (3) Severe anaesthesia and (4) Complete anaesthesia.

**Results:** The mean area of skin with sensory loss was 234 cm<sup>2</sup> for PP, 220 cm<sup>2</sup> for FT and 229 cm<sup>2</sup> for TP, with similar proportions and distributions of the 4 different grades of sensory loss. The ear was more severely affected than the rest of the head and neck, with 68.8%, 50.0%, 50.0% of the affected area having severe or complete anaesthesia for PP, FT and TP, respectively, while only 6.88%, 6.86%, 6.11% of the affected area of the rest of the head and neck had severe or complete anaesthesia for PP, FT and TP, respectively. (A visual representation of the patterns of sensory loss will be presented in the poster.)

**Discussion & Conclusion:** The sensation of a large area of skin of the head and neck is affected by GAN sacrifice. The ear is the most severely affected area of the head and neck. Pin-prick is the sensory modality most severely affected.

## OP-CR-63

### Resting Energy Expenditure in Singaporean Chinese

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**Background/Hypothesis:** Resting energy expenditure (REE) prediction equations are clinically useful in rapidly determining energy needs without requiring time consuming or expensive methods. Accurate prediction of REE in overweight and obese adults is important in establishing attainable goals for dietary intake, leading to effective weight management. Previous studies have shown that the accuracy of an energy prediction equation varies with the ethnicity of the population, however validation studies are lacking in the Chinese adults. The aim of this study was to validate prediction equations for use in Singaporean Chinese overweight and obese men.

**Methods:** Subjects were 48 healthy Singaporean Chinese male subjects of age range 21 to 40 years and body mass index range of 23.0 to 30.0 kg/m<sup>2</sup>. REE measured by indirect calorimetry was compared with REE predicted from the Harris-Benedict (actual and adjusted body weights), Schofield-HW, and Mifflin-St Jeor equations using simple linear regression, paired T-test and Bland-Altman analyses. Accuracy of equations was determined from the percentage of subjects predicted within  $\pm 10\%$  of REE measured, mean percentage difference between predicted and measured REE (bias) and root mean squared prediction error.

**Results:** Significant mean bias was observed for all equations ( $P < 0.001$ ) except the Harris Benedict (adjusted body weight) and Mifflin-St Jeor equations. The Mifflin-St Jeor equation demonstrated the highest percentage of accurate predictions (72.9%), the lowest prediction error (97.8 kcal/day) with a narrow error range (limits of agreement -368.5 and +299.9 kcal/day). The Harris Benedict (adjusted body weight) equation had 62.5% accurate predictions and a low prediction error (109.8 kcal/day), however, it showed the highest percentage of underpredictions (25%).

**Discussion & Conclusion:** Among the equations studied, the Mifflin-St Jeor equation appeared to be the most accurate for estimating REE in Singaporean Chinese overweight and obese men.

## OP-CR-64

### Endoscopic Submucosal Dissection for Colorectal Tumours

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**Background/Hypothesis:** Endoscopic submucosal dissection (ESD), a novel technique for treating superficial neoplastic lesions of the gastrointestinal tract without the use of snaring, was developed over the last few years to increase the en bloc resection rate. Cure is achieved when the tumours are localised without metastases. This is a pilot study aimed to evaluate the efficacy and safety with the introduction of a novel technique in a local tertiary institution.

**Methods:** From April 2009 to March 2010, ESD was performed for 12 patients with colorectal epithelial neoplasms in the National University Hospital by a single expert endoscopist. The rates of curative en bloc resection and incidence of complications were investigated.

**Results:** A total of 12 colorectal epithelial neoplasms were resected by ESD in 11 patients. The mean diameter was 27.7 mm (range, 5 to 85 mm). The rate of en bloc resection was 91.6% (11/12) as one procedure was abandoned upon visualisation of muscle involvement. Curative resection rate was 83.3% (10/12). The rate of complications was 8.33% (1/12). The rate of perforation was 8.33% (1/12), none had haemorrhage requiring transfusion. Of these lesions, 10 were mucosal lesions, 1 had extended into the submucosa and another had extended into the muscularis propria. Histology reported 9 as adenomas, and the other 3 lesions as adenocarcinomas (including the failed en bloc resection).

**Discussion & Conclusion:** The result from this small series is in concordance to the results of ESD performed in colorectal neoplasms in the larger case series published. It has proven to be a useful armamentarium in the endoscopic management of colorectal neoplasms. This pilot study has reinforced the need for a database to enable standardised and adequate data collection for eligible colorectal lesions so as to perform comparative studies against that of larger series published in literature.

## OP-CR-65

### Is There an Association between Functional Dysphonia and Anxiety Disorder?

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**Background/Hypothesis:** Functional dysphonia, defined as hoarseness in the absence of a neurological or structural laryngeal pathology, is a common yet enigmatic and controversial disorder encountered in multidisciplinary voice clinics. Functional dysphonia has been attributed to a combination of many factors, including certain psychological traits, vocal abuse/misuse and compensation for underlying disease. The aim of this study is to determine whether anxiety is associated with functional dysphonia.

**Methods:** All consecutive patients attending a tertiary otolaryngology centre multidisciplinary voice clinic with newly diagnosed functional dysphonia over a month period in 2010 were included. Demographic data, questionnaire comprising of the Voice Handicap Index (VHI), Clinical Anxiety Scale (CAS) and Reflux Symptom Index (RSI) were compiled. Laryngostroboscopy findings and the Reflux Finding Score (RFS) were recorded.

**Results:** A total of 59 patients were included (19 male, 40 female, mean age = 48.83 years). Linear regression with VHI as the dependent variable showed a moderate correlation between CAS and VHI (R square = 0.087,  $P = 0.025$ , B coefficient = 0.685).

**Discussion & Conclusion:** Anxiety accounted for 8.7% of the change in VHI, and as such this is in line with the current belief that the etiology of functional dysphonia is a multifactorial. However, at present, only a few treatments of functional dysphonia deal with the psychological aspects. As such, with further investigations, there may be a role for speech physiotherapy emphasising psychological interventions such as relaxation therapy/massages or cognitive behavioural therapy in the treatment of this condition.

**OP-CR-66**

**Is There an Association between Functional Dysphonia and Type A Personality?**

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**Background/Hypothesis:** Functional dysphonia, hoarseness in the absence of a neurological or structural laryngeal pathology, is a common yet enigmatic and controversial disorder encountered in multidisciplinary voice clinics. Functional dysphonia has been attributed to a combination of many factors, including certain psychological traits, vocal abuse/misuse and compensation for underlying disease. The aim of this study is to determine whether type A personality is associated with functional dysphonia.

**Methods:** All consecutive patients attending a tertiary otolaryngology centre multidisciplinary voice clinic with newly diagnosed functional dysphonia over a 5-month period in 2010 were included. Demographic data, questionnaire comprising of the Voice Handicap Index (VHI) and Bortner's Scale were compiled. Laryngostroboscopy findings and the Reflux Finding Score (RFS) were also recorded.

**Results:** A total of 59 patients were included (19 male, 40 female, mean age = 48.83 years). Linear regression was applied with VHI as the dependent variable. We found that there was no conclusive evidence for the correlation between the Bortner's scale and VHI (Rsquare = 0.004,  $P = 0.623$ , B Coefficient = 0.053).

**Discussion & Conclusion:** Bortner's Scale is one of the widely used questionnaires for diagnosing type A personality, and has been proven to have a good degree of concurrent and predictive validity. However, based on our results, there is no evidence to support an association between type A personality and functional dysphonia.

**OP-CR-67**

**Is There an Association between Functional Dysphonia and Laryngopharyngeal Reflux?**

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**Background/Hypothesis:** Functional dysphonia is defined as hoarseness in the absence of a neurological or structural laryngeal pathology. It has been attributed to a combination of many factors, including acid reflux, certain psychological traits and vocal abuse/misuse. It has been proposed that laryngopharyngeal reflux causes the tightening of the laryngopharyngeal constrictor muscles due to the airway protective mechanism. Thus the aim of this study is to determine whether laryngopharyngeal reflux is associated with functional dysphonia.

**Methods:** All consecutive patients attending a tertiary otolaryngology centre multidisciplinary voice clinic with newly diagnosed functional dysphonia over a 5-month period in 2010 were included. Demographic data, questionnaire comprising the Voice Handicap Index (VHI) and Reflux Symptom Index (RSI) were compiled. Laryngostroboscopy findings and the Reflux Finding Score (RFS) were jointly determined by an otolaryngologist and a speech therapist.

**Results:** A total of 59 patients were included (19 male, 40 female, mean age = 48.83 years). Linear regression was applied with VHI as the dependent variable. A moderate positive correlation between VHI and RSI was found ( $R^2 = 0.098$ ,  $P = 0.016$ , B coefficient = 0.391) and no conclusive results between VHI and RFS ( $R^2 = 0.053$ ,  $P = 0.08$ , B coefficient = -0.445).

**Discussion & Conclusion:** The current results suggest that RSI, based upon the patient's perception of reflux, has a positive correlation with VHI, which is the patient's impression of his/her severity of dysphonia, with 10% of VHI accounted by RSI. No conclusive association can be found between VHI and RFS based on stroboscopic assessment by the clinical team. Therefore, whilst the patient's own perception of reflux correlates well with the severity of dysphonia, the clinical signs of acid reflux do not. Such conflicting results will require further studies to determine the role of acid reflux in the pathogenesis of functional dysphonia.

## OP-CR-68

### A 10-Year Review of Submandibular Gland Operations in an Asian Population

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**Background/Hypothesis:** The prevalence of malignancy in the submandibular gland in the Asian population has been reported to be low (13.5% to 21.1%). This is in contrast with Western populations where the prevalence of malignancy in submandibular gland neoplasia ranges from 33.3% to 78.2%.

This study aimed to determine the prevalence of submandibular gland infections and neoplasia in an Asian population. It also evaluated the accuracy of fine needle aspiration cytology (FNAC) and computed tomography (CT) scans in diagnosing submandibular gland pathologies.

**Methods:** A 10-year retrospective study of 150 submandibular gland operations between 2000 and 2010 was conducted. Data on demographic profile, clinical impression, investigative (FNAC and CT), histopathological findings, and surgical techniques were collected.

**Results:** The prevalence of submandibular gland neoplasia was 28.7%, of which 18.6% were due to malignancy. Infection of the submandibular gland accounted for 21.3% of the operations conducted.

FNAC was a valuable preoperative investigation for benign submandibular neoplasia (sensitivity: 91.3%, specificity: 88.9%) and malignant submandibular neoplasia (sensitivity: 100%, specificity: 90.9%). Among the investigations used, CT scans were valuable in diagnosing malignant submandibular neoplasia with a sensitivity of 83.3% and specificity of 80.6%. Both FNAC and CT scans were inaccurate in diagnosing sialadenitis.

Clinical impression was useful in assessing for malignancies. In diagnosing the presence of calculi, clinical impression was 77.3% sensitive and 85.4% specific, while histopathology was 61.1% sensitive and 94.2% specific.

**Discussion & Conclusion:** The prevalence of malignant submandibular neoplasia in the Asian population is low, in keeping with previous studies. Both FNAC and CT were accurate in diagnosing malignant submandibular neoplasia, but were not useful in diagnosing sialadenitis. In addition, FNAC was useful in diagnosing benign submandibular gland neoplasia.



## OP-CR-69

### Extrahepatic Source of Liver Progenitor Cells

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**Background/Hypothesis:** Induced pluripotent cells are able to switch fate determination when extracellular conditions are changed. We hypothesise that epithelial cells from the amniotic and gastric sources are potentially capable of differentiating into liver cell lineages.

**Methods:** Amniotic and gastric epithelial cells were isolated and cultured using CSHFM (William's E media supplemented with ITS+, dexamethasone, EGF) and differentiation media (CSHFM supplemented with Oncostatin-M and HGF). They were characterised for liver and epithelial markers using RT-PCR and immunofluorescence, and albumin secretion was measured by ELISA.

**Results:** Amniotic epithelial cells were more mesenchymal-like than epithelial in its undifferentiated state. RT-PCR showed that cells at source were negative for albumin, CK19, EpCAM and E-cadherin. Upon slow differentiation with CSHFM, a pro-hepatocytic media, cell morphology became more epithelial with visible tight junctions. Albumin was secreted at Day 38, and cells were positive for all the markers mentioned by Day 46, with colocalisation of albumin and EpCAM as seen using immunofluorescence. Using differentiation media, earlier albumin secretion at Day 28 was detected.

Gastric epithelial cells were positive for CK19, EpCAM and E-cadherin and were able to maintain fibroblast-free culture up to Day 50 (3 passages). Albumin production was absent at source, but was present by Day 14. In contrast, E-cadherin was present at source but diminished by Day 50. Using differentiation media, cells increased in size and became polygonal in shape and earlier albumin secretion was detected.

**Discussion & Conclusion:** By changing the environmental cues, we were able to differentiate amniotic and gastric epithelial cells into hepatocyte-like cells. Although more extensive functional analyses are still underway, the primary results hold promise for additional sources of hepatocytes for clinical uses.

**OP-CR-70**

**The Frequency of Non-Retinopathy Eye Conditions and Vision Impairment in People with Diabetes**

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**Background/Hypothesis:** To determine the frequency of non-retinopathy eye diseases in people with diabetes.

**Methods:** A population-based, cross-sectional study (The Singapore Malay Eye Study) of 3280 adults, aged between 40 and 79 years and residing in 15 residential districts across Singapore, was conducted. Vision impairment (<0.3 LogMAR in the better eye-presenting and corrected), cataract, glaucoma, refractive errors, age-related macular degeneration and dry eye were assessed based on standardised interviews, clinical examinations and laboratory investigations.

**Results:** A total of 768 participants (24.2%) had diabetes. Compared to non-diabetics, people with diabetes were older and female; had higher body mass index and glycated haemoglobin levels; lower income and education levels; but were less likely to be smokers ( $P < 0.05$ ). Those with diabetes were more likely to be vision impaired (13.4% vs 7.3%;  $P < 0.001$ ); have cataract (52.1% vs 37.3%;  $P < 0.001$ ) and astigmatism (51.7% vs 38.1%;  $P < 0.001$ ). On the other hand, more non-diabetic participants had undercorrected refractive error (95.1% vs 85.9%;  $P < 0.001$ ). The odds of having vision impairment (best corrected) (OR 1.79, CI: 1.19 to 2.68), cortical cataract (OR 1.63, CI: 1.20 to 2.20), and undercorrected refractive errors (OR 2.11, CI: 1.41 to 3.16) were significantly higher in people with diabetes compared to those without. The population attributable risks for undercorrected refractive errors, cortical cataract and best corrected vision impairment due to diabetes were 12.7%, 8.7%, and 10.7%, respectively. There were no associations of diabetes with glaucoma, age-related macular degeneration and dry eye.

**Discussion & Conclusion:** People with diabetes were more likely to have undercorrected refractive errors, cortical cataract and vision impairment. Diabetes accounts for 10% of vision impairment in the population.

## OP-CR-71

### Low Incidence of Necrotising Enterocolitis at a Neonatal Intensive Care Unit

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**Background/Hypothesis:** Necrotising enterocolitis (NEC) is a serious fulminant intestinal disease of neonates. The reported incidence of stage  $\geq 2$  NEC among very low birth weight (VLBW) infants is 6% to 7%. The aim of this study was to examine the epidemiology of NEC in our NICU.

**Methods:** This case-control study involved VLBW infants (<1500 g) admitted to our NICU from July 2001 to June 2010. Each NEC case was matched to the next 2 surviving infants of the same gestational age (GA) without NEC. Data regarding antenatal, intrapartum and postnatal risk factors were collected from our VLBW database.

**Results:** Among 422 VLBW infants, 11 (2.6%) developed NEC, with a median onset at 17 days old. The mean GA was 27.7 ( $\pm 2.1$ ) weeks and birth weight 991 ( $\pm 293$ ) g. The control group (22 infants) had a mean birth weight of 1028 ( $\pm 225$ ) g. Antenatal risk factors were similar in both groups. Postnatally, more infants in the NEC group had treatment for PDA (82% vs 59%; OR 6.5; 95% CI, 1.2 to 32.7;  $P = 0.034$ ). More infants in the control group received exclusively breast milk compared to the NEC group. (54.5% vs 27.3%,  $P = 0.266$ ). Although 10/11 (91%) infants with NEC required laparotomy, the mortality was low 1/11 (9.1%). NEC cases had more sepsis (63.6% vs 22.7%,  $P = 0.024$ ) and a longer length of stay (LOS, mean 125 days vs 80 days,  $P = 0.009$ ).

**Discussion & Conclusion:** The incidence of NEC was low when compared to published data. NEC significantly increased hospital length of stay by 56%. Breast milk had a protective effect against NEC but this needs to be confirmed in a larger series of cases.

**OP-CR-72**

**Family History of Hearing Loss in First Degree Relatives Not Predictive of Hearing Loss in Neonates**

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**Background/Hypothesis:** In previous large population studies, 50% of congenital hearing loss has been designated as hereditary, making family history an important factor in identifying infants at high risk for hearing loss. In this review, we analyse the significance of family history in predicting hearing loss and audit the incidence, type and nature of hearing loss in the newborns screened from our hospital.

**Methods:** An audit of our neonatal screening outcomes from January 2003 to December 2009 was done. Our screening strategy is that of a two staged protocol using oto-acoustic emission (OAE) with automated auditory brainstem response (AABR). Family history in first-degree relatives was elicited from all the infants at screening. All children with family history of hearing loss were followed up to 1 year of age. The type of confirmed hearing loss was also recorded.

**Results:** Of the 16,794 babies screened, the incidence of hearing loss is 4.5 per 1000. Family history of hearing loss was present in 8 of the 70 babies (11.4 %) with confirmed hearing loss and majority were detected at birth via screening while the remainder had progressive loss presenting at less than 1 year. All infants had sensorineural hearing loss. Of those with family history (n = 54), only 14.8 % had hearing loss.

**Discussion & Conclusion:** We conclude that family history of hearing loss in first degree relatives was only present in 11.4% of the infants which was much lower than the previous studies. Screening at birth was able to identify 62.5% of the infants.

## OP-CR-73

### Evaluation of Cryopreservation on the Functional Capabilities of Adipose-derived Stem Cells

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**Background/Hypothesis:** The use of adipose-derived stem cells (ADSCs) tissue regeneration has vast clinical implications in tissue regeneration. However, the ability to store and maintain stem cell function after a reasonable period of cryopreservation is crucial. Hence, we aim to evaluate the effectiveness of traditional cryoprotectant, in search of an economical yet effective cryoprotectant.

**Methods:** Three patient samples of lipoaspirates were obtained and ADSCs derived thereafter were divided into cryopreserved and non-cryopreserved batches. The cells were subsequently compared in terms of their:

1. Proliferation rate via MTT assay;
2. Functionality via the ability to differentiate into adipocyte and osteocyte; and
3. Viability presented by positive stains for differentiated cell line

**Results:** Cell viability post cryopreservation in stipulated cryoprotectant was minimal. However, cell proliferation of viable cryopreserved adipose-derived stem cells (ADSCs) was maintained relatively well, with a doubling time of approximately 5 days. Cell function is retained in cryopreserved ADSCs; low count obtained due to low viability post-cryopreservation.

**Discussion & Conclusion:** Methodology implemented was limited by resources available at present but ideally:

1. DNA count to complement MTT assay in quantifying cell viability through cell doubling time.
2. Seeding of cells at a lower initial cell count can prevent false downward trend of cell viability due to overgrowth.
3. Use of alkaline phosphatase to identify osteocytes.

The traditional cryoprotectant:

1. Is not effective in preserving cell viability (average of 15.3%);
2. Reduces ADSCs' ability to retain original proliferation rate (Doubling time: 3 days increased to 5 days); and
3. Does not preserve optimal functionality and differentiation potential of ADSCs

Hence, modifying components of cryoprotectant and freezing methods should be derived for clinical application.

## OP-CR-74

### Prevalence and Risk Factors for Refractive Errors in Indians: The Singapore Indian Eye Study

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**Background/Hypothesis:** To determine the prevalence and risk factors for refractive errors in middle-aged to elderly Singaporeans of Indian ethnicity.

**Methods:** We conducted a population-based, cross-sectional study of Indians aged over 40 years residing in South-Western Singapore. An age-stratified (10-year age group) random sampling procedure was performed to select participants. Refraction was determined by autorefractometry followed by subjective refraction. Myopia was defined as spherical equivalent (SE) < -0.50 diopters (D), high myopia as SE < -5.00 D, astigmatism as cylinder < -0.50 D, hyperopia as SE > 0.50 D, and anisometropia as SE difference > 1.00 D. Prevalences were adjusted to the 2000 Singapore census.

**Results:** Of the 4497 persons eligible to participate, 3400 (75.6%) were examined. Complete data were available for 2805 adults with right eye refractive error and no prior cataract surgery. The age-adjusted prevalence was 28.0% (95% confidence interval [CI], 25.8 to 30.2) for myopia and 4.1% (95% CI, 3.3 to 5.0) for high myopia. There was a U-shaped relationship between myopia and increasing age. The age-adjusted prevalence was 54.9% (95% CI, 52.0 to 57.9) for astigmatism, 35.9% (95% CI, 33.7 to 38.3) for hyperopia and 9.8% (95% CI, 8.6 to 11.1) for anisometropia. In a multiple logistic regression model, adults who were female, younger, taller, spent more time reading and writing per day or had astigmatism were more likely to be myopic. Adults who were older, had myopia or diabetes mellitus had a higher risk of astigmatism.

**Discussion & Conclusion:** In Singapore, the prevalence of myopia in Indian adults is similar to Malays, but lower than Chinese. Risk factors for myopia are similar across the 3 ethnic groups in Singapore.

**OP-CR-75**

**Does Coronary Calcium Score Have Incremental Predictive Value for Obstructive Coronary Atherosclerosis in Singaporeans?**

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**Background/Hypothesis:** Coronary artery disease (CAD) is the leading cause of mortality globally. Current models predicting CAD use established Framingham risk score (FRS) factors with blood biomarkers, imaging, stress testing and increasingly, coronary calcium score (CCS). The usefulness of CCS and its negative predictive value has recently been questioned. We aimed to ascertain CCS's incremental predictive value for CAD in a multiethnic Singapore population, for which to date, no data have been published.

**Methods:** Two hundred and fifty-two patients with suspected but not previously documented CAD were prospectively recruited prior to invasive coronary angiography. CCS was carried out by electron beam computed tomography (Imatron C-100 scanner) and calculated using the Agatston method. CAD was defined as angiographic diameter stenosis of  $\geq 50\%$  in at least 1 of 3 major epicardial vessels (left, right coronary and circumflex). Predictive multivariate models were derived from traditional FRS vascular risk factors, symptoms, preangiographic imaging tests, and CCS with PASW Statistics 18.

**Results:** Mean age was 56 years (62% males, 67% Chinese). CCS had 98% sensitivity, 39% specificity and 96% negative predictive value for CAD. Area under curve (AUC) of the receiver operating characteristics (ROC) curve was 0.731 (95% confidence intervals [CI], 0.66 to 0.80) for a logistic regression model including age, gender, race, body mass index, hypertension, diabetes, dyslipidemia, smoking status and family history of CAD. Addition of chest pain characteristics and results of cardiac imaging and stress testing increased AUC to 0.76 (95% CI: 0.69 to 0.83) and 0.78 (95% CI: 0.71 to 0.86), respectively. Further addition of CCS to the prediction model increased AUC to 0.85 (95% CI: 0.79 to 0.90,  $P = 0.02$ ).

**Discussion & Conclusion:** In Singaporeans with suspected CAD, CCS is a highly sensitive screening test for detecting obstructive CAD with incremental value beyond traditional risk factors, symptoms and noninvasive stress testing.

## OP-CR-76

### Foreign Bodies of the Face: A Singapore Perspective

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**Background/Hypothesis:** Facial foreign body (FB) implantation can present as frustrating diagnostic and therapeutic dilemmas to both patients and surgeons. Judicious use of computed tomography (CT) scans may help localise FBs and reduce repeat surgeries. The authors aimed to identify risk factors predictive of multiple FB removal surgeries and propose imaging recommendations.

**Methods:** The authors conducted a retrospective review of 31 patients who underwent surgical exploration and removal of facial FB. Variables studied were injury mechanism, anatomical location of FB, depth and tissue plane of implantation, FB material, dimensions, preoperative imaging, number of surgeries performed, presence of facial fractures and neurovascular complications.

**Results:** Thirty-one patients underwent surgical removal. Mean age was 34 years (80.6% males). Commonest FB material was glass (35.5%). Majority of FB injuries was work (48.4%) and motor vehicle accidents-related (35.2%). Orbital and periorbital involvement (70.8%) was most common and 40.9% of them had associated ocular injuries. Of the patients, 45.2% required more than one surgery. Fifty percent of them (n = 7) had FB implanted in facial bones. Concomitant fractures were present and fixation was needed in all. Orbitozygomatic fracture was most common (67%). FB material most associated with fractures was metal (78%). The other 50% (n = 7) were penetrating wounds with small calibre FBs missed on superficial visual inspection during the first surgery. CT scan after initial failed FB removal resulted in successful removal in all cases.

**Discussion & Conclusion:** Based on the authors' experience, X-rays are limited in facial FB localization. CT scans should be considered in patients with risk factors of suspected facial fractures, periorbital injuries, metal FBs, ballistic injuries and deep penetrating wounds with small calibre FBs not visible on superficial visual inspection. These recommendations may lead to better clinical outcomes in future similar cases.



**OP-CR-77**

**Single-Tube Assay for Rapid Genotyping of Fragile X Mental Retardation 1 Alleles**

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**Background/Hypothesis:** Fragile X syndrome (FXS) is the most common inherited mental retardation disorder, caused by gene silencing due to hyperexpansion and hypermethylation of CGG repeats in the *FMRI* gene. Premutation alleles are not silenced but are associated with increased risk of fragile X-associated premature ovarian failure (FXPOF) and tremor ataxia syndrome (FXTAS). Molecular diagnosis of FXS commonly involves repeat-sizing PCR, which cannot detect all expanded alleles and has to be supplemented by Southern blot analysis, which is laborious and time-consuming.

**Methods:** We describe a novel single-tube methylation-specific PCR assay where triplet-primed PCR of bisulfite-modified DNA amplifies unmethylated and methylated *FMRI* CGG repeats simultaneously. Visualisation of differentially-labelled unmethylated and methylated allele peak profiles after capillary electrophoresis enables accurate classification of normal, gray zone and expanded alleles in males and females. The assay was validated on cell lines and archived clinical samples.

**Results:** Methylation states of all expanded alleles were unambiguously identified. Repeat structures and lengths could be accurately determined for normal, gray zone, and small premutation alleles. This enables accurate identification of individuals at risk for FXPOF and FXTAS, and those affected with or at risk of transmitting FXS. Homozygous normal females were clearly discriminated from expansion-carrying females. Skewed X chromosome inactivation in females, which may influence disease manifestation and severity, could also be determined.

**Discussion & Conclusion:** We have successfully developed and validated a simple assay that simultaneously informs on repeat length, AGG-interruption structure and methylation state of *FMRI* in males and females. This assay represents an efficient screening tool to identify affected or at-risk individuals from among the majority of normal individuals, thus significantly limiting the need for Southern blot analysis.

**OP-CR-78**

**Waist Circumference Is Better than Body Mass Index as Obesity-Related Health Risk Indicator**

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**Background/Hypothesis:** Central obesity is closely related to insulin resistance, the pathophysiology underlying metabolic syndrome and diabetes mellitus. However, in clinical practice, body mass index (BMI) is the preferred measure of obesity. In a homogenous cohort, we sought to determine whether BMI is comparable to waist circumference (WC) in predicting visceral adiposity and insulin sensitivity.

**Methods:** We recruited 93 healthy Chinese volunteers, aged 21 to 40 years. Anthropometric measurements of weight, height and WC were taken. Magnetic resonance imaging (MRI) of the abdomen was performed to assess visceral fat volume (VFV). Insulin sensitivity was measured using hyperinsulinemic euglycemic glucose clamp. Pearson's correlation analysis was performed to examine the relation between anthropometric measures and VFV and insulin sensitivity index (ISI). Anthropometric predictors for VFV and ISI were determined with multivariate analysis, adjusted for age.

**Results:** BMI and WC correlated significantly with measured VFV ( $r = 0.528$  for BMI,  $r = 0.702$  for WC,  $P < 0.001$ ), and ISI ( $r = -0.414$  for BMI,  $r = -0.508$  for WC,  $P < 0.001$ ); with greater correlation for WC than BMI. VFV showed a strong inverse correlation with ISI ( $r = -0.604$ ,  $P < 0.001$ ). In multivariate analysis, adjusted for age, WC accounted for 48% and 34% of the variation in VFV and ISI (log-transformed), respectively, independent of BMI.

**Discussion & Conclusion:** Using rigorous measurement of visceral adiposity and insulin sensitivity, we showed that waist circumference is a stronger predictor of visceral adiposity and insulin sensitivity than BMI. Therefore, WC may be a stronger predictor of health risk than BMI.

**OP-CR-79**

**Classification of the Vascular Patterns of Polypoidal Choroidal Vasculopathy and Its Relation to Clinical Outcomes**

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**Background/Hypothesis:** Polypoidal choroidal vasculopathy (PCV) is a potentially blinding condition with high prevalence among Asians with age-related macular degeneration. Its clinical course and prognosis are not well described and there is no universally accepted classification system. Advancements in confocal scanning laser ophthalmoscopy (CSLO) allow detailed visualisation of the vasculature of PCV. We propose a classification system for PCV based on vascular patterns on indocyanine green (ICG) angiography, and compare the clinical outcomes of the vascular subtypes.

**Methods:** An interventional, longitudinal study of 105 consecutive patients with PCV treated in a tertiary ophthalmic center over a 24-month period was conducted. The CSLO ICG vascular subtypes were assessed independently by 2 ophthalmologists, and compared with the clinical presentation and visual acuity (VA) for 5 years.

**Results:** Three distinct ICG patterns were seen: Type I (inter-connecting channels with no leakage) - 25%; Type II (branching vascular network with no leakage) - 26.2%; Type III (branching vascular network with active leakage) - 48.8%. A higher proportion of patients with Type III PCV experienced moderate visual loss (loss of  $\geq 3$  lines of VA) after 5 years, compared to Type II and Type I (41.2% vs 11.1% vs 0%). More patients with Type I PCV had good visual outcomes (VA better than 6/12) compared to Type II and Type III (83.3% vs 62.5% vs 20%,  $P = 0.034$ ). Type I PCV had better final VA outcomes compared to Type III (0.34 vs 0.85,  $P = 0.041$ ) and experienced VA improvement compared to worsening in Type III (0.25 vs -0.18,  $P = 0.036$ ).

**Discussion & Conclusion:** The rates of visual loss and final visual acuity of PCV differ according to ICG vascular subtypes. Therefore, PCV may consist of distinct, previously unrecognised, clinical subtypes which are characterised by specific ICG vascular patterns and differences in clinical outcomes, as opposed to being a uniform disease entity as originally believed.

## OP-CR-80

### Epidemiology of Pterygium and Its Risk Factors

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**Background/Hypothesis:** Pterygium is a growth on the conjunctiva which may cause visual impairment. Its prevalence varies with geographical location and demographics and is believed to be related to outdoor work and exposure to ultraviolet (UV) light in the tropics. We aimed to describe the epidemiology of pterygium in a rural Indonesian population and to examine the roles of age and gender as determinants of bilaterality and severity of the disease.

**Methods:** Population-based study in a rural Indonesian population. During eye examination by trained ophthalmologists, pterygia were graded according to standard photos. Odds ratio (relative risk) was calculated using logistic regression model with adjustment for age, and the 95% confidence intervals (CI) were calculated using the exact method.

**Results:** The overall prevalence rate was 17.0% (95% CI: 13.9% to 20.6%). The prevalence rate was significantly higher in males (22.7%, 95% CI: 17.6% to 28.9%) compared to females (12.4%, 95% CI: 9.0% to 16.9%) of all ages ( $P = 0.003$ ). Adjusted for age, the risk of disease was 3.1 fold higher among the males (95% CI: 1.72 to 5.61). Both eyes were equally affected, and 71.6% of subjects had bilateral disease. Males were more likely to have bilateral disease (79.2% vs 60.6%). Subjects with pterygium were older compared to those without (mean age 42.9 years vs 18.7 years,  $P < 0.001$ ). The prevalence rates in males increased from 33.3% at age 20 to reach a plateau of 63.6% at age 35 and remained stable thereafter. In the females, the rates also increased with age, albeit at a slower rate, from 16.4% at age 20 to reach a plateau of 46.7% at age 55 and remained stable thereafter.

**Discussion & Conclusion:** There is a high prevalence rate of pterygium in a rural Indonesian community, with the rates increasing rapidly with age. The majority had bilateral disease, and most develop by the third decade, suggesting the possible role of genetics or early exposure to risk factors such as UV radiation.

## OP-CR-81

### Perioperative Outcomes of Laparoscopic Distal Pancreatectomy

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**Background/Hypothesis:** Application of minimally invasive techniques in the surgical management of distal pancreatic lesions is on an uprising trend. Despite this, the number of laparoscopic distal pancreatectomy remains low; and its use has been mainly limited to the treatment of benign and pre-malignant lesions.

**Methods:** A prospective database comprising 31 patients who underwent distal pancreatectomy between 2005 and 2010 was analysed. Patients were grouped according to the mode of surgical access: open or laparoscopic distal pancreatectomy. Perioperative parameters were compared between the 2 groups.

**Results:** Twenty-one (67.7%) patients underwent open distal pancreatectomy and 10 (32.3%) patients underwent laparoscopic distal pancreatectomy. The median age of the patients was 61 years (range, 37 to 79). There were significantly more females in the laparoscopic distal pancreatectomy group (80.0% in laparoscopic group vs 38.1% in open group,  $P = 0.03$ ). No statistical difference was observed between the two groups in terms of preoperative clinical information and operation time. Postoperative morbidity rate were comparable between the 2 groups, with the new International Study Group for Pancreatic Surgery definition of Grade A postoperative pancreatic fistula contributing to overestimation of postoperative morbidity by approximately 30.0% in both groups. In the laparoscopic distal pancreatectomy group, there were significantly lower estimated blood loss ( $P < 0.001$ ), lesser amount of blood transfusion ( $P = 0.001$ ), smaller tumour size ( $P = 0.01$ ), fewer number of lymph nodes harvested ( $P = 0.02$ ), shorter postoperative length of stay ( $P = 0.02$ ) and shorter length of stay in surgical high dependency ( $P = 0.001$ ).

**Discussion & Conclusion:** Laparoscopic distal pancreatectomy is a safe and efficient technique for the resection of benign and pre-malignant pancreatic lesions. Indices reflecting perioperative outcomes in this study are highly competitive with those in other major centres.

OP-CR-82

**Lean Body Mass, Not Visceral Adiposity or Insulin Resistance, Predicts Bone Mineral Density in Young Chinese Men**

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**Background/Hypothesis:** Osteoporosis is associated with increased mortality and morbidity. Although greater body weight is associated with higher bone mineral density, recent epidemiologic studies have shown that obesity, after correcting for weight effects, is in fact detrimental to bone density. In this study, we determined whether regional adiposity or insulin resistance may negatively impact the bone health.

**Methods:** We recruited 93 healthy Chinese volunteers aged 21 to 40 years. Body mass index (BMI) and waist circumference (WC) were taken. Total body fat (TBF), lean mass (LM) and bone mineral density (BMD) at lumbar and hip were measured by dual energy X-ray absorptiometry (DEXA, Hologic Discovery Wi). Magnetic resonance imaging (MRI) of the abdomen was performed to assess visceral fat volume (VFV). Insulin sensitivity index (ISI) was measured using hyperinsulinemic euglycemic glucose clamp. Pearson's correlation analysis was performed to examine relationship between measures of obesity, ISI and BMD (Z-score), adjusted for age and multiple regression analysis to determine predictor of BMD.

**Results:** Both BMI and WC correlated significantly with BMD at hip ( $r_{\text{BMI}} = 0.329$ ,  $P = 0.003$ ,  $r_{\text{WC}} = 0.258$ ,  $P = 0.023$ ) but not lumbar spine. LM was positively correlated with BMD at both lumbar spine and hip ( $r_{\text{lumbar}} = 0.312$ ,  $P = 0.006$ ,  $r_{\text{hip}} = 0.378$ ,  $P = 0.001$ ). Although TBF and VFV correlated negatively with BMD in bivariate analyses, they become insignificant when adjusted for age. No significant correlation was found between ISI and BMD. LM is the only independent predictor of BMD at lumbar and hip, accounting for about 15% of BMD variance at the lumbar spine and 20% at the hip.

**Discussion & Conclusion:** Our study suggests that the positive association seen between body weight and bone mineral density is mediated by total lean body mass, but not by visceral adiposity or insulin resistance. Activity that increases lean body mass e.g. resistance and weight-bearing exercise will partly prevent osteoporosis.

## OP-CR-83

### Functional Outcomes after Total Knee Arthroplasty in Patients 55 Years Old or Younger

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**Background/Hypothesis:** The number of younger patients undergoing total knee arthroplasty (TKA) has been increasing, with surgeons advocating its use in patients with rheumatoid arthritis and post-traumatic arthritis, among other factors. However, few studies have looked at the physical and psychosocial impact of TKA on this demographic group. This study aims to evaluate the long-term outcome of TKA on patients aged below 55 in terms of physical function, quality of life and impact on employment.

**Methods:** Twenty patients who underwent TKA at the age of 55 or below between 2003 and 2008 were reviewed (12 unilateral, 8 bilateral). A minimum follow-up of 2 years was instituted as studies have shown that physical function usually plateaus after this period. Preoperative as well as final evaluation Oxford Knee Scores, SF-12 scores were obtained. Participants were also required to fill in an employment questionnaire.

**Results:** Seventy-five percent of these patients had body mass indices (BMI) of >25 and out of those who did not, 60% had either inflammatory arthritis or previous injuries sustained to their knees.

Oxford knee scores for the study group improved from an average of 21.2 preoperatively (range, 9 to 34) to 39.2 postoperatively (range, 19 to 46).

Sixty-five percent of patients who were employed preoperative were able to return to their previous job. Fifteen percent had to take on a job with lighter workload. Twenty percent were unemployed after undergoing TKA. From the unemployed group, half of these patients voluntarily chose not to return to work for non-medical reasons.

Subjectively, patients felt that their work productivity improved by an average of 32.9%.

**Discussion & Conclusion:** This study shows that TKA in patients aged 55 and below results in good functional outcome as evidenced by the improvement in Oxford Knee Scores as well as maintaining their employability.

This is especially important for patients in this age group as they still have a good 10 years or more of potential years contributing to the workforce.



## OP-CR-84

### Retrospective Review of Open Surgical Tracheostomy against Percutaneous Dilatational Tracheostomy

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**Background/Hypothesis:** Classically, a tracheostomy done by open surgical tracheostomy (ST) technique is the standard of care; recent percutaneous dilatational tracheostomy (PDT) method has been gaining popularity as it is simpler and can be done at the bedside. Current studies prove PDT to be cheaper, but equivocal in clinical outcomes. This project aims to compare outcomes between ST and PDT done by the Otolaryngology and Anaesthesia departments, respectively of National University Hospital.

**Methods:** All patients with tracheostomies done from January 2008 to December 2009 were included by procedure codes from inpatient records, and data collected via the Computerised Patient Support System. Cases were supplemented with case files and cases with incomplete data were excluded.

**Results:** There were 145 tracheostomies performed over the 2-year period: 104 ST with 11% done under local anaesthesia and 5% emergency, and 41 PDT.

ST and PDT had similar number of complications [31 events (30%) vs 9 events (22%),  $P > 0.05$ ]. Early events were less frequent in both methods [24% ST vs 25% PDT].

Major complications of significant morbidity, requiring invasive intervention in comparison to minor ones occurred more in ST than PDT- 20 events (65%) vs 4 events (40%); 30% of those post-ST major events occurred in the first 24 hours vs 0% in PDT.

Major post-procedure bleed was seen more in ST [6(19%) vs 1(10%)], and major events of pneumomediastinum and pneumothorax were more common in ST [5(16%) vs 0(0%)]. Long-term complications of 1 tracheal cutaneous fistula, 3 subglottic stenosis and 1 suprastomal collapse with granuloma were seen in ST, while PDT had only 1 subglottic stenosis. The only death, occurring in PDT arose from tracheostomy care-tube obstruction leading to cardiac event.

Decannulation rates at hospital discharge were similar.

**Discussion & Conclusion:** While complication rates and outcomes at discharge were similar, major events occurring early may be seen more in ST with more significant long-term complications.



**OP-CR-85**

**Intracameral Lidocaine on Pain and Fear Experienced during Cataract Surgery - A Placebo-Controlled, Double-Blinded, Randomised Study**

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**Background/Hypothesis:** Cataract surgery is performed under local anaesthesia and may be painful and frightening to patients. This may increase the risk of intraoperative complications and affect the level of satisfaction with the surgery. We aimed to determine whether supplemental intracameral injection of lidocaine reduces pain and fear experienced during cataract surgery.

**Methods:** In a placebo-controlled, double-blinded, randomised study conducted in 2 centres, 506 patients undergoing cataract surgery (phacoemulsification) under topical anaesthesia were randomised to receive a supplemental intracameral injection (into the anterior chamber) of either 0.5 ml of 1% lidocaine or balanced salt solution (BSS). Patients were interviewed postoperatively by a trained interviewer using a standardised questionnaire and visual analogue scales of 0 to 10 for pain and fear. The risk factors for pain and fear were analysed using multivariate logistic regression.

**Results:** There were 277 patients in the lidocaine group (54.7%) and 229 in the BSS group (45.3%). A smaller proportion of patients experienced pain in the lidocaine group (125 patients, 45.1%) compared to the BSS group (123 patients, 53.7%), (multivariate odds ratio [OR] 0.68, 95% confidence interval [CI], 0.47 to 0.97,  $P = 0.034$ ). The median pain score was significantly lower for the lidocaine group compared to the BSS group ( $P = 0.039$ ). Females (OR 1.56, 95% CI, 1.09 to 2.24,  $P = 0.016$ ) and non-Chinese (OR 2.13, 95% CI 1.25 to 3.64,  $P = 0.005$ ) were more likely to experience pain. The mean grade of fear was lower in the lidocaine compared to the BSS group (2.7 vs 4.6,  $P = 0.032$ ).

**Discussion & Conclusion:** A supplemental injection of intracameral lidocaine during cataract surgery significantly reduces pain and fear experienced by patients. Its use may be helpful in controlling discomfort and anxiety experienced by patients during surgery, leaving patients with increased satisfaction and better experience of cataract surgery.

**OP-CR-86**

**Clinical Outcomes of Manual Sutureless Small-Incision Cataract Surgery vs Phacoemulsification - A Prospective Randomised Clinical Trial**

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**Background/Hypothesis:** Cataract is the most common cause of treatable blindness in many countries. While phacoemulsification cataract surgery has excellent visual outcomes, it requires expensive equipment and consumables. In view of limited healthcare resources and funding in some populations, alternative low-cost and safe methods of cataract surgery are required. This study aimed to compare the safety and efficacy of manual sutureless small-incision cataract surgery with phacoemulsification in eyes with advanced cataracts.

**Methods:** A prospective, randomised, controlled interventional trial involving 270 consecutive patients with advanced cataracts who underwent manual sutureless small-incision (Group 1, 137 patients) or phacoemulsification (Group 2, 133 patients) cataract surgery. Visual outcomes and complications were compared 1 day and 6 weeks postoperatively.

**Results:** There were no significant differences between the groups for demographics, preoperative visual acuity and cataract grade. The mean surgical time for Group 1 was 28% shorter than Group 2 (8.8 min vs 12.2 min,  $P < 0.001$ ). Group 1 experienced faster visual recovery, with a higher percentage having good best-corrected visual acuity (20/60 or better) on the first postoperative day (82.4% vs 57.9%,  $P < 0.001$ ). The final visual outcomes were comparable, with good visual acuity in 115 patients (98.2%) in Group 1 and 112 patients (99.1%) in Group 2 ( $P = 0.594$ ). Group 1 had lower rates of postoperative oedema compared to Group 2 (10.2% vs 18.7%,  $P = 0.047$ ) and there were no sight-threatening complications in either group.

**Discussion & Conclusion:** Manual sutureless small-incision cataract surgery is a good alternative to phacoemulsification and can be performed at lower cost and in a significantly shorter time, allowing a greater volume of cataract surgery. It achieves faster visual recovery, and both techniques achieve excellent final visual outcomes with low complication rates.

## OP-CR-87

### Sense of Coherence and Glycaemic Control

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**Background/Hypothesis:** Antonovsky's concept of "sense of coherence" (SOC) refers to an individual trait or worldview that helps keep people healthy. SOC has 3 dimensions: comprehensibility, manageability and meaningfulness. Studies have reported SOC to be a stable parameter over time in adults with initial high SOC and associated with health indicators. We studied the relationship between SOC and glycaemic control in diabetic patients.

**Methods:** We surveyed diabetic patients at 2 polyclinics in 2009 using the 13-item SOC and the Diabetes Attitude Scale questionnaires. Interviewers also asked patients their demographic profile, medical history, adherence to medication, diet and exercise. HbA1c results within 3 months of the survey were obtained from medical records.

**Results:** Response rate was 81.4%. Of 290 respondents, 52% were male, 74.5% Chinese. Mean age was 57.9±9 years. Less than half (40.1%) had poor glycaemic control of HbA1c >8%. HbA1c >8% was significantly associated with age <65 years (OR 2.82, 95% CI: 1.02 to 7.84), monthly household income <\$5000 (OR 2.69, 95% CI: 1.01 to 7.19), duration of diabetes 10+ years (OR 2.52, 95% CI: 1.37 to 4.65) and low SOC score (OR 2.02, 95% CI 1.08 to 3.75). Low SOC score was associated with lower adherence to medication (OR 3.28, 95% CI: 1.94 to 5.56) and diabetic diet (OR 2.96, 95% CI: 1.78 to 4.92) but not exercise. SOC scores correlated negatively with Psychosocial Impact of Diabetes attitude scores ( $r = -0.32$ ,  $P < 0.01$ ) and positively with Value of Tight Control of Diabetes attitude scores ( $r = 0.26$ ,  $P < 0.01$ ).

**Discussion & Conclusion:** The observed association between having a low SOC and poor glycaemic control may be mediated by the relationship of low SOC with negative attitudes towards the psychosocial impact of diabetes, the value of tight glucose control and reduced medication and diet adherence. Identifying diabetic patients with low SOC by screening and providing behavioural interventions targeted at attitudes and self-care behaviour may improve their glycaemic control.

## OP-CR-88

### Resected Hepatocellular Carcinoma: Postoperative Prognostic Factors

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**Background/Hypothesis:** Hepatocellular carcinoma (HCC) is one of the most common cancers worldwide. Few HCCs are resectable at presentation, and outcomes are dismal even with optimal surgery. Current prognostic models for HCC are developed primarily from patients with metastatic or unresectable cancer, and are unlikely to be relevant to patients with resected HCC. We report outcomes of patients undergoing liver resection for HCC from a single tertiary centre representing the largest current surgical series in the literature.

**Methods:** HCC patients who underwent potentially curative surgery were identified and the charts were retrospectively reviewed. Overall survival was selected as the primary outcome measure. Univariate analysis (UVA) was performed for each putative risk factor using Cox regression. Significant prognostic factors were further examined in multivariate analysis (MVA).

**Results:** In total, 538 patients were identified. Of which, there were 278 patients who relapsed and 185 deaths. There were 331 patients with chronic hepatitis B, and 55 with chronic hepatitis C. Risk factors on UVA showing association with overall survival included age ( $P < 0.001$ ), ECOG performance status (HR1.83,  $P < 0.001$ ), TNM stage ( $P < 0.001$ ), cirrhosis (HR1.36,  $P < 0.05$ ), tumour multifocality (HR1.90,  $P < 0.001$ ), portal vein thrombosis (HR2.48,  $P < 0.001$ ), Childs Pugh Score (HR2.73,  $P < 0.001$ ) and positive resection margin (HR1.85,  $P = 0.003$ ). Hepatitis B status and Edmonson-Steiner grade did not show a significant effect on survival. MVA indicated that age, cirrhosis, lymphovascular invasion, portal vein thrombosis and tumour multifocality remained significant predictors of survival after resection.

**Discussion & Conclusion:** We have identified factors predicting survival outcomes in patients who have undergone curative resection of localised HCC. Our work provides a foundation for estimating survival outcomes, allowing for appropriate modeling, individual patient counselling, patient selection for adjuvant therapy and biomarker development.

## OP-CR-89

### Computer Tomography Volumetry as Adjunct in Predicting Postoperative Morbidity in Liver Resection

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**Background/Hypothesis:** Liver resection requires careful preoperative selection as it may lead to significant morbidity and mortality. Various methods of preoperative risk stratification include Child-Pugh scoring system, Indocyanine green retention test, computer tomography volumetry (CTV) or hepatobiliary scintigraphy. We study the relationship of CTV as an adjunct in predicting postoperative morbidity and mortality in liver resection.

**Methods:** Forty patients who underwent liver resection for various diseases were studied retrospectively. Clinical data such as operative parameters and postoperative morbidity was collected. Correlation of CTV with anthropometric parameters of patients was performed. Future liver remnant (FLR) was measured, calculated and correlated with postoperation morbidity.

**Results:** Twenty-five patients had underlying liver disease including 14 with chronic hepatitis B. The median total liver volume was 1240.8 m<sup>2</sup> (range, 590.0 to 2057.4). The median FLR volume was 528.1 m<sup>2</sup> (range, 196.4 to 1280.5). There was a positive correlation between FLRrTLV and FLRrBSA ( $r = 0.872$ ,  $P < 0.001$ ). The two most common morbidities include 9 patients with respiratory and 8 patients with intestinal morbidity. Liver-specific morbidity rate was 12.5% ( $n = 5$ ). The median FLRrTLV (median = 0.519, range, 0.242 to 0.888) was 0.057 (5.7%) greater in those without postoperative morbidity compared to those with morbidity, but it was not statistically significant ( $P = 0.19$ ). The median FLRrTLV (median = 0.505, range, 0.242 to 0.892) was found to be 0.135 (13.5%) greater in those without liver-specific morbidity compared to those with liver-specific morbidity but the results were not statistically significant ( $P = 0.85$ ).

**Discussion & Conclusion:** Computer tomography volumetry (CTV) may be useful to help plan liver resection with additional allowance of remnant liver volume. Selective use is useful as an adjunct in risk stratification of postoperative morbidity in liver resection.

## OP-CR-90

### Using Body Surface Area to Calculate Future Liver Remnant is Reliable in Diseased Liver

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**Background/Hypothesis:** Future liver remnant ratio (FLRr) is used as a method of preoperative risk stratification in patients undergoing liver resection. Prior methods of assessment studied the normal population. We compared the use of total computer tomography volumetry (CTV) and body-surface-area (BSA) derived formula for FLRr calculation in patients with disease.

**Methods:** We retrospectively recorded and compared anthropometric and CTV data of 40 consecutive patients who had undergone liver resection at a single institution between 2005 and 2009. The future liver remnant (FLR) was measured on computer tomography based on the known surgical resection plane. FLRr using an established body-surface-area (BSA) derived total liver volume (TLV) formula for a normal Asian population (FLRr<sub>BSA</sub>) was compared against FLRr derived from computer tomography volumetry (FLRr<sub>CTV</sub>), where the total liver volume did not include tumour volume.

**Results:** The median age of this cohort of patients was 65.0 years (range, 17 to 80), with male preponderance (n = 33, 82.5%). Fourteen patients (35%) had chronic hepatitis B. Eighty percent (n = 32) had major liver resection. The median body-surface-area was 1.63 m<sup>2</sup> (range, 1.37 to 2.07). All the patients were graded A during preoperative Child-Pugh scoring. The median TLV was 1240.8 m<sup>2</sup> (range, 590.0 to 2057.4). The median FLR was 528.1 m<sup>2</sup> (range, 196.4 to 1280.5). Mean FLRr<sub>CTV</sub> was 0.523 (95% CI: 0.455 to 0.591), while mean FLRr<sub>BSA</sub> was 0.520 (95% CI: 0.440 to 0.600). There was a positive correlation between FLRr<sub>CTV</sub> and FLRr<sub>BSA</sub> with the Pearson's correlation coefficient being 0.872 (*P* < 0.001).

**Discussion & Conclusion:** Computer tomography volumetry (CTV) and body-surface-area (BSA) derived methods of calculating FLRr are not significantly different in patients with disease. Given the greater ease of the latter method, computer tomography volumetry (CTC) should be reserved for estimation of the future liver remnant (FTR) and not the total liver volume (TLV).

## OP-CR-91

### **Does Throat and Perianal Swabs Increase MRSA Detection in Human Immunodeficiency Virus Patients?**

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**Background/Hypothesis:** HIV-infected patients are commonly colonised with MRSA. Combined nasal, axillary and groin (NAG) swabs are routinely obtained for MRSA screening in our hospital. We evaluated if throat and perianal swabs increased MRSA detection among HIV patients, and determined patients characteristics for NAG-negative but throat/perianal-positive MRSA colonisation.

**Methods:** We performed a retrospective case-control study of 54 HIV patients who were screened positive for MRSA on admission to CDC from 5 Jan 2009 to 5 Jan 2010. Specimens were taken from patients' nares, axillae, groin, throat, and perianal swabs. Relevant clinical and epidemiological data were collected by case notes review.

**Results:** Throat and perianal swabs increased MRSA screening sensitivity by 11% and 9%, respectively. Throat & perianal swabs combined increased detection by 20%. Compared to patients with NAG-positive swabs, NAG-negative but throat/perianal-positive MRSA colonisers were similar in gender (98% males in NAG-positive vs 91% NAG-negative,  $P = 0.289$ ), age (median age 50 vs 49 years,  $P = 0.889$ ), ethnicity (Chinese 84% vs Chinese 91%,  $P = 0.549$ ), intravenous drug use (7% vs 9%,  $P = 0.811$ ), CD4 counts (most recent CD4 <200 prevalence 91% vs 73%,  $P = 0.113$ ), respectively. Bactrim use in the preceding 2 years was more likely to be associated with a positive NAG swab (OR 6.2, 95% CI: 1.2 to 40.3;  $P = 0.009$ ). On multivariate analysis, a history of herpes simplex infection (adjusted OR 8.8, 95% CI: 1.3 to 62.2,  $P = 0.029$ ) was the only independent factor associated with non-NAG but throat/perianal MRSA colonisation.

**Discussion & Conclusion:** Throat and perianal swabs combined can increase MRSA detection by 20% in HIV patients. In addition to the routine NAG swabs, throat and perianal swabs could be considered for MRSA screening in patients with a history of herpes simplex infection.



**OP-CR-92**

**Risk Factors Associated with Cyclosporine-Induced Nephrotoxicity in Paediatric Nephrotic Patients: A Retrospective Analysis of Data from a Single Centre**

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**Background/Hypothesis:** Cyclosporine A (CsA) is an effective treatment modality for children with steroid-dependent (SDNS) and steroid-resistant nephrotic syndromes (SRsNS). Its use, however, is related with risk of nephrotoxicity. Identification of risk factors associated with CsA-induced nephrotoxicity (CIN) is imperative to minimise nephrotoxicity related to use of this drug.

**Methods:** A retrospective descriptive study was performed in 20 paediatric nephrotic patients (12 SRsNS and 8 SDNS patients) treated with CsA at the Shaw-NKF Children's Kidney Centre, Singapore. Serum creatinine and CsA levels were obtained periodically for titration. Renal biopsies were performed prior and at 2 years after CsA initiation or when CIN is suspected. Statistical analysis of risk factors associated with CIN, including mean CsA dose rate [defined as total daily dose (mg/day) / weight (kg)], was performed using SPSS Statistics 17.0.

**Results:** Our results showed 60% of paediatric nephrotic patients (5 SDNS and 7 SRsNS) developed CIN. Mean CsA dose rate in CIN patients was higher ( $5.21 \pm 1.19$  vs  $3.57 \pm 1.26$  mg/kg/day, respectively). Mean duration of CsA therapy was also higher in CIN group ( $58.8 \pm 25.0$  vs  $47.3 \pm 20.2$  months, respectively). Mean CsA level was, interestingly, lower in CIN group ( $135.0 \pm 105.3$  vs  $149.2 \pm 44.7$  µg/L, respectively). Mann-Whitney U test performed revealed mean CsA dose rate to be significantly associated with risk of CIN ( $P = 0.021$ ). Mean CsA levels and duration of CsA therapy, however, were not significantly related with CIN ( $P = 0.364$  and  $P = 0.315$ , respectively). Using development of CIN as a dependent variable in a multivariate logistic regression analysis, mean CsA dose rate was again noted to be an independent and significant risk factor ( $P = 0.034$ ; OR 1.430, 95% CI: 1.018 to 1.487).

**Discussion & Conclusion:** Mean CsA dose rate is a significant risk factor related with CIN. Minimisation of CsA dose should be attempted so as to avoid morbidity related with the treatment of this disease.



## OP-CR-93

### Coarctation Stenting - The New Paradigms in Treatment

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**Background/Hypothesis:** Aortic coarctation (CoA) accounts for 5% to 8% of all congenital heart disease. Left untreated, most patients with significant coarctation will have varying degrees of morbidity such as hypertension, stroke, formation of collateral vessels, ventricular hypertrophy and even mortality. Treatment for this condition has traditionally been surgery. We report a series of patients with CoA who underwent stenting performed during cardiac catheterisation as an alternative to surgery.

**Methods:** Four patients, (2 males and 2 females) with age range from 20 years to 41 years underwent coarctation stenting in our institute for native coarctation and restenosis of coarctation post-surgical repair from January 2007 to December 2009. General anaesthesia was given for the CoA stenting. Three patients had 40 mm Palmaz stent put in, while the other had a 39 mm Cheatham-Platinum Covered stent. Angiogram and pressure gradients were measured prior to the stent implantation. Repeat angiograms and pressure measurements were taken to ensure good results before the balloon catheter was taken out.

**Results:** The outcomes were good with significant reduction in gradients across the narrowed segments. There was relief of the CoA as evidenced on angiography. These patients have been followed up for 1 to 3 years and there were no complications noted.

**Discussion & Conclusion:** Therapeutic treatment of CoA through the use of stents during interventional cardiac catheterisation represents new paradigms of treatment for adult patients with aortic coarctation in Singapore. This is the first reported series performed in Singapore where patients with CoA were treated in a non-surgical fashion. With the improvement of technique and devices, it is envisaged that stenting of coarctation will be the treatment of choice for growing children in the future.

## OP-CR-94

### Prediction of the Cognitive Outcome after Stroke

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**Background/Hypothesis:** The Montreal Cognitive Assessment (MoCA) has been suggested to be a better screening tool for Vascular Cognitive Impairment (VCI) than the Mini-Mental State Examination (MMSE). However, the prognostic value of MoCA and MMSE after acute stroke in relation to formal neuropsychological evaluation has not been determined. We aim to compare and evaluate the predictive ability of baseline MoCA and MMSE in the acute post stroke period for cognitive outcomes at month 3 to 6.

**Methods:** Acute stroke patients were administered the MoCA and MMSE at baseline. The locations of stroke were classified according to the Trial of Org 10172 in Acute Stroke Treatment (TOAST) criteria. At 3 to 6 month follow-up, formal neuropsychological testing was performed. Cognitive outcome was classified into No Cognitive Impairment (NCI), Vascular Cognitive Impairment - No Dementia (VCIND)-Mild, VCIND-Moderate and Dementia. The cognitive outcomes were further divided into a) NCI versus VCI; b) cognitive severity groups (NCI and VCIND-Mild versus VCIND-Moderate and Dementia).

**Results:** Of 100 patients, 80 completed the formal neuropsychological evaluation at follow-up. The majority of stroke patients with small artery occlusion (SAO), large artery atherosclerosis (LAA) and cardioembolism (CE) presented with VCI. Baseline MMSE and MoCA scores individually predicted the cognitive outcome of NCI and VCI as well as the cognitive severity groups at month 3 to 6. However, only baseline MoCA scores predicted the outcome of a) NCI and VCI (OR = 0.4); b) cognitive severity groups (OR = 0.74) when both MMSE and MoCA scores were entered simultaneously in the logistic regression model. In addition, baseline cognitive screening test results groups with "Screen positive for both MoCA and MMSE", "Screen positive for either MoCA or MMSE" and "Screen negative for both MoCA and MMSE" predicted the cognitive outcome at follow-up. However, the score change of MMSE and MoCA from baseline to month 3 to 6 did not predict the cognitive outcome groups.

**Discussion & Conclusion:** Baseline MoCA (but not MMSE) scores predicted cognitive outcomes as defined by formal neuropsychological testing at 3 to 6 months post-stroke. Ongoing longitudinal study is carried out to examine the prognostic value of MoCA and MMSE for cognitive outcome at 1 year follow-up.

**OP-CR-95**

**Loss of Cervical Lordosis - An Indicator for Foreign Body Impaction in the Aerodigestive Tract?**

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**Background/Hypothesis:** The sensitivity of lateral neck x-ray to detect the presence of a foreign body in the aerodigestive tract is poor. The authors have observed that normal cervical lordosis is lost on lateral neck x-ray when there is foreign body impaction. The aim of this study was to determine whether there is a relationship between loss of cervical lordosis on radiological examination and the presence of an impacted foreign body in the upper aerodigestive tract.

**Methods:** A retrospective chart review of 29 consecutive cases of foreign body ingestion requiring surgical removal in our institution has been included. All patients had lateral neck x-rays. The foreign bodies were confirmed during surgical removal in the operating theatre.

**Results:** Of the 29 cases, 26 demonstrated loss of cervical lordosis on the lateral neck x-ray. All foreign bodies removed were between C4 and T1 level (Fish bone 10, Aluminium Foil 2, Crabshell 1, Duck bone 3, Chicken bone 6, 7 were not described). The 3 cases with no lordosis were all fish bone and were found at between 15 and 18cm from the upper incisors. The sensitivity of the loss of cervical lordosis as a sign of presence of foreign body in the upper aerodigestive is 89.7%.

**Discussion & Conclusion:** Loss of cervical lordosis is a sensitive sign for the presence of impacted foreign body in the upper aerodigestive tract. This will help clinician to raise a high index of suspicion in cases with negative clinical examination.

**OP-CR-96**

**Chronic Pain and Its Impact on Quality of Life Following a Traumatic Rib Fracture**

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**Background/Hypothesis:** Thoracic trauma comprises 10% to 15% of all trauma patients and traumatic rib fractures account for 7% to 40% of trauma admissions. Most of the traumatic rib fractures heal spontaneously and do not contribute to permanent disability. Prevalence of chronic pain and its impact on quality of life following a traumatic rib fracture is not published yet.

**Methods:** Retrospective review of electronic medical records of all the traumatic rib fracture admissions from January 2007 to December 2008 was conducted. This was followed up with a brief telephonic survey of following questions: (1) Do you have pain following the trauma? (2) If YES, how severe is your pain from a score of 0 to 10? (3) Does the pain affect your life style? (4) Does the pain affect your work? (5) Do you need to take regular pain medications?

**Results:** One hundred and two patients responded to the survey and 23 patients (22.5%) complained of persistent pain after a median duration of 18 months. Five patients (4.9%) had a persistent pain that required regular use of analgesic medications. Six patients (5.9%) complained of impairment of work like and 3 patients (2.9%) complained of impairment of personal quality of life. The persistent pain was not related to the number of fractures, flail chest, hemo-pneumothorax, insertion of the chest tube and the duration of hospitalisation.

**Discussion & Conclusion:** This is the first study from a busy trauma centre that confirms a high incidence of chronic pain after a traumatic rib fracture. While majority of the patients can manage this pain without interference with quality of life, a few minorities do suffer from life style/work interference and may have to resort of regular analgesic usage.

## OP-NA-01

### Improving Dysphagia Management Skills in Nurses

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**Background/Hypothesis:** Dysphagia management requires a multidisciplinary approach. Nurses play a very important in dysphagia management as they work closely with patients and are often the ones who feed patients at meal times. Nurses, therefore, have the best opportunities to implement compensatory feeding strategies, including the preparation of thickened fluids and to promote safe feeding in patients with dysphagia.

**Methods:** One hundred and ten nurses were randomly selected and screened across 22 wards in National University Hospital (NUH) by Speech Therapists. Initial screening (pre-training) revealed that only 18% of nurses at NUH were able to prepare thickened fluids accurately. Basic dysphagia workshops were organised for the nurses with aim of enhancing quality of patient care by improving accuracy of preparing appropriate consistency of thickened fluids, and increasing understanding of dysphagia management. A total of 391 nurses attended this training hosted by Speech Therapists. A post-training screening was repeated 6 months after the workshops.

**Results:** Out of the 110 nurses screened post-training, 52% attended the dysphagia workshop and 48% did not. Seventy-three percent of nurses who attended the workshop remained competent in preparing thickened fluid consistencies 6 months post-training. Interestingly, accuracy in preparation of thickened fluids also increased in the group who did not attend the workshop from 18% pre-training to 42% post-training.

**Discussion & Conclusion:** A generalisation effect of dysphagia management skills was evident from those who attended the workshop compared to those who did not. The former group was still more competent overall when compared to the latter group by nearly two folds. All nurses should be trained in basic dysphagia management to equip them with skills to provide quality care to patients with swallowing difficulties.

**OP-NA-02**

**Code Blue Simulation Training in a Psychiatric Inpatient Unit**

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**Background/Hypothesis:** Simulation training for our hospital nurses in response to collapsed patients requiring basic cardiac life support (BCLS) interventions is commonly done in a structured teaching environment that involves the use of a mannequin on a hospital bed with ready access to the crash cart, defibrillation machine, monitors and oxygen supply. Although this centralised training programme by the nursing education department is crucial to maintain nurses' competencies in BCLS, it does not fully translate and tailor teaching practice to match nurses' clinical setting needs. The majority of our psychiatric inpatients are physically mobile. The ward therapeutic milieu allows patients to move about freely in a big physical space and to participate in various rehabilitation activities. Thus it is less likely to find psychiatric inpatients collapsed on their bed pro-ready for medical emergency interventions. This poses great clinical challenges for the inpatient team to ensure collapsed patients get quick and timely access to BCLS interventions that safeguard their survival chances.

**Methods:** A "Code Blue" nursing workgroup was formed in a psychiatric ward of a general hospital. The workgroup was tasked to design and implement a code blue simulation training programme that tailors to the psychiatric inpatient unit. Participants were asked to rate their perceived ability and confidence before and after the training.

**Results:** After simulation, participants reported increased confidence in their ability to perform both technical and non-technical aspects of responding to medical emergencies.

**Discussion & Conclusion:** The presentation illuminates the workgroup's efforts in assessing the ward physical environment and ward team learning needs to plan and design the "surprise" simulation training programme. The theory and knowledge that guided the teaching practice will be highlighted in the presentation. This presentation will be beneficial to nurses with the keen interest to bridge nursing knowledge practice gap.

**OP-NA-03**

**Preliminary Analysis of Diabetes Advanced Practice Nurse Clinic**

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**Background/Hypothesis:** Diabetes Mellitus is a chronic disease that affects morbidity and mortality. An Advanced Practice Nurse (APN) clinic was initiated to manage diabetes patients in Tan Tock Seng Hospital specialist clinic. An APN is a master's prepared nurse specifically trained in diabetes-related clinical decision making.

**Methods:** Eighteen patients were referred to the APN clinic from 1 to 30 June 2010. We conducted preliminary analysis on the characteristics of the patients referred for APN consult and obtained feedback from the patients via telephone to guide future improvement initiatives.

**Results:** All patients were referred by Endocrinologists from diabetes specialist clinic (n = 11), inpatient setting (n = 6) and polyclinic (n = 1). The age of patients ranged from 32 to 72 years. Seventeen have more than 8 years of diabetes duration and are on insulin therapy. The mean glycosylated haemoglobin was 9.7%. Five patients failed to attend the APN clinic appointments. Out of the 13 patients, 11 patients had insulin doses adjusted. Issues related to glycaemic control were identified in the clinic: e.g. hypoglycaemia (n = 1); wrong insulin injection doses (n = 3); meal-timing mismatch (n = 2), etc. Ninety-two percent of the attendees were successfully contacted for feedback. On a Likert scale of "Poor", "Average", "Good" and "Excellent", 11 patients rated the APN's knowledge, listening and explanation skills "good" or "excellent". The patients would attend a repeat APN consult session if necessary (n = 11).

**Discussion & Conclusion:** Preliminary analysis shows the characteristics of patients referred to APN clinic and a preview of their satisfaction level. More studies are needed to evaluate the clinical, cost effectiveness and patients' satisfaction of the diabetes APN clinic over time.

## OP-NA-04

### Best Treatment Modality for Superficial Phlebitis

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**Background/Hypothesis:** Phlebitis is a common intravenous therapy complication but there is limited evidence to conclude the best treatment modality. The available studies evaluated treatments not commonly used by the local nurses. The health ministry guidelines have no recommended treatments for catheter-related phlebitis. This prompted the nursing research team to undertake an interventional study to compare the topical applications used in the local institution.

**Methods:** The study was a randomised controlled trial. Consenting patients who developed redness associated with peripheral catheters in Tan Tock Seng Hospital between December 2009 and February 2010 were randomised to (1) remove catheter only, or (2) apply glycerine magnesium sulphate (GMS) or (3) Hirudoid. Patients were excluded if they had thrombosis, poor skin condition, and pus seen at the previous puncture. The research nurses performed repeated assessments and administered the treatments for 5 days. The main outcomes to compare were percentage changes in size of redness and the time to resolve redness. The changes in area were tested using Kruskal-wallis. The time variables were modelled in poisson regression adjusted for prognostic factors.

**Results:** Of the patients, 31/46 (67.4%) in the no-application group had redness resolved compared to 32/48 (66.7%) receiving GMS and 32/53 (60.4%) with Hirudoid. There is no evidence of differences in the rank sums across time after the Bonferroni correction. Compared to the no-application group, the data suggested Hirudoid prolonged the time to achieve resolution (time ratio 1.40;  $P = 0.041$ ; 95% CI: 1.01 to 1.93) while GMS was not different from the no-application group (time ratio 1.06;  $P = 0.735$ ; 95% CI: 0.77 to 1.45) after adjusting for important factors.

**Discussion & Conclusion:** The study indicated that low-grade phlebitis can heal effectively without an application if the cannula is removed early. This knowledge will transform the nurses' traditional treatment for phlebitis.



**OP-NA-05**

**Nurses' Perception of Doing Abbreviated Mental Test for the Elderly in the Acute Hospital**

**PLY CHONG**

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**Background/Hypothesis:** Abbreviated Mental Test (AMT) is a simple and objective assessment of cognition in the elderly and has been validated. Cognitive impairment and delirium has been associated with prolonged length of stay and increased resource utilisation. With an ageing population, we decided to pilot the use of AMT in a General Medical ward where 70% of patients are above 65 years old.

**Methods:** All the registered nurses (RN) underwent training and competency assessed by geriatric trained registered nurse. Questionnaires were administered to 24 RN's to determine their perception of doing AMT for the elderly in the general medical ward.

**Results:** From this study, 94% of nurses agreed on the importance of AMT but interestingly, only 50% of the nurses were able to state the purpose of performing AMT which includes detection of delirium, institute treatment early and shorten length of stay. Seventy-nine percent of nurses were able to state the interventions that they would carry out when AMT score is below 7/10. Fifty-eight percent of nurses were able to state the 10 questions used in AMT. Ninety-two percent of nurses expressed interest in attending workshop focusing on the management of elderly with cognitive impairment.

**Discussion & Conclusion:** We usually expect nursing staff to complete assessment forms on admission but rarely explore their perception and understanding. With improved education, we hope to improve nurses' perception on the importance of AMT and better management of patients with cognitive impairment.

**OP-NA-06**

**Effects of Integrating Case Scenarios with Problem-Based Learning in Improving Critical Thinking Skills among Nurses**

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**Background/Hypothesis:** In today's healthcare arena, nurses constantly confront numerous complex problems and life threatening situations in their daily practice. Clinical decisions made without careful reasoning can endanger patients' lives, impede their recovery and may even result in premature death. Education methodologies that foster critical thinking abilities in clinical areas, such as problem-based learning, are therefore imperative. The purpose of this study is to examine the effects of using case-based and problem-based learning in improving critical thinking skills among Registered Nurses in psychiatric settings.

**Methods:** Eighty registered nurses (RN) who met the inclusion and exclusion criteria were randomly selected from the nursing database of a large psychiatric hospital. Upon obtaining their consent, subjects were randomly assigned to 2 groups using computerised randomisation software. Those in the experimental group (n = 40) attended 5 sessions of case-based and problem-based discussion forum, known as Nursing Grand Round, every month over a period of 5 months. Subjects in the control group (n = 40) continued with their current practice of monthly ward-based didactic format of case study presentation. The Health Science Reasoning Test (Facione & Facione, 2006) was used to assess subjects' critical thinking abilities before and after the intervention.

**Results:** These are pending analysis.

**Discussion & Conclusion:** The findings from this study will provide useful evidence-based information that will assist nurse educators in making informed decisions when adopting case-based learning and problem-based learning as a combined teaching and learning methodology for nursing education in psychiatric clinical settings.

**OP-NA-07**

**Use of Arm-Span and Knee-Height Measurement Techniques as Predictors of Standing Height for Patients in Psychiatric Settings**

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**Background/Hypothesis:** Malnutrition is an issue of concern in long-term psychiatric care settings. Standing height has been a procedure of choice in verifying height for nutritional assessment and clinical treatment interventions. However, this technique may not be feasible for patients who are uncooperative or have difficulties standing straight. Anthropometric measurements, such as those of arm-span and knee-height, have been used to estimate stature. This study aims to (1) determine if arm-span and knee-height measurement techniques provide reliable prediction of actual height of patients in long-term psychiatric settings, and (2) determine which of the 2 techniques provide the more reliable prediction of actual height.

**Methods:** A cross-sectional single group study design was conducted with a convenience sample of 487 patients, aged between 23 and 80 years, residing in a long-term care setting of a psychiatric hospital in Singapore. Standing height, arm-span and knee-height were measured for all subjects.

**Results:** Findings indicate that both arm-span (adjusted  $R^2 = 0.757$ ) and knee-height (adjusted  $R^2 = 0.728$ ) measurement techniques are reliable predictors of actual height. Of the two, arm-span is the more reliable predictor.

**Discussion & Conclusion:** The findings from this study will provide nurses with useful evidence-based information that will assist them in making informed decisions, when using either arm-span or knee-height measurement techniques for patients in the long-term psychiatric settings, who have difficulties standing unaided.

**OP-NA-08**

**Relationship between Internalised Stigma and Coping**

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**Background/Hypothesis:** Schizophrenia, a highly disabling and chronic mental disorder, is considered one of the most stigmatised psychiatric disorders due to the negative stereotypes associated with it. Individuals' negative perceptions about stigma can be associated with greater distress and lower self esteem, and result in development of poor coping mechanisms to avoid the rejection that they anticipate from others. This study aims to examine the levels of internalised stigma and relationships with common stigma coping orientations, such as secrecy, withdrawal and education among people with schizophrenia in Singapore.

**Methods:** A descriptive correlational design was employed. Using convenience sampling, 69 eligible subjects were recruited from a subsidised psychiatric outpatient clinic for a cross-sectional survey. Data were collected using a self-reported questionnaire comprising the Internalised Stigma of Mental Illness scale (Ritscher, Otilingam, & Grajales, 2003) and Coping Orientations: Secrecy, Avoidance-withdrawal and Education scale (Link, Mirotznik, & Cullen, 1991).

**Results:** The total mean score did not show a high level of internalised stigma among people with schizophrenia but close to one-third reported so. All subjects endorsed the 3 coping orientations (Secrecy, Avoidance-Withdrawal and Education) strongly. The mean scores for Avoidance-Withdrawal and Education were significantly higher than the midpoint. Internalised stigma was positively correlated with Avoidance-Withdrawal.

**Discussion & Conclusion:** The meaning and impact stigma has on individuals with schizophrenia should not be disregarded. Additionally, they should be empowered and equipped with more positive coping strategies with stigma. People who endorse avoidance-withdrawal strongly may be at higher risk of suffering negative consequences of internalised stigma as well. Mental health professionals have the responsibility to empower individuals with schizophrenia in adapting to present situations.

**OP-NA-09**

**To Increase Influenza Vaccination Rate for Human Immunodeficiency Virus Patients in Specialist Outpatient Clinic J, Tan Tock Seng Hospital**

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**Background/Hypothesis:** Annual influenza vaccination is recommended for human immunodeficiency virus (HIV) patients. A Clinical Practice Improvement Project (CPIP) was initiated with the aim of improving vaccination rate from the pre-existing 27.0% to more than 80% of all eligible patients.

**Methods:** Standard CPIP methodology was used. Potential causes for poor vaccination rates were identified by discussing with patients and healthcare providers. Clinic processes were re-examined, and we quantified the relative contribution of different causes. Interventions were designed, rolled out and changes in vaccination uptake monitored post-implementation.

**Results:**

*Pre-Implementation Findings*

Fish-bone diagram identified several reasons for missed vaccination opportunities; lack of reminders (20.0%), lack of proper patient education (17.8%), patient defaulting vaccination (17.8%), patients deferring vaccination (13.3%) and lack of tracking systems (8.9%) were highlighted on Pareto analysis as causing more than 80% of the problem. The causes were grouped into 3 major obstacles amenable to intervention: 1) lack of patient awareness on benefits; 2) lack of a tracking system; and 3) short patient-doctor contact time.

*Interventions*

We then set up a nurse-led Vaccination Clinic along with a vaccination tracking system to: 1) provide for patient education, 2) promote benefits of vaccination; and 3) conduct eligibility assessment

*Outcome*

From June to December 2009, 1561 patients were reviewed for influenza vaccination, of which 1359 were eligible for vaccination. Of these, 1098 (80.8%) received influenza vaccination. This represents a substantial improvement over the estimated pre-implementation vaccination rate of 27.0%.

**Discussion & Conclusion:** The nurse-initiated CPIP successfully identified causes for poor vaccination rates and substantially improved uptake of annual influenza vaccinations among HIV patients.

## OP-NA-10

### A Retrospective Study of Labour Pain of Women in a Singapore Hospital

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**Background/Hypothesis:** For most women, natural labour is considered to be one of the most painful and significant events in their lifetime. A range of variables such as sociodemographic, psychological and physical characteristics have been found to correlate with labour pain. However, the existing empirical works were inconclusive. Therefore, the purpose of this study was to examine the parity and racial-related differences in labour pain intensity level in Singapore. In addition, various predictor factors of labour pain such as maternal age, time of day, cervical dilation, educational levels, gestational age and infant birth weight were tested to determine their contribution to or impact on labour pain.

**Methods:** This was a retrospective audit of medical records of the parturients who delivered at an acute care hospital in Singapore. A convenience sampling was used and a sample size of 310 (Chinese = 129, Indian = 76, Malay = 70, others = 35) pregnant women at term (37 to 42 weeks gestation) was identified from December 2009 to February 2010. The main outcome measure was labour pain as assessed by the Numerical Rating Scale (NRS).

**Results:** There were statistically significant differences ( $P < 0.05$ ) between primiparous women and multiparous women in terms of labour pain intensity. In addition, factors such as ethnicity, maternal age, time of day, and cervical dilation were found to affect the labour pain score. No significant differences were found between educational levels, gestational age and infant birth weight.

**Discussion & Conclusion:** The findings suggest a complexity to individual variations of labour pain. This stresses the importance of developing an individualised childbirth care plan and pain management in order to enhance parturients' birthing experience. Further studies are necessary for a deeper understanding of women's labour pain experiences across the different racial or ethnic populations in Singapore as a global community.

## OP-NA-11

### Factors Affecting Effective Nurse-Patient Communication

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**Background/Hypothesis:** In oncology nursing where conversations entail emotionally loaded topics and patients' receptivity is greatly affected by their life-threatening disease and its trajectory, effective communication is particularly crucial. This study investigated the factors affecting effective communication between Singaporean registered nurses and inpatient oncology adults.

**Methods:** This was a qualitative study situated within the interpretivism paradigm. Ten registered nurses from oncology wards of a major teaching hospital in Singapore were interviewed. Data were transcribed verbatim and thematically analysed.

**Results:** Influencing factors were found to originate from the patient, the nurse and the environment. Patient factors were their disease trajectory and low perception of nursing work. Nurse factors included fear and discomfort when discussing sensitive topics, and appropriate non-verbal behaviours and communication approaches. Environmental factors included Singapore's "user-pays" health system and management support. Language barriers were significant in multicultural Singapore, particularly between overseas trained nurses and patients who could not converse in English. Additionally, the government's promotion of Singapore as a medical "hub" increases the cultural and ethnic mix of in-patients.

**Discussion & Conclusion:** While there are common factors influencing communication in all contexts of practice, this study suggested that in the oncology setting, patients' disease trajectory and psychological state could affect effective communication. A multicultural community also presents special challenges in the oncology inpatient setting; this could be observed from patients' acceptance to touch across the various ethnic groups/gender as well as the communication difficulties posed by language/cultural differences. A particular concerning finding was the Singapore society's poor perception of and lack of respect for the nursing profession.

## OP-NA-12

### Breast Cancer Women's Anxiety during Chemotherapy

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**Background/Hypothesis:** Breast cancer is one of the most common cancers among women worldwide, accounting for 20% to 25% of all cancers diagnosed. With the introduction of more advanced treatments, the life expectancy of these patients has increased. However, accompanying these improved treatments are many side effects that patients have to cope with. When compared across breast cancer treatments, it was noted that patients receiving chemotherapy tend to exhibit significantly higher levels of anxiety. This exploratory study postulated that anxiety prevails among women with breast cancer in Singapore commencing chemotherapy for the first time. It also sought to identify factors that could have contributed to anxiety.

**Methods:** Using a quantitative survey approach, a convenience sampling of 20 women with breast cancer who received first time chemotherapy at a restructured hospital were invited to participate in the study. Data were collected using the Becks Anxiety Inventory.

**Results:** It was noted that the level of anxiety among women who participated in the study was generally low, with only 10% reporting moderate level of anxiety. No significant correlation was established between the level of anxiety and patients' demographics, i.e. age, race, marital status and educational level.

**Discussion & Conclusion:** This preliminary study provides initial exploration on the research interest. Though the results were not congruent with findings from similar studies exploring anxiety in women with breast cancer receiving chemotherapy, it is postulated that if replicated with a larger sample size, it may be able to establish a more representative and meaningful evaluation of the situation.



**OP-NA-13**

**A Pilot Descriptive Study on Adult Mothers' Views and Experiences of Postpartum Support**

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**Background/Hypothesis:** This pilot study aimed to identify the levels of support expected and received by adult postpartum women in Singapore. Another objective was to compare the different subscales of social support. As there is a lack of publication of local Singaporean perspective of postpartum support, this research sought to highlight pertinent concerns for consideration in future studies.

**Methods:** This study adopted a descriptive design. A self-administered questionnaire comprising demographics and the postpartum support questionnaire (PSQ) was administered via convenience sampling to 25 participants. Participants in their 6 to 8 weeks postpartum period were recruited from late December 2009 to late February 2010. The data were analysed using descriptive statistics and inferential statistics.

**Results:** The overall support needs of the participants were met. Only informational support had a statistical difference between the levels of support expected and received, indicating that this subscale was unmet. The level of material support received was higher than the level expected. This study found statistical significance in the relationships of social support with 2 demographic variables namely, working status and breastfeeding status in the past 6 to 8 weeks.

**Discussion & Conclusion:** Assessing the needs of postpartum women and teaching them how to convey and manage expectations are recommended initiatives for healthcare practitioners, nurses in particular to consider. For future research, it is recommended that psychosocial tools be developed to assess social support needs. This study may be replicated with larger samples and correlated with other outcomes such as postnatal depression and stress levels.

**OP-NA-14**

**To Explore the Effect of Distance of Light Source from Extremity on Ambient Temperature for Microsurgical Patients at National University Hospital**

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**Background/Hypothesis:** Microsurgery performed for patients who have digit amputation or flap transfer after trauma injuries. Survivorship of replanted digit or flap depends on blood circulation and permeability of repaired small vessels. Microsurgical site kept warm using exogenous heat source (e.g. lamp). Nurses and doctors frequently adjust the distance resulting in fluctuation of temperature reading. Blisters and burns are common complications develop from long hour exposure under heated lamp. This study explores the effect on the distance of heat source on microsurgical site to minimise microsurgery failure.

**Methods:** To evaluate the difference and effect on 40 wattage light bulb. In study phase I, a purposive sampling of 30 healthy volunteers of age 21 to 39 years old was recruited. They were divided into 3 groups of 10. Temperature monitoring of their upper extremities for 180 minutes at distance of 15 cm, 20 cm and 25 cm. During monitoring, one side of their upper extremities was place under the lamp with 40 wattage light bulb. Phase II, temperature of 4 pieces of raw fresh chicken thighs with skin simulate as microsurgical site with no circulation was monitored as in study phase I.

**Results:** Complications occurred if monitoring site exposed long hours under heated lamp. At 25 cm, the rate of temperature increase remained constant 0.348 ( $P = 0.037$ ). When temperature is less than 30°C, adjustment of distance achieves desired temperature.

**Discussion & Conclusion:** In phase I, temperature at distance of 25 cm maintained around 32°C throughout 180 mins. Phase II, effect of the light therapy does affect the temperature of the circulation compromise microsurgical site. If microsurgical site doesn't achieve target temperature of 30 to 32°C within an hour, this signals possibility of poor arterial or venous circulation. Immediate treatment is necessary. Clinical competency of neurovascular assessment is essential.

OP-NA-15

**Intima-Medial Thickness Guidance of Primary Prevention in Relatives with Early Onset Atherosclerosis: The IMPRESS Study (Pilot Results)**

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**Background/Hypothesis:** Cardiovascular disease (CVD) is the leading cause of death globally and affects one in three Singaporeans. The IMPRESS study aims to determine if a nurse-led disease management program (DMP) can reduce atherosclerotic burden and improve overall health. This paper presents the early findings of the initial screening prior to entry into the IMPRESS study.

**Methods:** Participants aged 40 to 65 years old with a first degree family history of premature CVD underwent cardiovascular risk screening from May 2010 to determine their eligibility to enter the IMPRESS Study. Screening tests include fasting lipids, liver function, renal function, blood glucose, estimation of BMI and blood pressure, ECG and carotid intima-medial thickness (CIMT). Risk profiling was determined using a modified Framingham risk score. Mean CIMT was measured and subclinical atherosclerosis was defined as a mean CIMT above 75th percentile according to American Society of Echocardiography (ASE) guidelines.

**Results:** Of 65 participants screened, over two-thirds (70%) had low-density lipoprotein (LDL) cholesterol levels  $\geq 3.4$  mmol/dL and 41 (65%) had body mass index (BMI)  $\geq 23$  kg/m<sup>2</sup>. Twenty-six (40%) had a systolic blood pressure (BP)  $\geq 140$  mmHg, of which 70% were untreated or unaware of their increased BP. Undiagnosed diabetes mellitus was found in 6 (10%) participants. Nine patients had CIMT thicker than expected for age and gender - two-thirds of these were from the "low risk" group.

**Discussion & Conclusion:** Initial results from this study suggest that screening of first degree relatives of patients with premature CVD cohort is beneficial. They frequently have undiagnosed or unappreciated vascular risk factors and evidence for subclinical atherosclerosis, and stand to benefit from a DMP.

**OP-NA-16**

**The Role of Family and Friends in Providing Social Support towards Enhancing the Wellbeing of Postpartum Women: A Systematic Review**

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**Background/Hypothesis:** Social support provided by family and friends has been identified as a buffer against the many stressors faced by postpartum women. This systematic review aimed to appraise and synthesise the best available evidence which discusses its impact on enhancing the well being of postpartum women.

**Methods:** Both published quantitative and qualitative studies were considered. This review included women who were within their first year postpartum period, of any parity, and had given birth to healthy infants. Mothers who had coexisting morbidities such as depression, or those from low socioeconomic groups were excluded. Studies that involved the provision of social support by family, friends, or peer counsellors were considered. The 6 outcomes were stress, self esteem, breastfeeding levels, mental health in relation to postnatal depression, infant care and maternal adaptation. Tools developed by Joanna Briggs Institute (JBI) were used in the appraisal, extraction and synthesis of the selected papers.

**Results:** A total of 24 quantitative and 3 qualitative articles were included. Quantitative analysis indicated a significant negative correlation between social support and levels of stress and postnatal depression. Social support was positively correlated with the other 4 outcomes. Qualitative synthesis generated one synthesised finding which is, "Motherhood as a period of learning, adjustment, seeking positive social support whilst buffering against stressors".

**Discussion & Conclusion:** Family members and peer volunteers should be involved in the provision of care towards postpartum women. Healthcare professionals also ought to be equipped with the knowledge on social support so that they can cater to their needs.

**OP-NA-17**

**National University Hospital Diabetes Control Programme: A Unique Approach towards Diabetes Control**

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**Background/Hypothesis:** Using an interactive educational approach, a multidisciplinary team can provide effective yet cost-efficient improvements in glycaemic control in diabetes patients.

**Methods:** The Diabetes Control Programme was designed to empower patients with knowledge about diabetes, including complications, medications, self-care, suitable exercise and healthy eating. This programme was unique in its hands-on approach and interactiveness between patients, in groups of 4 to 10, and the diabetes nurse educator (DNE), dietitian and physiotherapist, over 2 Saturday mornings. By measuring blood glucose levels of participants before and after breakfast and exercise during the programme, participants were able to obtain real time feedback on the impact of food choices and exercise on blood glucose levels. Food diaries and self-blood glucose monitoring records were analysed by both DNE and dietitian simultaneously. Working together, they could quickly identify whether elevated readings were due to food indiscretions, medication issues or progression of disease. HbA1c and participants' diabetes knowledge, using a questionnaire, were assessed pre-programme, and 3 to 4 months post-programme. Participants were further motivated to improve their outcomes as they could get a full refund of the small programme fee if their HbA1c improved by  $\geq 1\%$ , made possible with funding from the Singapore Totaliser Board.

**Results:** Fifty participants took part in the programme between July 2008 and December 2009, of which 26 had pre and post HbA1c results. Glycaemic control improved significantly, with mean HbA1c reduction of  $1.53\% \pm 1.78$  ( $P < 0.001$ ), from  $8.6\% \pm 1.5$  to  $7.1\% \pm 1.0$ . There was also a mean increase of 41% in participants' diabetes self care knowledge post-programme.

**Discussion & Conclusion:** A well-structured interactive educational programme by a multidisciplinary team was able to make significant improvements in diabetes control.

**OP-NA-18**

**Developing a Patient-Centric Late Effects Surveillance Program for Children and Adolescent Blood/Marrow Transplantation Survivors**

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**Background/Hypothesis:** Blood/marrow transplantation (BMT) has increased disease-free survival rates of childhood cancers and genetic blood disorders. International guidelines have been established to safeguard health of survivors through focused clinics for early detection/intervention of late effects. We adopted an approach that allowed us to provide late effects surveillance in a busy acute care setting in the form of oncology-nurses driven 'After Care and Transition' (ACT) clinic.

**Methods:** The ACT clinic started in April 2009. Patients who have reached 1 year after BMT were invited to comprehensive health screens. ACT nurses identified patients through BMT records; organised tests selected by physician; sent off invitation letters to parents/guardians; retrieved results before patient's closing visit with physician; and facilitated sending off final medical reports to parents/guardians.

**Results:** Thirty-two BMT survivors were screened from April 2009 to June 2010. Primary diseases included acute/chronic leukaemia, lymphoma, thalassaemia and primary immunodeficiency. Median age at the time of BMT, from time of BMT to screening, and at the time of screening were: 7.0 (range, 0.3 to 20.7); 3.3 (range, 1.2 to 9.0); and 11.3 (range, 2.8 to 25.1) years, respectively. Fifty-four percent of patients have low bone mineral density; 25% have hyperlipidaemia; 17% have biochemical hypothyroidism; 11% have cataracts and 66% have high ferritin levels.

**Discussion & Conclusion:** We found that most patients can benefit from simple lifestyle changes while some need definite monitoring/intervention. Many measures incur low/no extra costs to families (e.g. low fat, high calcium diet; weight-bearing exercises; sun protection with shades etc). Our eventual aim is to develop a patient-centric surveillance programme that is relevant and cost effective; and recognise that a dedicated ACT nurse equipped with necessary skills and knowledge can enhance the running of this programme.

**OP-NA-19**

**Ready...Set...Home! Transiting from Blood/Marrow Transplant Unit to Home/Outpatient Safely**

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**Background/Hypothesis:** Discharging patients after prolonged admission in blood/marrow transplant (BMT) unit elicits mixed emotions from parents. To help ease anxiety induced by the daunting task of caring for their child at home; and to ensure that complex BMT medications are properly taken, we developed parent-friendly informative booklets such as educational aids. We also attempted to evaluate the effectiveness of these booklets.

**Methods:** From May 2009, all BMT patients were given 2 discharge booklets ("Discharge from Stem Cell Transplant Unit" & "Follow-up"). Using these booklets, the nurse conducts one-on-one sessions with the parents 3 to 5 days before discharge. Discharges were guided by checklists and essential information relayed to BMT outpatient nurses for continued care. A 100-day follow-up data on the frequency of hydration drips, hypertensive episodes, electrolyte replacements and readmissions were retrospectively collected. We compared the outcomes in 7 patients who received discharge preparation and 7 who did not receive.

**Results:** Overall, parents who received discharge preparation felt empowered to monitor their children's health at home. With the 'Follow-up' booklets, the health care team had objective recordings of health parameters for better titration of medications; both healthcare team and parents have accurate access to updated patient's medications. We noted that patients who were prepared had fewer episodes of outpatient intravenous hydration, electrolyte replacements and fewer readmissions.

**Discussion & Conclusion:** We recognise that confounding factors exist that preclude meaningful comparison in the 2 groups of patients, but we noted a trend for higher confidence levels amongst the parents and the healthcare team, safer transition to home/outpatient and relatively lesser need for intervention while in outpatient in patients who received discharge preparation. With feedback from parents, we continue to refine the discharge preparation and educational aids to improve the discharge outcome of our patients.

## OP-QHSR-01

### **Economic Evaluation of Adjuvant Trastuzumab in the Treatment of Early, Her2neu Over-Expressing, Breast Cancer in Singapore**

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**Background/Hypothesis:** Trastuzumab has revolutionised the way we treat early Her2Neu-positive breast cancer, as it significantly improves disease-free and overall survival. Little is known about the societal costs and benefits of treatment with trastuzumab in the adjuvant setting in Asia. This study aimed to perform the first economic evaluation of trastuzumab in Singapore and Asia, showing that its use generates net gains to the society.

**Methods:** Societal costs (benefits) were estimated as the sum of direct and indirect costs minus benefits in the base case. Direct costs were derived from actual patient costs at 4 treatment centres in Singapore (2 private and 2 public, comprising 60% to 70% of all patients with cancer seen in the island-nation); indirect costs were assessed as the loss of productivity caused by the disease or treatment. Benefits to society were based on extra years of productivity, as measured by GNI per capita, resulting from the quality adjusted life-years (QALYs) saved with the use of trastuzumab as determined in the models by Kurian (J Clin Oncol 2007), Liberato (J Clin Oncol 2007) and Garrison (Cancer 2007). Sensitivity analysis was performed.

**Results:** Incremental costs in Singapore (all costs in 2005 US dollars) were US\$26,971.05. Average Cost per QALY was US\$19,174.59 (Median: US\$18,993.70). Costs (benefits) to society ranged from a cost of US\$79.42 to a benefit of US\$9263.06, depending on the model used (Average benefit: US\$4375.89, Median US\$3944.03). Sensitivity analysis ranged from a cost of US\$10,685.00 to a benefit of US\$17,298.79.

**Discussion & Conclusion:** Treatment with adjuvant trastuzumab is likely to generate net societal economic benefits in Singapore. Nevertheless, the lower range of possible outcomes does not refute the possibility that treatment may actually generate costs. These costs however clearly fall within the usual range of acceptable cost-effectiveness.



## OP-QHSR-02

### Estimating Intensive Care Unit Bed Capacity Using Discrete Event Simulation

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**Background/Hypothesis:** The intensive care unit (ICU) in a hospital caters for the critically ill patients. The number of ICU beds has direct impact on many aspects of the hospital performance. Lack of ICU beds may cause ambulance diversion and surgery cancellation, while excessive ICU beds may cause a waste of resources. In this paper, a discrete event simulation (DES) model is developed to help the healthcare service providers determine the proper ICU bed capacity which strikes the balance between service level and cost effectiveness.

**Methods:** The DES model is developed to reflect the complex patient flow of the ICU system. Actual operational data including emergency arrivals, elective arrivals and length of stay is directly fed into the DES model to capture the variations in the system. The DES model is validated by open box test and black box test. The validated model is used to test 2 what-if scenarios the healthcare service providers are interested: the proper number of ICU beds in service to meet the target rejection rate and the extra ICU beds in service needed to meet the demand growth.

**Results:** A 12-month period actual operational data was collected from an ICU department with 13 ICU beds in service. Comparison between the simulation results and the actual situation shows that the DES model accurately captures the variations in the system, and the DES model is flexible to simulate various what-if scenarios.

**Discussion & Conclusion:** DES helps the healthcare service providers describe the current situation, and simulate the what-if scenarios for future planning.

## OP-QHSR-03

### **Improving Patient Access to Emergency Care: Implementation of Lean Concepts at Emergency Department of National University Hospital**

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**Background/Hypothesis:** This project aims to achieve lean transformation in the emergency department (EMD) of National University Hospital (NUH) in order to provide timelier access to EMD care for patients. Lean is about understanding value from the patient's perspective and delivering exactly what is required at the right time with minimum effort and waste minimised in a safe environment. The objectives are to eliminate unnecessary waits for patients, reduce length of stay (LOS) and free up EMD capacity.

**Methods:** A "LEAN" team was assembled and led by Dr Malcolm Mahadevan (NUH EMD Chief, Senior Consultant) and a series of lean improvement events (Rapid Improvement Event and 6S) were planned and conducted. These events were orchestrated from a process improvement and waste elimination perspective to provide EMD patients with timely access and high quality clinical care and services.

**Results:** The results from the lean improvement events are rapid and apparent. The consultation waiting time for P2 and P3 patients and the LOS for P3 patients are now ~30% lower than before. Wait time for medication at EMD Pharmacy was successfully reduced by a remarkable 50%. A general decrease in the number of patients leaving EMD without follow-up appointment date is also observed. As a result of all these improvements, the EMD of NUH scored an astounding 52% improvement in the 2009 Ministry of Health (MOH) Patient Satisfaction Survey. A well-organised "6S" EMD results in a safer, more efficient and productive operation, in turn, enhancing patients' experience and boasting staff morale.

**Discussion & Conclusion:** This project managed to help drive paradigm shift, behavioural changes and sustainable improvements in quality of care across EMD. A lean EMD improves patient flow and access, leading to more appropriate use of EMD resources for higher acuity patients. This allows the clinical team in EMD to improve the stability of the patients and right-site them to the appropriate follow-ups based on the acuity level, ultimately improving the overall utilisation of EMD healthcare resources.

## OP-QHSR-04

### Adherence to Post-Hospitalisation Rehabilitation

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**Background/Hypothesis:** Rehabilitation has been shown to improve the quality of life and decrease costs associated with disability and life expectancy. We studied the one-year adherence of newly discharged patients from a community hospital to supervised rehabilitation, and to study the various barriers affecting compliance using mixed methods.

**Methods:** In Phase 1, 48 inpatients who were recommended for rehabilitation by a multidisciplinary healthcare team upon discharge were qualitatively interviewed to gather their views on rehabilitation, and recurrent themes from interview transcripts were analysed and used for creating a quantitative questionnaire. In Phase 2, another 70 inpatients also recommended for rehabilitation were interviewed with a questionnaire prior to discharge. Telephone interviews were subsequently conducted at 3, 6, 9 and 12 months.

**Results:** Phase 1 interviews revealed specific perceived financial, social, physical and health barriers. At the start of the Phase 2 study, 87.1% viewed rehabilitation as beneficial, but overall longitudinal compliance rate fell from 100% as inpatient to 20.3% at 3 months, 9.8% at 6 months, 6.3% at 9 months and 4.3% at 12 months. Physical, caregiver and social barriers were featured strongly initially but decreased in importance with time. In contrast, financial barriers increased in importance with time.

**Discussion & Conclusion:** Adherence to post-hospitalisation rehabilitation in Singapore is low. Specific barriers affecting compliance at different time-points should be addressed to improve this.

## OP-QHSR-05

### Quality Audit of Elective Major Operations Using Physiological and Operative Severity Score in the Enumeration of Mortality and Morbidity Scoring System

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**Background/Hypothesis:** The data of crude morbidity and mortality rates do not allow comparison with international standards because they are not risk-adjusted and standardised. Physiological and Operative Severity Score in the enUmeration of Mortality and morbidity scoring system (POSSUM) adjusts for the operation and physiological status of patients and thus allows meaningful comparison of surgical performance. Our primary objective is to reduce mortality and morbidity (M&M) in patients undergoing elective major gastrointestinal operations using POSSUM tools. The secondary objective is to audit surgical performance in our department.

**Methods:** Elective major gastrointestinal cases were recruited. Using the 12 physiological factors before operation and 6 operative factors at the end of operation, the M&M rates were calculated from POSSUM equations. The Observed to Expected ratio, O/E ratio was used to assess surgical performance over time.

**Results:** From July 2009 to April 2010, 311 patients were analysed. The observed morbidity by POSSUM was 41% and the expected morbidity was 48% with O/E ratio 0.85. For mortality, our observed mortality rate was 1.3% while the expected mortality was 13.5% with O/E ratio 0.1. As for surgeon performance, 71% and 95% of our surgeons had  $O/E \leq 1$ , i.e., satisfactory, for both morbidity and mortality.

**Discussion & Conclusion:** We found that our surgical performance was better than expected with POSSUM scoring tools. By adjusting for the severity of the operation and the physiological status of the patient, predicted outcomes can be compared with those observed in practice, hence providing a more reliable assessment of surgical performance.

## OP-QHSR-06

### Hypertension Management in a Singaporean Low-Income Community

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**Background/Hypothesis:** Factors affecting hypertension treatment and control amongst lower-income Singaporeans are largely unknown. We studied hypertension management in a low-income Singaporean community and the effect of regular follow-up.

**Methods:** We studied a neighbourhood of 3 blocks of rented public flats. Participants were recruited in January 2009 and January 2010. At the recruitment, sociodemographic details were collected and blood pressure (BP) measured. For participants recruited in January 2009, known hypertensives not on treatment/with suboptimal control, and newly-diagnosed hypertensives were encouraged over 2009 to go on treatment and improve BP control via phone calls/house visits, and we re-measured treatment and control a year later. Backward logistic regression was performed to obtain the most parsimonious model for outcomes studied.

**Results:** Participation was 89.0% (357/400). Two hundred and nine residents were recruited in 2009 and 148 in 2010. At baseline, prevalence, awareness, treatment and control was 63.9% (228/357), 61.8% (141/228), 69.5% (98/141) and 43.9% (43/98). Awareness was higher in diabetics ( $P < 0.001$ ), dyslipidaemics ( $P < 0.001$ ),  $\geq 60$  yrs ( $P = 0.001$ ) and those with regular access to doctors ( $P = 0.013$ ). Treatment was more likely in  $\geq 60$  yrs ( $P = 0.031$ ), but less likely in those needing financial aid ( $P = 0.016$ ). Control was less likely in the employed ( $P < 0.001$ ). Of the 209 participants recruited in 2009, 143 had hypertension, 61 were newly diagnosed and 82 were known hypertensives. Post-intervention, of the 61 newly diagnosed hypertensives, 6 were on treatment and 33.3% (2/6) had good control. Of the 82 known hypertensives, treatment rose from 63.4% (52/82) to 92.7% (76/82); while control rose from 42.3% (22/52) to 78.9% (60/76).

**Discussion & Conclusion:** Hypertension awareness, treatment and control in lower-income Singaporeans are poor. A one-year follow-up intervention via house visits/calls improved treatment and control in known hypertensives, but not in newly-diagnosed hypertensives.

## OP-QHSR-07

### Sources of Healthcare Advice in Low-Income Singaporeans

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**Background/Hypothesis:** Cost and misperceptions may discourage lower-income Singaporeans from seeking medical followup. We investigated preferences for providers of health advice/treatment in a low-income Singaporean community.

**Methods:** We studied a neighbourhood of 3 blocks of rented public flats from 2009 to 2010. At the recruitment, residents were asked who their preferred source of health advice was. Sociodemographic details were collected, health-seeking behaviours were surveyed and blood pressure (BP) was measured. Backward logistic regression was performed to obtain the most parsimonious model for outcomes studied.

**Results:** The participation was 89.8% (359/400). Only 11.1% (40/359) preferred to approach the Western-trained doctors for medical advice; 29.5% (106/359) preferred alternative medicine; 6.7% (24/359) approached family members and 52.6% (189/359) preferred to rely on their own knowledge. Comparing against 351 residents recruited from adjacent non-rental flats and controlling for sociodemographic factors, the rental residents were more likely to turn to alternative medicine and family members but less likely to turn to Western-trained doctors ( $P < 0.001$ ). In the rental flat community, singles were more likely to consult alternative medicine practitioners ( $P = 0.005$ ) and non-Chinese were more likely to consult family ( $P = 0.016$ ); while dyslipidaemics were more likely to consult Western doctors ( $P = 0.017$ ). There were no significant associations between source of medical advice and participation in regular chronic disease screening, smoking or drinking cessation, and control of BP in known hypertensives. Cost and lack of perceived efficacy were the main reasons cited for not seeing the Western-trained doctors.

**Discussion & Conclusion:** Western-trained physicians are not the first choice of lower-income Singaporeans for seeking medical advice. Nevertheless, those seeking medical advice from Western-trained doctors did not have better health seeking behaviours compared to those preferring alternative medicine or consulting family.

## OP-QHSR-08

### A Subacute Model of Geriatric Care for Frail Older Persons

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**Background/Hypothesis:** Problems may arise post-acute hospitalisation during care transitions for the frail elderly. The subacute-care unit in Tan Tock Seng Hospital (TTSH) was set up in May 2009. We examined its impact on the transitions at the nexus between hospital and community sectors, patients' discharge destination and functional performance.

**Methods:** We studied patients admitted to subacute unit during the initial 6-month period. Demographic data, length of stay (LOS), medical and functional measures (modified Barthel Index (MBI)) were obtained. Final discharge outcome data was captured.

**Results:** The acute ward transfer back rate was 2.7%. For the 180 subjects, most of hospital stay was in subacute care (mean acute and subacute LOS 9.4 + 9.4, 12.6 + 10.8, respectively), 45% of total patients went home, 23.9% went to slow-stream rehabilitation (SSR) and 29.4% were institutionalised. There was a subgroup of 18.4% dementia patients requiring further behavioural and functional interventions, of which 58% managed to be discharged back into community. Functional gains were seen during subacute stay (MBI improvement 41.1-52.8,  $P < 0.001$ ); with greatest gains observed in patients discharged to community.

**Discussion & Conclusion:** The geriatric subacute unit helped the patients in achieving significant functional improvement, thus allowing majority of patients to be discharged back into the community (including dementia patients with challenging behaviours).

## OP-QHSR-09

### **Risk Assessment Index for Nursing Home Admissions for Geriatric Inpatients**

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**Background/Hypothesis:** Institutional care drives healthcare expenditure and results in functional decline. However, only a portion of geriatric inpatients referred for placement were eventually institutionalised. This study looked at the development of a clinical tool to triage nursing home requests to enable high risk patients to be seen promptly by social worker and lower risk elderly to have home care-coordination.

**Methods:** We reviewed data on geriatric inpatients collected from October 2006 to September 2007 referred to our social workers for nursing home placement. Demographic data, medical comorbidities, illness severity indices, activities of daily living, caregiver and socioeconomic data and eventual discharge status (nursing home, slow-stream rehabilitation or home) were obtained. We performed univariate and multivariate statistical analysis. A composite risk index for nursing home admission was developed and cut-offs obtained using receiver operating characteristic analysis.

**Results:** One hundred and twenty-nine inpatients were referred for institutional care of which only 54.3% (70 patients) were institutionalised. Our 4-item risk index consisted of: patients  $\geq 80$  years, single, functionally dependent (moderate assistance in 4 activities of daily living) and dementia with significant behaviour problems. Receiver operating characteristic analysis showed index score  $\geq 4$  identified high risk patients for social worker input for institutionalization (area under curve 0.77, 80% sensitivity, 61% specificity).

**Discussion & Conclusion:** The risk assessment index for nursing home admission shows initial promise in efficient triage of geriatric inpatients at high risk and lower risk for institutionalisation which may improve efficiency of healthcare delivery and resource utilisation. This needs further validation for practical routine use.



## OP-QHSR-10

### Cosmetic Procedure Survey among Singapore Junior College Students

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**Background/Hypothesis:** Cosmetic procedures have become increasingly popular in recent years due to media coverage and advances in medicine. Through this survey, we seek to explore Singapore Junior College students' views on cosmetic procedures, their knowledge of the types of procedures available, and the associated potential risks.

**Methods:** A cross-sectional questionnaire survey of a random sample of students aged 16 to 21 years from 2 Singapore Junior Colleges has been conducted in 2010.

**Results:** There are 1164 respondents (71% response rate), with male to female ratio of 1.13, and median age of 17. Majority is Chinese (89%), followed by Indian (3.6%), Malay (1.8%), Caucasians (0.7%), and others. Eighty-three percent are Singaporeans, the remaining comes from 28 different countries. Twenty-nine students (2.5%) admit to have previous cosmetic procedures (10 different types). Thirty-four percent approve fellow students having cosmetic procedures. Among those who have never had cosmetic procedures, 5% would consider cosmetic procedure now, and 9% in the future. Forty-five body parts are in their wish list of change. The most frequently desired to alter body part is the nose, followed by eyelids. Forty-seven percent claim to be not aware of any associated risks. Seventy-one percent would not feel embarrassed if their family or close friends know about them having cosmetic procedures. Sixteen percent approve their boy or girlfriends having cosmetic procedures.

**Discussion & Conclusion:** This study shows that cosmetic procedures are well accepted among the legal under age in Singapore. Shockingly, nearly half of the studied population are not aware of any associated risks. These findings have significant implications on physicians who are involved in providing cosmetic procedures on this medico-legally high risk group of patients.

## OP-QHSR-11

### Profiling Discharge Needs Using Clustering and Decision Tree

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**Background/Hypothesis:** Home Nursing Foundation, together with Tan Tock Seng Hospital (TTSH), will be implementing an Integrated Home Care Programme to manage patients within TTSH's catchment. This study aimed to identify clusters of patients according to their post-discharge needs to assist service planning.

**Methods:** A cross-sectional study was conducted between 12 April 2010 and 15 May 2010 in TTSH. Patients likely to require home care were assessed by the case managers and care-coordinators for their post-discharge needs. The top 15 needs were used to identify clusters of patients using 2-step clustering algorithm. Decision tree algorithm was then applied to predict patients cluster's membership.

**Results:** Three clusters emerged from the 488 patients surveyed. Patients in Cluster 1 (42%) had the most needs (average 7.0 out of 15), including physiotherapy. They were likely to have functional decline and poorer functional status. Cluster 2 (35%) had slightly fewer needs (average 5.9) and were characterised by needs on education about their disease and management of exacerbations, but not physiotherapy. They had good Barthel scores but might have chronic obstructive lung disease (COLD) or heart failure (HF). Patients in Cluster 3 (23%) had the least needs (average 1.5) and these were likely to be wound care. The patients were similar to Cluster 2 but without COLD or HF.

**Discussion & Conclusion:** While the techniques were data-driven with subjective interpretation, it gave a compact stratification of needs of the population of interest. This insight could guide decision makers in policy making and services planning.

## OP-QHSR-12

### Quality Control in Singapore Mental Health Study - Interview Validation

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**Background/Hypothesis:** Quality control in surveys is the process of monitoring and maintaining the quality of data during data collection. Part of quality control involves the validation of interviews which reduces interviewer-related errors and prevents or reveals actions that could result in incomplete or false data. This paper highlights the scientific and operational strategy to maintain high quality of data collection.

**Methods:** The Singapore Mental Health Study (SMHS) aims to determine the prevalence of mental illness in Singapore. A validation script was designed which includes questions on respondents' demographics, details of time and date of interviews, procedures involved in the survey, and key questions from the questionnaires. Validation is conducted on 20% of each interviewer's completed cases, either via telephone contacts or door-to-door revisits, by a separate team who are not involved in the fieldwork. Interviews are deemed invalid if the demographics of the respondent differ from the original data or do not match the study criteria, or if the interview was not conducted according to the defined standard procedures.

**Results:** Between October 2009 and May 2010, staff validated 532 completed interviews, which is approximately 21.2% of all completes. Thirteen cases were voided due to interviewers not adhering to the defined rules and procedures. Five of these involved translating and rephrasing of questionnaires either by the interviewer or a third party. The remaining 8 were voided due to interview conducted with respondent who did not meet the study criteria. Interviewers whose cases were voided were given retraining to avoid similar mistakes in the future.

**Discussion & Conclusion:** A well designed quality control system plays an important role in maintaining the quality of data collected in surveys. Interviews and interviewers that fail to meet the specified rules and procedures must be excluded from data analysis to maintain the integrity and veracity of the data.

## OP-QHSR-13

### **Threshold-Level Transcranial Electrical Motor Evoked Potentials: A Bright Future of Intraoperative Monitoring in Cervical Spine Surgery**

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**Background/Hypothesis:** Somatosensory evoked potentials (SSEPs) may unfortunately lose sensitivity and reliability when encountering neurologic dysfunction, especially cervical diseases. To overcome these drawbacks, we propose an advanced technique based on threshold-level tceMEPs (transcranial electrical motor evoked potentials) to further reduce the risk, and supply reliable judgment a priori (success or fail) before post-op clinical assessment.

**Methods:** Component activities of muscle potentials were measured by a five-pulse train of stimulation to the motor cortex. The novelty is the floating baseline. Along with the surgery, we start to scan the baseline from a preset low voltage rather than fix the baseline in conventional monitoring, until threshold stimulus intensity is achieved. The threshold baseline level becomes significantly lower than the traditional method, and induces the same response. It helps predict motor status, causes less harm to muscles and nerves, and is a valuable tool in the success of the operation.

**Results:** SSEPs was applied to all 27 individuals, but 6 cases showed blocking responses of it. Successful threshold-level tceMEPs monitoring was achieved for all 27 surgeries. Five cases using threshold-level tceMEPs show significant improvement of neurophysiologic value with reduced stimulus intensity and improved responses. Only 2 cases found improvement in response of SSEPs. There was one true-positive case, occurring to both SSEPs and threshold-level tceMEPs with deteriorated neurologic function post-operation.

**Discussion & Conclusion:** Threshold-level tceMEPs has been proposed and clinically validated to be a simple, safe, highly accurate and reliable monitoring technique to prevent worsening neurologic function, and it serves as an objective and quantitative assessment in the execute of a successful cervical spine surgery.

## OP-QHSR-14

### **Developing a Data Management Strategy to Complement Project Management for a Nationwide Survey in Singapore**

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**Background/Hypothesis:** The Singapore Mental Health Study (SMHS) is a nationwide survey to establish the prevalence of mental disorders in Singapore. Survey information flows in from multiple sources. A rigorous data management regime ensures that the data collected is timely, accurate and consistent to meet the research and quality standards. In SMHS, the data management strategy (DMS) is expanded to fill the information gap encountered by the project management team. This abstract elaborates the survey DMS and approach.

**Methods:** Data is collected through paper-based and computer-assisted questionnaires and maintained in a master SAS dataset. Data integrity is checked, following which performance metrics are generated on routine basis from the interview and auxiliary data sources to monitor the progress. Ad-hoc metrics are also generated to provide summarised and visual representation. Discrepancies found in the data are resolved on an on-going basis.

**Results:** Key performance metrics such as interviewer turnover, weekly progress and forecasted date of completion were generated. From December 09 to May 10, 37.5% of the target surveys were completed. In May 10, 21 of the 38 interviewers trained remained active in the field. Interviewers were achieving 20±13 completes per month. A monthly productivity of 10% of the total target was projected to meet 6500 completes by December 10 and this could be achieved if there were 30 to 35 active interviewers in the field. By adopting an evidence-based management approach, the project team had justified and arranged 2 extra interviewer training programmes. Through data collected from two separate sources, 26 age (1% of completes) and 17 marital status discrepancies (0.8%) were found and resolved.

**Discussion & Conclusion:** Implementation of a robust DMS has allowed the project team to track the study progress and make timely and critical operational decisions. The findings highlight the importance of a well designed DMS in improving the quality and productivity for large surveys.

## OP-QHSR-15

### **The Independent Effect of Neighbourhood and Socioeconomic Status on Multi-Disease Health Screening: A Tale of Two Communities**

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**Background/Hypothesis:** We studied whether individual socioeconomic and neighbourhood factors such as living in a poor community independently affected health screening participation.

**Methods:** We studied 3 blocks of public-rental flats (the poorer community) adjacent to 3 blocks of owner-occupied flats (the better-off community) in a precinct in Taman Jurong, Singapore. Demographic details and reasons for not having regular hypertension, diabetes, dyslipidemia, colorectal and cervical cancer screening were collected from 2009 to 2010. Independent factors of health screening take-up were assessed using logistic regression.

**Results:** Participation rates for rental flats and owner-occupied flats were 89.0% (357/400) and 70.2% (351/500), respectively. Only individual socioeconomic factors like no financial aid ( $P = 0.023$ ), employment ( $P < 0.001$ ) and household income ( $P = 0.039$ ) were independently associated with regular hypertension screening. Both individual socioeconomic factors like no financial aid ( $P < 0.001$ ) and household income ( $P = 0.006$ ), and living in a better-off community ( $P = 0.004$ ) were independently associated with regular diabetes screening. For dyslipidaemia, both individual socioeconomic factors like employment ( $P < 0.001$ ) and household income ( $P = 0.006$ ), and living in a better-off community ( $P < 0.001$ ) were independently associated with regular screening. No financial aid ( $P < 0.001$ ), employment ( $P < 0.001$ ), household income ( $P = 0.005$ ) were independently associated with regular colorectal cancer screening; as was living in a better-off community ( $P < 0.001$ ). Only employment ( $P = 0.035$ ) was associated with regular cervical cancer screening.

**Discussion & Conclusion:** Differing neighbourhoods within one geographical location independently associated with differences in diabetes, dyslipidaemia and colorectal cancer screening, even after controlling for individual demographic and socioeconomic indicators. Staying in a poorer community itself can influence individual decisions on health screening.

## OP-QHSR-16

### Influenza Vaccination amongst Staff at Risk

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**Background/Hypothesis:** Although seasonal influenza vaccination has been shown to reduce infection and absenteeism, vaccination rates amongst healthcare workers have remained low. Elderly healthcare workers and those with pulmonary or cardiovascular system disorders have a greater risk from influenza-related complications. This study investigates the uptake and perception of primary healthcare workers towards seasonal influenza vaccination and compares the vaccination rate between those with a high risk for influenza-related complications and those who do not.

**Methods:** An anonymous survey was conducted in Nov 2009 amongst all medical, nursing, allied health and operations staff of NHG Polyclinics, Singapore. Staff were asked if they had any of the risk factors associated with influenza-related complications (asthma, stroke, heart disease, cancer, diabetes mellitus, renal disease, elderly ( $\geq 65$  years old), pregnant), their perception towards vaccination and whether they had been vaccinated within the preceding 2 years.

**Results:** Response rate was 80%. Of 721 respondents, 16.6% reported having at least 1 risk factor. Asthma (10.8%) and diabetes (2.9%) were the main risk factors. Most respondents (64.6%) had been vaccinated within the preceding 2 years with no significant differences in uptake between staff with and staff without risk factors (61.7% vs 65.2%,  $P = 0.457$ ), and with different risk factors. The main reasons for not being vaccinated were the fear of side effects (44.4%) and dislike of injections (27.2%) with no significant differences between staff with and without risk factors.

**Discussion & Conclusion:** About a third of at risk primary healthcare workers had not been vaccinated against seasonal influenza. Having a risk factor did not influence the uptake and concerns of staff towards vaccination. Vaccine safety was a major concern amongst staff. This should be addressed to raise vaccine uptake especially amongst staff at greater risk from influenza-related complications.

## OP-QHSR-17

### Kinetics of Middle Molecules in Haemodialysis Subjects

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**Background/Hypothesis:** Recently, middle molecules have emerged as the marker toxin of haemodialysis patients. Of these,  $\beta_2$ -microglobulin (B2M) has received significant attention because its serum level is found to correlate with mortality and morbidity of renal patients. To understand the kinetics of B2M, the two-pool kinetics has been studied; however, it results in inappropriate parameter estimates for an individual patient. The objective of our study is to develop regional blood flow (RBF) kinetics for B2M whose applicability has previously been realised for small molecules like urea and creatinine, and obtain precise parameter estimates for individual patient.

**Methods:** We have modified the existing RBF model to cater the requirements of  $\beta_2$ -microglobulin. Data from 10 haemodialysis patients were obtained from Dr Richard A Ward (University of Louisville) and employed in the present study. Plasma  $\beta_2$ -microglobulin concentrations measured at different times during and after haemodiafiltration were used to estimate model parameters for each patient.

**Results:** Two model parameters namely, inter-compartmental clearance and toxin distribution volume are found to be estimable. Inter-compartmental clearance of  $91.9 \pm 11.4$  mL/min, and toxin distribution volume of  $13.1 \pm 0.66$  L, corresponding to  $18.8 \pm 1.3\%$  of body weight, are obtained. Toxin generation rate is  $130 \pm 0.007$  mg/min.

**Discussion & Conclusion:** The developed RBF model accurately predicts the toxin kinetics. Significant improvement in estimates of toxin distribution volume in comparison to existing two-pool kinetics is achieved. The obtained estimate of distribution volume relates to haemodialysis patient physiology. Hence, the proposed model can help in precise estimation of toxin distribution volume/extracellular fluid volume, and be able to facilitate the prescription of improved dialysis dose based on B2M (e.g.  $Kt/V_{B2M}$ ).



## OP-QHSR-18

### Premorbid Functional Characteristics of Hospitalised Elderly

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**Background/Hypothesis:** Population ageing presents key challenges to the healthcare system, including disability in an older adult. Hence, we seek to determine the premorbid functional characteristics and their correlates in the hospitalised elderly admitted into an acute ward.

**Methods:** Consecutive patients aged 65 or above admitted from the Accidents and Emergency Department into Geriatric Medicine or Internal Medicine in Ward 63B over a 3-week period. Premorbid activities of daily living (ADL) function was assessed using the Katz Index. Demographic, clinical, cognitive, instrumental activities of daily living (IADL) and Nagi disability data were collected from eligible patients with ADL score  $\geq 1$  using a standardised questionnaire. Data are obtained from an ongoing prospective study to investigate functional decline in the hospitalised elderly.

**Results:** A total of 80 patients were screened and 21% (n = 17) were totally ADL dependent (ADL = 0) and excluded from the study. Of the 63 eligible patients, 48 (76%) gave consent and were recruited. They were predominantly female (54.2%), Chinese (81.3%) and uneducated (62.5%). Median age was 80 years (range, 66 to 96). Premorbidly, 41.7% had ADL disability (inability to perform  $\geq 1$  ADL), 76.6% had IADL disability, 97.9% had functional disability defined using the Nagi scale and 43.7% were unable to walk independently. ADL disability was significantly correlated with the inability to walk independently ( $P < 0.0005$ ) and previous diagnosis of dementia, cognitive impairment or memory problems ( $P = 0.006$ ).

**Discussion & Conclusion:** Many hospitalised elderly are premorbidly frail and disabled. In this cohort, 2 in 5 elderly have premorbid ADL disability. ADL disability is associated with impaired mobility and cognition. Due to the high prevalence of frail and disabled elderly, a comprehensive assessment like the Comprehensive Geriatric Assessment should be done for the hospitalised elderly in Singapore.

## OP-QHSR-19

### **Treatment-Seeking Behaviour in Men with Lower Urinary Tract Symptoms: A Community-Based Study in Singapore**

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**Background/Hypothesis:** Lower urinary tract symptoms (LUTS) are a common problem in men with increasing age. However, many men still do not seek medical advice for their symptoms. We aimed to characterise the nature of, and factors associated with, treatment-seeking for LUTS in Singaporean men.

**Methods:** A community-based, cross-sectional study conducted in Bedok North, Singapore. Six hundred and forty-four male residents aged 40 and above responded to an interviewer-administered questionnaire, which elicited information on treatment-seeking for LUTS. Associations were examined using logistic regression between treatment-seeking and symptom severity (as measured by the IPSS - International Prostate Symptom Score), bother from symptoms, overall quality of life, beliefs about LUTS, and demographic factors.

**Results:** Of them, 70.7% had one or more LUTS, and 16.5% had moderate to severe LUTS (defined as IPSS >7). Of those with moderate to severe LUTS, only 28.3% had sought help for their symptoms. The majority of those who did not seek help said that they "did not think it was a problem". Multiple regression analysis showed that the presence of urgency, overall quality of life, bother from nocturia and age were independent factors associated with treatment-seeking for LUTS.

**Discussion & Conclusion:** Our results suggest that a large proportion of Singaporean men with moderate to severe LUTS do not seek medical advice for their symptoms. Urgency may be an important symptom in determining treatment-seeking. More research can be done to elicit the environmental factors influencing treatment-seeking behaviour.

## OP-QHSR-20

### Cost-Utility Analysis of Selective vs Full thickness Corneal Transplantation for the Treatment of Keratoconus

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**Background/Hypothesis:** Keratoconus is an ectatic disease of the cornea and the leading cause of corneal transplants in young people. This study seeks to determine the cost-effectiveness of a selective tissue transplantation procedure, deep anterior lamellar keratoplasty (DALK) compared with full thickness transplantation, penetrating keratoplasty (PK) for the treatment of keratoconus. DALK is associated with lower rates of postoperative complications compared with PK, but is a more expensive procedure; whether it is cost-efficient compared with PK is unknown.

**Methods:** An incremental cost-utility analysis from a societal perspective comparing DALK to PK was performed using one year cost and outcomes data from 148 keratoconus patients, representing 102 PK and 46 DALK cases, seen for corneal grafts between January 1991 and January 2009 at the Singapore National Eye Center.

**Results:** Over a 20-year period, PK is the lower cost procedure and has an incremental cost-utility ratio (ICUR) of \$3750/QALY compared with no surgical treatment. Compared with PK, DALK has an incremental QALY gain of 0.8 and an incremental cost of \$2420, for an ICUR of \$3025/QALY.

**Discussion & Conclusion:** Compared with PK, DALK has a favourable cost-effectiveness ratio and resources permitting, should be considered as a first-line treatment for keratoconus even though the procedure is technically more time consuming.

## OP-QHSR-21

### Infant Mortality in Singapore and Macao: A Comparative Study

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**Background/Hypothesis:** Infant mortality rate is widely used as an indicator of the health services standard in a society. After 40 years of economic endeavour and expansion, Singapore and Macao have transformed themselves into different levels of economic powerhouse, and yet achieved similar infant mortality rates of 2.6 and 2.7 infants per 1000 live births in 2006, respectively. We would like to investigate this apparent paradox by examining the impact of demographic changes, socioeconomic instability, and health resources availability on infant mortality rate in the two cities in a comparative perspective. We hypothesised that each factor has significant direct and indirect impact on infant mortality rate in each city.

**Methods:** Regression models were used to analyse yearly data for the two cities covering the period from 1968 to 2006.

**Results:** The results showed that higher birth rate ( $P < 0.01$ ) and more public expenditure on health ( $P < 0.05$ ) were likely to reduce the infant mortality rate in both cities. For Singapore, female education ( $P < 0.01$ ), marriage rate ( $P < 0.01$ ), income ( $P < 0.05$ ), inflation rate ( $P < 0.05$ ), and number of doctors ( $P < 0.05$ ) significantly affected the infant mortality rate. By contrast, higher unemployment rates was more likely to reduce the infant mortality rate in Macao ( $P < 0.05$ ) but not in Singapore.

**Discussion & Conclusion:** The result of this study can be used as a guide for policy makers in allocating their resources and designing the most effective yet amenable intervention to improve and maintain the low infant mortality rate. Critically, during the economic crisis, more effort should be put in the provision of health services in order to alleviate the adverse impact of socioeconomic inequalities on infant mortality and health outcome as a whole.

## OP-QHSR-22

### An Overview of the Management of Hypoglycaemia at a Tertiary Hospital from 2005 to 2009

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**Background/Hypothesis:** Tan Tock Seng Hospital has undertaken initiatives to improve the management of hypoglycaemia through the efforts of case management unit (CMU), emergency department (ED) and Endocrinology Departments. These initiatives include establishment of a hypoglycaemia carepath (CP) in 2003 and inclusion of severe hypoglycaemia as a condition managed by a protocol in emergency diagnosis and therapy centre (EDTC) in September 2005. This descriptive review provides longitudinal perspective to data accumulated over a 5-year period.

**Methods:** Patient numbers were collated from Health Information Service using codes DRG 539-541 and ICD i25080-25083 for *EDTC Discharge*, *EDTC Admitted Inpatient* and *Total Admitted Inpatient* for primary diagnosis of hypoglycaemia. Patient numbers for *ED Discharge* were attained with general diabetes category and delta codes related to hypoglycaemia. Clinical pathway data was systematically collated in a prospective manner by CMU. Chi-square tests for trend were performed.

**Results:** Total ED attendance for hypoglycaemia increased progressively from 2005 (n = 690) to 2008 (n = 969) but decreased in 2009 (n = 685). Total number of inpatient admissions however decreased progressively from 2005 (n = 426, 62% ED attendance) to 2009 (n = 257, 38% ED attendance) ( $P < 0.001$ ). There is corresponding decrease in patients placed on inpatient CP from 2005 (n = 302, median age = 69 years, range, 19 to 97) to 2009 (n = 227, median age = 70 years, range, 19 to 96). CP patients with 3 or more medical comorbidities increased from 65% in 2005 to 78% in 2009 ( $P < 0.01$ ). Despite this increase in comorbidities, outcome measures for CP patients remained stable: Readmission  $\leq 30$  days is 2% vs 2%, average length of stay (ALOS) is 4.5 days vs 4.5 days, and discharge with capillary blood glucose range of 4 to 12 mmol/l is 91% vs 100%.

**Discussion & Conclusion:** Collaborative effort has reduced patient admissions despite increased ED attendance for hypoglycaemia. Although the number of medical comorbidities of carepath patients has increased, outcome measures remain stable.

## OP-QHSR-23

### Parental Perceptions: Effect on Newborn Metabolic Screening Uptake

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**Background/Hypothesis:** A yearly (2007 to 2009) screening rate below 65% (target 95%) in the 'opt-in' screening program for inborn errors of metabolism (IEM) at the National University Hospital has improved marginally despite several changes in processes relating to advocacy and patient education. We evaluated the parental decision making process for or against screening.

**Methods:** Parents routinely receive informational pamphlets advocating an IEM screen at NUH. Hundred consecutive parents participated in this questionnaire-based survey and prioritised their top 5 reasons behind acceptance or refusal of IEM screen from a list of several.

**Results:** Sixty-eight percent agreed for the IEM screen. Parents deciding jointly were more likely to take up the screen. Majority of parents who consented understood the principle behind metabolic testing however close to a fifth of the parents yielded to advocacy rather than the reason. The most frequently cited reasons for non-consent were either related to the processes (IEM screening being optional is unimportant), or related to the understanding (previous child unaffected and well; present child appears healthy; it is a research tool). Parent's judgment on risk assessment played a significant role (IEMs deemed uncommon). Emotional state of parents also had a bearing on the uptake (test too painful or the baby too young to be tested). Though the odds of uptake decreases by half among parents from lower socioeconomic strata, cost of screening was seldom cited as a barrier.

**Discussion & Conclusion:** While advocacy and patient education should continue to help patients make an informed decision, 'opt-in' screening may not be ideal till parental understanding improves.

## OP-QHSR-24

### **A Pilot Project in Advance Care Planning among Patients with Advanced Heart Disease within the Cardiology Service of Tan Tock Seng Hospital**

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**Background/Hypothesis:** Advance care planning is an important dimension of end-of-life care. Patients and families often do not fully understand the choices that they face in future medical care and clinicians do not always explore their preferences. In tandem with efforts at promoting advance care planning in Singapore, a 6-month pilot project was performed in the Heart Failure Service in Tan Tock Seng Hospital.

**Methods:** An 8-member team consisting of doctors, medical social workers, an advanced practice nurse, a pharmacist and an operations executive was formed to carry out the pilot project. Six members of the team underwent formal training in facilitating advance care planning discussions, based on Respecting Choices, an established Advance Care Planning programme originating from the Gundersen Lutheran Medical Foundation in Wisconsin, the United States of America. Materials were adapted to the local context where necessary.

**Results:** Between February 2010 and July 2010, advance care planning discussions were carried out with 6 patients together with their next-of-kin. All subjects felt that these discussions were important and most were satisfied with the outcomes. One subject had unresolved questions for the cardiologist and thus, preferences were not recorded. Another subject expressed ambivalence about his choices due to spiritual considerations and was encouraged to follow-up with his spiritual advisor.

**Discussion & Conclusion:** There is an unmet need for advance care planning among patients with advanced heart disease. A viable and sustainable advance care planning programme to target this patient group should be explored.

## OP-QHSR-25

### Tan Tock Seng Hospital Plasmapheresis Audit

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**Background/Hypothesis:** The Department of Haematology, Tan Tock Seng Hospital was approved to perform therapeutic plasmapheresis from January 2009. We present an audit of the first 100 therapeutic plasmapheresis sessions done on 18 patients from January 2009 to June 2010.

**Methods:** All indications were classified based on the American Society For Apheresis (ASFA) categories. Technical details were compiled. Complications including hemodynamic changes, transfusion-related and technical complications, disturbances in electrolytes, hematological and coagulation profiles were reviewed. Clinical responses were also recorded.

**Results:** The majority of the procedures were performed for neurological conditions. All conditions were ASFA categories I to III. A mean of 1.1 plasma volumes were extracted per session. Replacement fluid varied according to diagnoses. Hypotension (mean arterial pressure, MAP <65 mmHg) occurred during 23% of procedures but most were asymptomatic and transient. The lowest MAP during the procedure was on average 12 mmHg below the pre-procedure MAP. Transfusion-related and technical complications occurred in 11% and 6% of all procedures respectively. Post-procedural hemoglobin and platelet counts fell by a mean of 0.3 g/dl and 28 x 10<sup>9</sup>/L respectively when compared to pre-procedural values. Serum K<sup>+</sup> and Ca<sup>2+</sup> fell by a mean of 0.3 mmol/L and 0.11 mmol/L, respectively. Prothrombin time and activated partial thromboplastin time rose by a mean of 4.3 and 10.6 seconds respectively. Eight (44%) patients improved - 3 were treated for transverse myelitis, 2 for myasthenia gravis, 1 for neuromyelitis optica, 1 for multiple sclerosis and 1 for thrombotic thrombocytopenic purpura, although the latter subsequently died from respiratory failure. There were no procedure-related deaths.

**Discussion & Conclusion:** Therapeutic plasmapheresis is a safe procedure with tolerable side effects and generally asymptomatic complications. Details of complications and replacement fluid usage will be presented.



## OP-QHSR-26

### A Quality Assurance Survey to Improve Communication between Ear Nose Throat Specialists and General Practitioners

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**Background/Hypothesis:** Communication between medical specialists and primary care providers in the community plays a pertinent role in patient care and doctor education. Referral and reply letters are the most common means by which doctors exchange information. Much clinician time is spent writing letters but the information or the format in which the letter is written may not meet the needs of the recipient. This study aims to determine the type of reply letter preferred by General Practitioners (GPs) and as such, attempts to improve communication between doctors as part of a quality assurance survey.

**Methods:** Questionnaires were mailed out to 1700 GPs in Singapore. Each questionnaire was accompanied by 2 sample reply letters from the Department of Otorhinolaryngology-Head and Neck Surgery. Sample letters were written in different formats. Letter 1 was written in a non-structured free text format and letter 2 included a structured summary at the beginning. Both letters contained the same amount of information with equal number of words.

**Results:** There were 535 replies (response rate 32%). Letter 2 was preferred in 97%. Ninety-six percent found letter 2 easier to read and 86% felt it contained more information. Sixty-four percent felt letter 1 took longer to read.

**Discussion & Conclusion:** Our study shows a preference for diagnosis and treatment plan to be presented in a summary style report rather than as free text. Structured format for reply letters, including the use of headings, allows readers to easily identify the information desired and thus improves the quality of correspondence between specialists and GPs.

## OP-QHSR-27

### Reducing Postoperative Infections after Cataract Surgery - The Outcomes of Intracameral Antibiotics

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**Background/Hypothesis:** Endophthalmitis is a devastating ocular infection which results in significant visual impairment and blindness, as well as prolonged hospitalisation. We aimed to evaluate the efficacy of a new antibiotic regime (intracameral injection of cefazolin) on the rates of postoperative endophthalmitis after cataract surgery.

**Methods:** A review of 45,580 consecutive cases of cataract surgery performed at Tan Tock Seng Hospital over a 10-year period (1999 to 2009) was performed, assessing the risk factors, microbiological cultures, and outcomes of patients with endophthalmitis. Up to June 2006, the standard regime consisted of subconjunctival injection of antibiotics. From July 2006, this was modified to 0.1 ml cefazolin (1 mg/ml) injected directly into the anterior chamber of the eye (intracameral injection).

**Results:** From 1999 to June 2006, the overall rate of postoperative endophthalmitis was 64.3 per 100,000. After the introduction of intracameral antibiotics, there was a 12-fold decrease in the rate of postoperative endophthalmitis to 5.3 per 100,000, with only 1 case of endophthalmitis out of 18,722 surgeries performed. There were no adverse events associated with the use of the new antibiotic treatment. The mean age of the endophthalmitis patients was higher than those without infection (72.3 vs 67 years). Males had double the rate of females (multivariate odds ratio [OR] 2.51) and the left eye was more commonly affected (68.4% vs 31.6%, multivariate OR 2.86,  $P = 0.045$ ). There was a higher rate of gram negative organisms cultured compared to gram positive organisms (30% vs 25%).

**Discussion & Conclusion:** By modifying the postoperative antibiotic regime, the clinical outcome of cataract surgery has improved dramatically. The use of intracameral antibiotics has resulted in a 12-fold decrease in the rate of postoperative endophthalmitis after cataract extraction, hence improving outcomes and reducing hospitalisation time and costs for the patient.

## OP-QHSR-28

### Improving Patient Satisfaction and Reducing Fear during Cataract Surgery - A Randomized Controlled Study on the Efficacy of Preoperative Counselling

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**Background/Hypothesis:** Cataract surgery is the most common ocular surgery worldwide and is performed under local anaesthesia, where patients are aware of events occurring intraoperatively. Up to 19% of patients are frightened during surgery, which may affect their co-operation and result in adverse surgical outcomes. We aimed to determine whether preoperative patient counselling reduces fear and increases satisfaction with the surgery.

**Methods:** In a prospective, randomised controlled trial, patients undergoing cataract surgery (phacoemulsification) under topical anaesthesia were randomised to those receiving additional counselling and those not counselled beyond the standard surgical risks. A trained interviewer assessed patients postoperatively on their intraoperative experiences and their satisfaction with the surgery.

**Results:** Of 851 consecutive patients, 558 (65.6%) received additional preoperative counselling while 293 (34.4%) did not. The counselled group had a lower proportion who were frightened (4.5% vs 10.6%,  $P < 0.001$ ) and a significantly lower mean fear score ( $P = 0.002$ ) compared to the non-counselled group. Using multivariate logistic regression, preoperative counselling was a significant factor affecting fear after accounting for age, gender, operated eye and duration of surgery (multivariate odds ratio 4.3, 95% confidence interval 1.6 to 11.6,  $P = 0.003$ ). More patients in the counselled group reported that counselling led to greater satisfaction (77.6% vs 48.1%,  $P < 0.001$ ), and a greater number reported that counselling prevented fear (38.2% vs 27.3%,  $P = 0.002$ ).

**Discussion & Conclusion:** Preoperative counselling before cataract surgery is useful and significantly reduces both the proportion of patients who are frightened as well as the mean fear score compared to patients who are not counselled. Patients counselled experienced greater satisfaction and reduced fear from their surgical experiences.

**PP-AH-01**

**The 'Erythrocyte Pressure Induced Cells Suspension' Solution: Markedly Improving Diagnostic Yield from Heavily Blood-Stained Fluids**

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**Background/Hypothesis:** The Erythrocyte Pressure Induced Cells Suspension (EPICS) method lyses and removes erythrocytes, concentrating diagnostic material in fluid samples. We aim to assess its role in improving diagnostic yield in heavily blood-stained, otherwise non-diagnostic fluid samples.

**Methods:** The EPICS method was applied to 50 cases of heavily blood stained fluid samples (21 pleural effusions, 26 peritoneal effusions, 2 pericardial effusions and 1 fluid from a tumour in the humerus). In each case, paired smears were prepared with and without EPICS treatment. For the latter, EPICS solution was added to cell pellets after centrifugation. After re-suspension and re-centrifugation, the supernatant was discarded and 0.9% normal saline was added. Smears were made from the remaining cell pellet. Diagnostic yield was compared in each sample-pair.

**Results:** All 50 cases EPICS-treated smears show greatly increased cellularity and a clean background, compared with untreated smears which were bloody, with very few diagnostic cells. In 13 cases, conventional smears were inconclusive due to obscuring blood, while the EPICS-treated smears yielded definite malignant cells.

**Discussion & Conclusion:** EPICS treatment greatly increases diagnostic yield and diagnostic accuracy, reducing false negative rates and the need for repeat samples. This simple, cost-effective method should be used routinely on heavily blood stained fluids.

**PP-AH-02**

**Clinical Outcomes from a Hypertension, Diabetes, Lipids Clinic (HDL-C) in Singapore: An Update**

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**Background/Hypothesis:** Diabetes Mellitus (DM) is a chronic disease, afflicting more than 8% of Singaporeans. In Singapore, the role of pharmacists in caring for patients with DM is unclear. The first pharmacist-run DM clinic in Singapore (also known as Hypertension, Diabetes, Lipids Clinic; HDL-C) was launched in collaboration with physicians from outpatient second tier DM clinics. With DM being one of the top chronic diseases, it is hoped that pharmacists would play a pivotal role in the multidisciplinary healthcare team.

**Methods:** A retrospective, time-series, single-group study was conducted on patients aged 21 and above with uncontrolled Type 1 or 2 DM, hypertension and/or dyslipidaemia, referred by second tier DM physicians to HDL-C between October 2007 and November 2009. Data was collected at 4 junctures: 3 months before HDL-C entry (Preperiod), at the point of HDL-C entry (Index), 3 (Postperiod 1) and 6 months (Postperiod 2) after HDL-C entry. Primary outcomes analysed included glycosylated haemoglobin (HbA1c), blood pressure (BP), and low-density lipoprotein (LDL). The appropriateness of Aspirin, Angiotensin-Converting Enzyme Inhibitor (ACEI) or Angiotensin-Receptor Blocker (ARB) use was analysed as secondary outcomes.

**Results:** Statistically significant improvements were found in HbA1c (mean change -0.52%;  $P = 0.008$ ) and LDL (mean change -0.37 mmol/L;  $P = 0.004$ ). Mean BP was already controlled at Index (131.7/77.1 mmHg) and HDL-C maintained the control of BP (129.7/74.6 mmHg). Appropriateness of aspirin use increased from 8.3% to 45.0% at Postperiod 2 ( $P < 0.001$ ) with pharmacist's intervention. Of patients, 98.3% were prescribed with ACEI/ARB appropriately by the end of the study.

**Discussion & Conclusion:** The HDL-C service is effective in improving the overall clinical outcomes of the patients with DM, hypertension and/or dyslipidaemia. Pharmacists play a pivotal role in the multidisciplinary healthcare team, providing quality care for these patients in Singapore.

**PP-AH-03**

**Pharmacist-Managed Anticoagulation Clinics: Clinical Outcomes in the Primary Care Setting**

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<sup>1</sup>Pharmacy, National Healthcare Group Pharmacy, Singapore, <sup>2</sup>Pharmacy, National University of Singapore, Singapore, <sup>3</sup>Clinical Services, National Healthcare Group Polyclinics, Singapore

**Background/Hypothesis:** Warfarin has numerous therapeutic benefits. However, the management of some patients remains suboptimal. As a result, Anticoagulation Clinics (ACC) have been set up to optimise its use. However the literature has shown conflicting results. It was of interest to find out the outcomes of the patients who are managed in pharmacist-managed ACC in the primary care setting in Singapore. The objectives are to determine the effectiveness of the pharmacist-managed ACC in keeping patients' International Normalized Range (INR) within the therapeutic range and the incidence of adverse events.

**Methods:** This was a retrospective, timed-series, single group study. Patients referred to the pharmacist managed ACC in the 9 National Healthcare Group polyclinics were eligible for the study. Only patients who had attended a minimum of 3 ACC visits within a year were included. Data was collected at 5 intervals. INR values were analysed as the primary outcome measure with the incidence of adverse events analysed as the secondary outcome measure. Patient modifiable factors such as smoking were also associated with the INR values.

**Results:** Significantly more patients had an INR value within the target range after a year of ACC attendance ( $P = 0.0453$ ). The incidence of adverse events was reduced to  $10.9\% \pm 2.13$  from 30.9% on the first visit. Patient modifiable factors also occurred to a lower incidence after a year of ACC attendance.

**Discussion & Conclusion:** Pharmacists are able to maintain the INR of the patients enrolled in the ACC within their target range. There was also a lower incidence of adverse events from the use of warfarin in ACC managed patients. The lower incidence of patient modifiable factors indicated better patient education. The results demonstrated that the patient was able to benefit more from a team based care by both the physicians and the pharmacists.

**PP-AH-04**

**A Prospective Analysis of the Medication Review Service at the Tan Tock Seng Hospital Outpatient Pharmacy from November 2008 to December 2009**

**CY TAN, JC LEE, HY LIM, CY LIM**

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**Background/Hypothesis:** Medication review is a process where pharmacists will assess patient's current medications and supplements. Pharmacists will detect any drug related problems (DRPs) and contact the doctor if there are DRPs. Primary objective: To collect data on the patient demographics, DRPs and interventions. Secondary objective: Patient satisfaction with the service, potential cost savings.

**Methods:** The medication review service (MRS) was promoted to doctors, pharmacists and patients via posters and emails. Patients were referred to the pharmacy for MRS after doctors' consultation. Inclusion criteria: Patients who were taking >5 chronic medications and appeared confused. Patient satisfaction survey was administered to most patients. Cost savings were calculated based on the hospital price and from patient's perspective.

**Results:** A total of 387 patients were referred for the MRS, with 310 patients referred from (GRM) department. Some declined MRS. A total of 103 reviews were done. Most of the referred patients were elderly (>65 years old), Chinese females with an average of 10 long term medications. There was a total of 237 drug related problems detected out of the 1014 medications reviewed. Pharmacists made phone calls and wrote memos to doctors to resolve the DRPs. Thirty-nine patients completed the survey, 38 were satisfied with the service. Patients benefited from knowing the indication, frequency, side effects and storage of their medications. Patients wanted MRS to be provided for free. Based on individual cases reviewed, patients can have potential cost savings from \$15 to \$30 per month.

**Discussion & Conclusion:** Despite continued advertising, referral rates from other departments remained low. To enhance awareness of MRS, regular staff briefings can be conducted. Advertising in newspapers can be used to increase public awareness. DRPs are detected and resolved, resulting in therapy optimisation. Patients are satisfied with MRS. Patients enjoy cost savings but more data is required.

**PP-AH-05**

**Severity of Knee Pain in Mature Hospital Workers**

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**Background/Hypothesis:** The aim of this study is to report the severity of knee pain in hospital workers above the age of 50 working in the second biggest acute hospital in Singapore. The study also aims to report on the different groups of hospital workers who are more likely to suffer the most knee pain. The Knee Injury and Osteoarthritis Outcome Score questionnaire was used as a mode of quantifying the severity of the hospital worker's knee pain. We hypothesise that mature hospital workers working in Singapore hospitals suffer from knee pain with similar severity to other subjects with related osteoarthritis with radiological degenerative changes.

**Methods:** Data were collected from 82 hospital workers (18 males and 64 females) from a voluntary knee screening programme at Tan Tock Seng Hospital using the Knee Injury and Osteoarthritis Outcome Score questionnaire. This data was analysed to compare the hospital worker's self-reported knee function to their job profession, gender and baseline data of subjects with radiological degenerative changes of the knee.

**Results:** Male hospital workers generally scored a higher Knee Injury and Osteoarthritis Outcome Score than females for pain ( $P = 0.001$ ), symptoms ( $P = 0.006$ ), activities of daily living ( $P = 0.002$ ), sports and recreation ( $P = 0.003$ ) and quality of life ( $P < 0.001$ ). Staff nurses working in the wards scored the lowest for pain ( $P = 0.003$ ), activities of daily living ( $P = 0.005$ ) and quality of life ( $P = 0.004$ ). Staff nurses working in the operating theatre scored the lowest when reporting symptoms ( $P = 0.05$ ) and house keeping staff scored sports and recreation as the lowest ( $P = 0.317$ ). Mature hospital workers may suffer from knee pain, symptoms and quality of life similar to other subjects with radiological degenerative changes.

**Discussion & Conclusion:** Nurses working in the wards were more prone to suffer from knee pain. Preventive measures need to be taken at an earlier stage of their profession to prevent early degenerative changes.



**PP-AH-06**

**Understanding the Profile of Patients with Psychiatric Conditions Who Default Treatment**

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**Background/Hypothesis:** It is pertinent that patients be compliant with their treatment upon their discharge. However, literature has shown that 30% to 40% of patients with psychiatric conditions default their first scheduled outpatient appointment. This paper examines the profile of patients with schizophrenia, schizoaffective disorder and delusional disorder who defaulted treatment within 3 months of discharge.

**Methods:** Data mining of patients discharged from an acute ward from July 2009 to December 2009 was done. The results were analysed using Microsoft Excel programme.

**Results:** There were 126 patients discharged with the mentioned diagnoses, 12 of whom did not have further appointments with the hospital. Of the remaining 114 patients, 13 were readmitted before their first out-patient appointment and another 8 readmitted within 6 months. A social demographic analysis of the remaining 93 patients revealed 69 Chinese (74.19%), 10 Malays (10.75%) and 14 Indians (15.05%) aged between 19 to 73 years old (mean age of 45). Marital status: 77(82.79%) patients single, 7(7.52%) patients married and 9(9.67%) divorced. Eight (8.6%) of the patients who could be case managed and contactable defaulted treatment. Five lived alone and 2 patients who lived with their family members, wandered out in the day. Six other patients could not be case managed as they led vagrant lifestyles.

**Discussion & Conclusion:** With case management, 8.6% of patients defaulted treatment. These patients were likely to live alone or wander out of the house. Therefore case managers should be made aware of the need to design a more comprehensive discharge plan to prevent patients' defaults.

**PP-AH-07**

**A Demographic Profile and Factors Leading to Unplanned Readmission of Psychogeriatric Female Patients in the Acute Ward**

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**Background/Hypothesis:** The 38-bedded acute psycho-geriatric female ward in Institute of Mental Health (IMH) caters to the psychiatric needs of elderly patients. The case manager (CM) on the ward ensures the continuity and coordination of care for these patients on admission and upon discharge. This paper analyses the demographic profile and factors leading to unplanned readmissions (UR). UR is categorised as admission within 30 days of discharge other than for respite care.

**Methods:** Data mining of patients admitted to the ward from June 2006 to May 2010 was done and results analysed using Microsoft Excel programme.

**Results:** Of the 974 patients admitted, 938 were accepted for case management after assessment. Fifty-nine (6%) were classified as UR of whom 36% diagnosed with Dementia and 37% Schizophrenia. Social demography revealed that the majority of patients (78%) were Chinese. Seventy-six percent were between 71 to 90 years old and 80% widowed. Many had repeated admissions.

Reasons for admission were

- 48% caregivers' stress
- 10% suicide threat
- 10% refusing medicine
- 7% request from caregiver for admission
- 7% medication side effects
- 5% social reasons
- 3% medical reasons
- 9% other issues

Patients and carers were provided with psychoeducation, counseling, linkages to essential services and telephonic case management. Only 3 (5%) of the 59 patients experienced another UR after discharge.

**Discussion & Conclusion:** Results of the survey indicate that caregiver stress contributed to a high percentage of UR. Therefore strategies to alleviate this factor, namely, psychoeducation, support, family sessions and telephonic case management will be enhanced by case managers in their aftercare services to patients and carers.

**PP-AH-08**

**Lack of Admission Weight Measure is Predictive of Mortality at 6-Month**

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**Background/Hypothesis:** Weight is a common anthropometric measurement, yet it is often not measured in hospitalised older adults. This study aims to determine the clinical and nutritional characteristics associated with the lack of admission weight measurement, and its associated impact on clinical outcomes.

**Methods:** Newly admitted patients aged  $\geq 60$  years and who were not critically or terminally ill, were recruited from an acute geriatric medicine unit. We measured admission nutritional status using Subjective Global Assessment and functional status using modified Barthel Index (MBI). Participants were dichotomized into those with and without admission weight measures. Availability of admission weight measure was analysed against clinical outcomes e.g. length of stay (LOS), discharge to higher level care, 3-month readmission, 6-month mortality and 6-month MBI, using regression analysis with adjustment for age, gender, race, comorbidities, severity of illness, and admission MBI.

**Results:** We studied 281 participants with mean age  $81.3 \pm 7.6$  years; 44% male; 83% Chinese; median length of stay 9 days. Weight measure was unavailable in 45(16%) participants. In the group without admission weight measure, malnutrition prevalence was significantly higher (51% vs 32%,  $P < 0.05$ ) and mean MBI on admission was significantly lower ( $31.5 \pm 27.7$  vs  $64.3 \pm 25.2$ ,  $P < 0.05$ ). Lack of admission weight was predictive of mortality at 6-month (33% vs 8%, OR 5.0, 95% CI: 1.9 to 13.4) after adjustment for covariates.

**Discussion & Conclusion:** Hospitalised older adults without weight measurement on admission represent an at-risk group with poorer nutritional and functional status and with 5 times higher risk of mortality at 6-month.

**PP-AH-09**

**Retrospective Analysis and Prevention of Medication Errors in Tan Tock Seng Hospital Outpatient Pharmacy**

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**Background/Hypothesis:** A medication error is any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the healthcare professional, patient, or consumer. It is important to prevent medication errors as it may adversely affect patient safety. Strategies have been implemented to reduce and prevent such errors in Tan Tock Seng Hospital (TTSH). These include separating look-alike drugs, packing by bin codes, and conducting continuing education (CE) sessions for pharmacy staff. Despite these, medication errors were still reported.

**Methods:** This project is an analysis of past medication error reports aimed to identify the stages of dispensing process which are prone to medication errors. A secondary objective is to provide recommendation to help reduce such errors. Retrospective analysis of medication errors reported from year 2002 until June 2009 was done using Microsoft Excel. Data was analysed based on the root causes of these errors.

**Results:** A total of 478 error reports were extracted. One hundred and ninety-three cases were due to 'Human factors: knowledge or performance deficits'. One hundred and fifteen cases were attributed to 'Communications: misread or didn't read', most of which also resulted from human errors. To address these deficits, CEs were conducted and the common errors were highlighted. Constant reminders were given during roll calls. Implementation of electronic ordering system also helped to minimise the need for manual typing and reduced typing errors. 'System related' errors constitute 95 cases. Of these, 'Frequent interruptions and distractions' were common. Duty roster is planned to give staff a variety of roles a day to serve as refresher and help improve concentration.

**Discussion & Conclusion:** In conclusion, human factors remain the most significant cause of medication errors in TTSH. CEs are recommended to address knowledge deficits. Assigning different duties a day may help staff stay focused and this may minimise errors caused by frequent interruptions and distractions.

## PP-AH-10

### Shoulder Disability Post Rotator Cuff Repair

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**Background/Hypothesis:** Shoulder pain is a common complaint, and the rotator cuff is often implicated. Many of these patients in Tan Tock Seng Hospital undergo rotator cuff repair and receive a standardised physiotherapy treatment. Assessing the effectiveness of the rehabilitation protocol post repair is important.

**Methods:** This retrospective study looked at outcome measures collected for 43 patients who had a rotator cuff repair. The data was retrieved from the Shoulder Pain and Disability Index (SPADI) questionnaires administered to patients on their preoperative, postoperative initial visit, 3, 6 and 9 months post-surgery. The SPADI comprised of 5 self-report items of the pain subset and 8 items of the disability subset. Patients indicated their level of pain or disability from 0 (none) to 10 (worst). Scores from both subsets were summed and proportioned out of 100. The average was then used as the total score. Higher scores signified more pain and disability.

All patients underwent a 1.5 hour long exercise session conducted by a physiotherapist on a weekly or fortnightly basis for 9 months. Patients did specific exercises based on the protocol for rotator cuff repair. A t-test for paired comparisons was used to test for significant changes of mean scores between preoperative and end of rehabilitation.

**Results:** According to the SPADI scores, the protocol was effective. The mean change of 33.46 between the preoperative and 9 months postoperative scores was significantly different ( $P = 0.037$ ). The effect size of this group was good (Cohen's  $d = 1.88$ ,  $r = 0.685$ ).

**Discussion & Conclusion:** The rehabilitation protocol for post rotator cuff repair patients at Tan Tock Seng Hospital is efficacious. The SPADI may be a useful clinical outcome measure for this group. Longer term follow-up may be needed to monitor postoperative complications. A good therapeutic relationship between the patient, surgeon and physiotherapist is vital to ensure the best outcome and cuff integrity.

## PP-AH-11

### General Group Exercise for Back Pain

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**Background/Hypothesis:** There is a trend in Singapore hospitals to group patients with low back pain into general group-based exercise rehabilitation classes. This was designed to provide a cost-effective progression of treatment for patients with subacute to chronic low back pain. The main aim of the exercise class is to enable patients to learn exercise techniques to self manage their condition, and offer them empowerment and self-efficacy. We hypothesise that a group exercise class will be beneficial to patients with low back pain.

**Methods:** This is a retrospective study investigating the standardised programme currently available in Tan Tock Seng Hospital back exercise class. One hundred and sixty-seven patients with subacute to chronic low back pain were referred by their physiotherapists into the class. The patients were put through a standardised intervention programme consisting of light aerobic exercises, flexibility exercises, and stabilisation exercises. The Roland-Morris Disability Questionnaire was used as an outcome measure pre- and post-exercise class.

**Results:** Mean pre-exercise Roland-Morris Disability Questionnaire score was 6.63 (SD = 0.34). Mean post-exercise Roland-Morris Disability Questionnaire score was 5.13 (SD = 0.30). Mean change of Roland-Morris Disability Questionnaire score was 1.49 (SD = 0.25) over a median of 3 (3, 9) sessions of exercise class. The mean change was statistically significant ( $P < 0.001$ ).

**Discussion & Conclusion:** The back exercise class did not seem to offer patients with low back pain a clinically important difference in changes in functional disability as measured by the Roland-Morris Disability Questionnaire. However, there was still a positive change and the exercise class can still be considered as a cost-effective way of progression for patients who have recovered from their acute stage. It is recommended that patients be segregated into different condition-specific groups so that the exercises can be more targeted to their specific needs.

**PP-AH-12**

**Increasing Prescription Home Delivery Service Load by at Least 50% at Tan Tock Seng Hospital Outpatient Pharmacy**

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**Background/Hypothesis:** The Tan Tock Seng Hospital (TTSH) Outpatient Pharmacy's "Prescription Home Delivery" Service (PHD Service) is a value-added service to help deliver repeat prescriptions with chronic medications to patients' doorsteps. Despite the convenience, the service received low popularity. This project aimed to promote the service, identify its deterring factors and increase its workload by at least 50%.

**Methods:** Business models of different institutions were compared. The in-house survey carried out between November and December 2009 determined eligible patients' service awareness, willingness and cost acceptability. Data was then compared with the survey done by an external surveyor. Advertising improvements included designated email address, working line, SMS service, posters, brochures and staff education to help promote the service.

**Results:** The service's minimum purchase requirement was removed; active advertising and promotions were done. Lack of awareness (79% to 80%) was a large potential deterrence. A substantial patient number (In-house survey 54%, External survey 49%) were keen to try out the service. Only 23.0% were willing to pay for the fixed delivery charge (S\$10.70), and 38.2% for the cash handling fee (S\$3.21). However, the Price Sensitivity Measurement Analysis concluded that lowering the service fee would not yield an increase in service demand. Cost acceptability was not a potential deterrence. Post implementation efforts showed a significant increase of 126.7% (average service workload increased from 15 [January to June 2009] to 32 prescriptions [September to January 2010]) in the PHD workload, exceeding targeted 50%.

**Discussion & Conclusion:** Lack of awareness was a large deterring factor, which was reduced through visual and active promotions, allowing a greater workload and greater patient satisfaction.

**PP-AH-13**

**Evaluation of CA 15-3 Measurement on Beckman Coulter Unicel DxI 800 Immunoassay Analyser**

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**Background/Hypothesis:** CA 15-3 is a tumour marker used for monitoring of breast cancer. This study evaluates the performance of CA 15-3 measurement on the Beckman Coulter DxI 800 immunoassay analyser and compares against the Siemens Centaur immunoassay analyser.

**Methods:** CA 15-3 was measured using a two-site immunoenzymatic method. Imprecision was assessed at 2 levels using manufacturer-supplied QC material for 20 days. Analytical sensitivity was assessed using the QMIT model. Linearity was assessed using the highest level of calibrator material diluted in zero calibrator. Results from 73 patient samples were compared against the Centaur system.

**Results:** Day-to-day CV was 3.8% (CA 15-3 18.7 U/mL) and 4.7% (48.3 U/mL). Analytical sensitivity was 0.0415 U/mL. The assay was linear up to 1000 U/mL. Using manufacturer-sourced upper reference limits of 31(DxI 800) and 35 U/mL (Centaur), there was very good agreement up to 100 U/mL between methods ( $\kappa = 0.92$ ). Centaur results were generally higher than DxI 800 results in this range (Deming model regression:  $\text{DxI 800} = (0.62 * \text{Centaur}) + 2.55$ ). There was poor agreement at concentrations above 100 U/mL.

**Discussion & Conclusion:** CA 15-3 measurement on the DxI 800 is precise, has a wide measuring range and agrees well with Centaur up to 100 U/mL. The DxI 800 system generally reads lower than the Centaur results and results cannot be used interchangeably between the two platforms. At higher concentrations, there is poor agreement between methods, requiring individual patient comparison of results to establish new baselines when transferring from one platform to another.



## PP-AH-14

### Lysholm Scores Following Knee Surgery

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**Background/Hypothesis:** The anterior cruciate ligament is the most commonly injured ligament of the knee, an occurrence frequently observed in athletes (Ageberg 2002). Should surgery be performed, an effective rehabilitation program is paramount, enabling the individual to return to their pre-injury level of function. The aim of this study is to present the standardised rehabilitation program currently used at Tan Tock Seng Hospital and to analyse the effectiveness of this program with use of the Lysholm Knee Rating Questionnaire. The Lysholm Knee Rating Questionnaire is an outcome measure extensively used in clinical research studies (Marx et al 2001). The questionnaire aims to correspond with a patient's own perception of function and signs of instability. At Tan Tock Seng Hospital, approximately 250 anterior cruciate ligament reconstructions are performed every year. Subsequent rehabilitation is undertaken at the Physiotherapy Department. To date, no study has analysed the efficacy of this program. Furthermore, few studies have analysed the efficacy of a rehabilitation program with a large number of patients, whilst providing a detailed description of the rehabilitation program.

**Methods:** This is a retrospective quasi-experimental study where data was retrieved from patient case notes and Lysholm Knee Rating Questionnaire scores. In total, 217 who had undergone anterior ligament reconstruction at Tan Tock Seng Hospital were used in the study.

**Results:** A good knee rating mean of 87.2 was achieved at 6 months. At 9 months post operation, mean scores increased to excellent ratings of 96.1.

**Discussion & Conclusion:** Patient's perception of knee function, as reported by the Lysholm Knee Rating Score was deemed to be excellent at 9 months post operation.

## PP-AH-15

### Evaluating Pharmacy Pre-Packing Service

#### **CP TENG**

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**Background/Hypothesis:** Pharmacy Pre-packing service is defined as the preparation of medication according to doctor's electronic prescription order before patient arrives at the pharmacy. It was introduced to the Ophthalmology department in Tan Tock Seng Hospital on 27 July 2009. The aim of the Pre-packing service is to reduce patient's waiting time at the pharmacy.

The ideal situation of the pre-packing service is when patient collects the full quantity of the prepared medications. However, patients do change their minds at the point of dispensing to obtain a different quantity. This is defined as true partial rework. Rework increases patient's waiting time as pharmacy staff has to spend more time to alter the quantity. Orders not collected by patients, known as uncollected medications, also contribute towards rework. The target rework rate for pre-packing is not more than 5%. The target waiting time for pre-packed medications is not more than 15 minutes.

**Methods:** Data was studied for September and October 2009. Data was extracted from the Pharmacy system, iPharm. The true partial rework and uncollected rate were analysed. Waiting times for the fully dispensed and true partial pre-packed medications were also measured.

**Results:** The true partial rework was 17.36% and the uncollected rework was 10.36%. The average total rework for the month of September and October 2009 was 26.16%. Despite the rework rate, the average waiting time achieved for fully dispensed pre-packs was 9 minutes and 46 seconds, while that for partially dispensed was 12 minutes and 38 seconds.

**Discussion & Conclusion:** Pharmacy Pre-packing service proves to reduce patient's waiting time by more than 50% even though rework rate failed to achieve its target value of 5%. Patient whom medications are pre-packed will now enjoy greater convenience and higher satisfaction. Reasons for true partial were also analysed and communicated to the doctors in order to aid in the reduction of rework rate.

**PP-AH-16**

**Detection of Epidermal Growth Factor Receptor Mutations in Asians Using Sanger Sequencing**

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**Background/Hypothesis:** Epidermal growth factor receptor (EGFR) mutations were performed on patients diagnosed with primary and metastatic lung cancers. Results from EGFR mutation testing provide valuable guidance to oncologists in their decisions on EGFR-targeted therapies.

**Methods:** Sanger-based sequencing was used to detect the EGFR mutations. DNA was isolated from various sources and PCR amplification-direct sequencing with primers targeting exons 18, 19, 20 and 21 of the EGFR gene was carried out using an in-house validated protocol.

**Results:** Since 2006, ~330 cases were analysed for EGFR mutations. The following mutations were found: 2 in exon 18, 87 in exon 19, 10 in exon 20 and 45 in exon 21 (total =144). In several cases, combinations of mutations were found in two different exons: e.g., in exons 18 and 21 (E709K and L858R), in exons 19 and 20 (delE746-A750 and L782F; delE746-A750 and R803Q/ G810D; delE746-A750 and Q820X; delL747-P753 and A763T/ R776H) and in exons 20 and 21 (T790M and L858R/ S768I/ L858R). We also found 15 rare mutations, some of which had not been reported elsewhere.

**Discussion & Conclusion:** Whilst gene mutation targeted technologies such as SnapShot, Fluorescent RFLP and the real-time PCR-based TheraScreen EGFR29 mutation kits, have higher sensitivity and are less time-consuming, these methods merely analyse and report for only specific known EGFR mutations. The direct-sequencing method we used can potentially detect all the mutations, including novel ones, is relatively less costly and easy to perform and DNA sequencing is largely available in most molecular genetics laboratories.

**PP-AH-17**

**Modified Illinois Agility Test among Frail Elderly**

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**Background/Hypothesis:** Falls are multi-factorial. Studies show that one third of elderly fall once a year, constituting 85.3% of trauma cases sustained in elderly. Agility, requiring a combination of muscle strength, balance, coordination and speed, may be used to provide a holistic approach to address such fall risk factors at once. Hence, this study aims to determine if agility is suitable to identify fall risk in frail elderly. The Modified Illinois Agility Test (MIAT) by Tang et al (2008) was compared against other common measures of fall risks, specifically the Physiological Profile Approach (PPA) and Timed Up and Go (TUG). The PPA has an accuracy of 76% in predicting fall risk, whilst the TUG indicates higher fall risk with timings of  $\geq 14$ secs (Shumway-cook et al, 2000).

**Methods:** Convenience sampling was carried out at eldercare centres. 21 subjects were assessed using MIAT, PPA and TUG, to identify their agility and fall risk (PPA and TUG) respectively. Fall risk was calculated by the FallScreen© Falls Risk Calculator based on data collected from the PPA. Pearson's correlation and the One sample t-test were used to analyse the relationship among the 3 tests. Confounding factors were determined by the Independent t- test.

**Results:** MIAT correlated strongly with TUG ( $r = 0.864$ ,  $P = 0.000$ ), but not with PPA ( $r = 0.140$ ,  $P = 0.546$ ). There was a statistical significant difference between MIAT and PPA ( $t = 13.009$ ,  $P = 0.00$ ), MIAT and TUG ( $t = 13.746$ ,  $P = 0.00$ ) and PPA and TUG ( $t = 9.704$ ,  $P = 0.00$ ). Age and walking aids (specifically walking sticks and quad sticks) were not confounding factors. MIAT was also able to differentiate fallers from non-fallers based on TUG timings of  $\geq 14$ s or  $< 14$ s ( $t = 2.822$ ,  $P = 0.036$ ).

**Discussion & Conclusion:** MIAT should be used in adjunction with other fall risk tests to generate a more accurate assessment of fall risk in elderly population. MIAT is able to assess the subject's agility based solely on their capacity and not their age. Walking aids can be used during MIAT.

**PP-AH-18**

**Cognitive Testing of Candidate Items for the Positive Mental Health Instrument**

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**Background/Hypothesis:** Part of the Singapore Mental Health Study aims to develop a culturally relevant instrument to measure the level of positive mental health (PMH) in Singapore. A questionnaire with 187 candidate items was constructed in the preliminary phase of the study. This paper described the cognitive testing of the questionnaire to ascertain if the items were working as intended and to suggest improvements for unambiguous question wording, layout and instructions.

**Methods:** Given the length of the questionnaire, candidate items were sorted into 4 separate semi-structured protocols for cognitive interviews (CIs). Face to face CIs were conducted with 22 Singapore residents of different age, gender, ethnic and educational groups. Respondents were asked to complete the self administered PMH questionnaire before proceeding to CIs. We tested the effect of providing a specific recall period on comprehension and response. A 'think aloud' method was used to obtain information on retrieval and judgment while selecting the response categories. Answers from CIs were mapped to evaluate the similarity between responses and identify sources of measurement error.

**Results:** Respondents could understand the items and relevant concepts and retrieve required information from memory. All items were interpreted correctly, except for one which was misinterpreted for reasons like problems with clarity and incomplete wording. Providing an 'in general' recall instruction improved judgment and responses, and was preferred over a specific time period while answering the statements about respondents' own characteristics and behaviours. Respondents had no difficulty using the four-point response scale.

**Discussion & Conclusion:** Interview findings provided a rationale for avoiding a specific recall period for the instrument and employing a four-point response scale. Incorporating inputs from intended users of the measure in the early stages of development improves the validity and application of an instrument.

**PP-AH-19**

**A 3-Year Review of Unplanned Re-Admissions and Treatment Default Rates of Patients in an Acute Psychiatric Ward**

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**Background/Hypothesis:** The objective of case management is to ensure patients are cared for and supported from admission through discharge. Thus, assessment and identification of patients' needs, psychoeducation, supportive counseling, linkages to essential services, patient advocacy and telephonic case management are done. This paper aims to review the effectiveness these interventions have on readmission and treatment default rates.

**Methods:** Case managed patients in an acute psychiatric ward from 2007 to 2009 were included in this review that analysed readmission rates and outpatient clinic defaults.

**Results:** The unplanned readmission rates (UPR) within 30 days were found to be 5.55% (2007), 4.58% (2008) and 3.44% (2009). This was lower than the hospital's UPR record of 14%. Contributing factors for readmission included exacerbation of acute psychiatric conditions, psychosocial problems, behavioural problems and side effects of antipsychotics. The default rates were noted to be 11.79% (2007), 11.37% (2008) and 10.46% (2009) which are lower than the reported hospital's overall rate of 22%. The reasons for defaults were mainly due to relapse of mental state, side effects of anti-psychotics, titration or change of anti-psychotics.

**Discussion & Conclusion:** The lower recorded rates of unplanned readmission and default rates of the ward as compared to the hospital's are encouraging. Case managers will need to continue to utilize their care processes to ensure these rates are further reduced.

**PP-AH-20**

**Viewing Software Influence on Diagnosis and Quality Of Cone Beam Computed Tomography Images**

**DWC ONG**

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**Background/Hypothesis:** To assess the influence of viewing software on diagnostic and image quality of CBCT images.

**Methods:** Two CBCT images of 2 patients taken from the records of National University Hospital, Singapore were used in this study. Primary and secondary reconstructions were performed from data sets of KaVo 3D eXam (KaVo Dental Corp, Germany) and E-Woo Pax Uni 3D (Vatech, Korea) machines using their respective software and patient data. The same reconstructions using these 2 data sets were performed using Osirix (Osirix, Switzerland). Paired comparisons between Osirix and eXam coupled with Osirix and Ezy-3D (E-Woo viewing software) were done. Image quality was analysed by 20 examiners using a ranking scale while diagnostic quality was assessed in a questionnaire. Results were assessed for statistical significance using Wilcoxon signed rank test and Kappa coefficient.

**Results:** The results show that primary reconstructed images showed no difference in image and diagnostic quality when traversing between different software platforms assessed in this study, with average Kappa coefficient of 0.95. However, Osirix's secondary reconstructed image was consistently of poorer image quality compared to eXam and Ezy-3D viewing software (Wilcoxon signed rank test score  $P < 0.01$ ). Diagnostic quality of Osirix's secondary reconstructed images also scored less on certain anatomic landmarks compared to eXam and Ezy-3D.

**Discussion & Conclusion:** Software variability does not influence the image and diagnostic quality of primary reconstructed images. However, secondary reconstructions (i.e. Orthopantomagram) using different softwares will influence a clinician's diagnostic capabilities.

**PP-AH-21**

**A Survey to Identify Perception of Healthcare Professionals on High-Alert Medications, Frequent Causes of Errors and Acceptability of Interventions for High-Alert Medications**

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**Background/Hypothesis:** The High-Alert Medications (HAM) Survey aimed to determine drug classes/drugs perceived as HAM aside from 7 drug classes identified based on local and international data (anticoagulants, chemotherapeutics, concentrated electrolytes, insulins, neuromuscular blockers, parenteral opiates and medications administered via intrathecal and epidural route), the perceived frequent causes of errors and acceptability of interventions for HAM by local healthcare professionals (HCP).

**Methods:** The questionnaire was developed based on published literature and inputs from HCP. Cognitive testing was carried out before the online, cross-sectional survey was conducted from Jan to Feb 2010 in Alexandra Hospital, Institute of Mental Health, National Healthcare Group Polyclinics, National Skin Centre, National University Hospital and Tan Tock Seng Hospital.

**Results:** The overall response rate was 29.5% (1070/3621: 339/1925 doctors, 611/1498 nurses and 120/198 pharmacists). Top 10 (out of 28) drug classes/drugs perceived as HAM were (parenteral unless indicated otherwise) vasopressors, anaesthetics (parenteral and inhaled), antiarrhythmics, thrombolytics, inotropes, opiates (oral and transdermal), immunosuppressants, benzodiazepines, nitroprusside sodium and hypertonic dextrose. 'Poor communication between HCP' was the main perceived cause of errors across HCP. The next leading causes of errors perceived by doctors, nurses and pharmacists respectively were 'lack of knowledge on HAM', 'not following policies, guidelines or procedures for administering HAM' and 'distractions and interruptions'. 'Improve communication processes' was most favoured whereas 'monitor and control usage of HAM' was least favoured by HCP.

**Discussion & Conclusion:** This survey identified drug classes/drugs considered as HAM by HCP, their perception on frequent causes of errors and acceptability of interventions for policy makers' consideration in improving safe use of HAM.



**PP-AH-22**

**A Review on Health Information Literacy**

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**Background/Hypothesis:** A public event was held in Tan Tock Seng Hospital (TTSH) in conjunction with World Chronic Obstructive Pulmonary disease (COPD) day in 2009. Questionnaires were given. The questions were reflective of the displayed posters in English with regards to definition, main causative factor, diagnostic test used and management of COPD.

**Methods:** The aim of this survey was to test the health information literacy of adults that came to the event based on their answer(s). It was a walk-in voluntary participation. This report analyses the variation in understanding of displayed information across different age groups. Some of the findings are highlighted.

**Results:** One hundred and seventy-nine adults participated in the survey, 32% were below 40 years old and 44% were between 41 to 60 years old. A 5 item true-false questionnaire was used. The survey showed 32% of the questions being answered incorrectly.

**Discussion & Conclusion:** True-false items are used as it requires a short time to answer but is able to test a large amount of content. Contrary to assumptions, the inaccuracy was believed to be more than reported as the answers were all reflected on the displayed posters. This shows that information displayed is not equivalent to literacy skill. In conclusion, health care providers should ensure their patient(s) understand basic health information and services needed to make appropriate health decisions through direct communication and not just through papers of information.

**PP-AH-23**

**Home Care Program for Chronic Obstructive Pulmonary Disease Patients Reduces Hospital Admissions**

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**Background/Hypothesis:** Chronic Obstructive Pulmonary Disease (COPD) is the eighth leading cause of death and the top sixth condition for hospitalisation in Singapore. A home care program was implemented on a selected group of COPD patients with aims to reduce hospital admissions and improve patient's Quality of Life (QoL).

**Methods:** A group of 40 patients were enrolled to our programme. 90% (n = 36) were in disease stage 3 and 4, 10% (n = 4) were in disease stage 1 and 2. Interventions during home visitation consisted of patient education, medication adherence, caregiver training and linkage to social support. Patients were followed-up with telephonic calls. Hospital admissions and length of stay (LOS) for acute exacerbation of COPD were tracked, comparing 6 months period before and after home visitation. St George's Respiratory Questionnaire (SGRQ) was used as a tool to assess patient's QoL. An increase of 4 units of SGRQ score indicates an improvement in QoL.

**Results:** There was a 15% reduction in hospital admissions. Number of admissions was reduced from 82 to 70. Total hospital days fell from 335 days to 232 days. The average LOS was reduced from 4.09 days to 3.3 days. Seventy-three percent of patients completed both baseline and 6 month SGRQ post home visit. Thirty-eight percent showed an improvement in QoL. Most of these patients were in stages 1 and 4 of the disease.

**Discussion & Conclusion:** Our results suggest that the home care program reduces overall hospital utilisation and improves QoL of a selected group of COPD patients. The programme has now been extended to all our COPD patients.

**PP-AH-24**

**Detection of Chromosome 1 Abnormalities in Multiple Myeloma Using in-House Fluorescence in-Situ Hybridization Probes**

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**Background/Hypothesis:** Abnormalities of chromosome 1 involving the regions 1p36.1 and 1q21.1 are highly prevalent in multiple myeloma (MM) and indicate progression of disease. Malignant cells in MM are difficult to grow in-vitro and yield few metaphases, making analysis using cytogenetics difficult. Fluorescent in-situ hybridization (FISH) using chromosome 1 probes allows easy detection in both interphase and metaphase cells. Probes for 1p36 and 1q21 are not readily available commercially and are expensive. Addition of these probes to the existing MM FISH panel would definitely add clinical value, as chromosome 1 abnormalities are known to indicate disease progression and are also associated with an adverse outcome.

**Methods:** Locus specific BAC clones with inserts for genes MAD2B (1p36) and CKS1B (1q21.1) supplied by the Mayo Clinic were used. BAC DNA was extracted by alkaline lysis and labelled by nick translation to incorporate either orange or green fluorophores. FISH was performed on a set of patients with complex chromosomal abnormalities encompassing deletions, duplications, jumping translocations and other complex rearrangements involving chromosome 1, which were difficult to analyse with traditional cytogenetics.

**Results:** A normal sample showed 2 red and 2 green signals in interphase/metaphase cells. Increase and decrease in signals from individual probes indicate gain or loss of chromosomal regions. Hence, patients with total or partial deletions/duplications of chromosome 1 were correctly identified by FISH and we were able to clarify the complex rearrangements involving chromosome 1 detected by routine karyotyping.

**Discussion & Conclusion:** The in-house FISH probes allowed enumeration of copy numbers for the 1p36 and 1q21.1 region with high sensitivity and specificity. It resolved the complex cytogenetic karyotypes successfully. The in-house probes worked out to cost half as much as commercially available probes, and should be included in the FISH panel used in myeloma assessment.

**PP-AH-25**

**Influenza Vaccinations Reduces Readmission Rate**

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**Background/Hypothesis:** Influenza vaccines can help to reduce readmission of acute exacerbations for patients with Chronic Obstructive Pulmonary Disease. From April 2005 to March 2008, the vaccination rate of influenza was measured to be only 33% (n = 307). The common reasons why these patients were deterred from physicians' recommendations to have the vaccination done were cost, needle-phobia, low pain-threshold and the inconvenience of walking to Travellers' Clinic, located a distance from the Respiratory Clinic in Tan Tock Seng Hospital.

**Methods:** From April 2008 onwards, a 5-year government-funded Chronic Obstructive Pulmonary Disease Education Programme (The Airways Programme) initiated one of its new interventions by the Disease Case Managers for the vaccine to be available in the respiratory clinic. Bio-data of patients including spirometry results for diagnosis confirmation as Chronic Obstructive Pulmonary Disease and influenza vaccination dates were entered into a centralized clinical research database. Similarly, readmission episodes for acute exacerbations of the two periods of time were tracked & analysed as well to investigate any reduction in average readmission rate.

**Results:** The vaccination rate has gone up to 74% (n = 550) during the ongoing The Airways Programme, reflecting a 41% increase. The average readmission rate from April 2005 to March 2008 was 38% while the readmission rate from April 2008 till June 2010 has fallen to 34%.

**Discussion & Conclusion:** Since influenza-related respiratory infections can cause unplanned exacerbation-eliciting hospitalisations, the increase of patients being vaccinated against influenza has influenced a reduction in readmission episodes of acute exacerbation for patients with Chronic Obstructive Pulmonary Disease.

**PP-AH-26**

**Postoperative Physiotherapy in Grating Scapula- A Case Study**

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**Background/Hypothesis:** The grating scapula is an underestimated shoulder problem. Non-operative and operative management has been discussed in details in literature. The post-operative physiotherapy management has been discussed in a case of bilateral shoulder grating scapula managed by the excision of the supero-medial angle of the scapula.

**Methods:** A young adult suffering with bilateral grating scapula, treated with operative procedure after failed conservative trial of physiotherapy, has been identified from musculoskeletal out-patient at NUHS. The phase-wise physiotherapy management will be described in this poster.

**Results:** Pain-free full active range of motion without any complaint of grating or snapping with strength 4/5 as measured in manual muscle testing have been achieved with 12 weeks.

**Discussion & Conclusion:** This case study highlights the postoperative physiotherapy management leading to an optimum recovery and provides insights for understanding of grating scapula.

## PP-AH-27

### Validating a Fall Risk Assessment Tool

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**Background/Hypothesis:** Although prevention of falls in the older persons is recognised to be important in averting the associated physical, psychosocial and financial consequences, the challenge is to identify those who are at risk of falling. The Physiological Profile Approach (PPA) offers multi-dimensional risk assessment, given that falls in the older persons can be attributed to many modifiable factors. However this assessment tool was developed based on Australian populations and its applicability on Singaporean older adults has not been examined. This study therefore aimed to validate the use of PPA among older Singaporeans and to establish the cut-off values for the individual tests within this assessment tool.

**Methods:** We recruited community-dwelling older adults as well as patients referred by physicians. Each participant underwent a battery of 5 tests that examined visual edge contrast sensitivity, proprioception, quadriceps muscle strength, hand reaction times and postural sway. Receiver operating characteristic curves were plotted to identify the most optimal cut-off values for these tests.

**Results:** Among a total of 227 participants, 115 had  $\geq 1$  fall in the previous 12 months and 112 were non-fallers. Fallers were significantly older than non-fallers (74.1 years  $\pm$  10.6 vs 66.3 years  $\pm$  9.2;  $P < 0.001$ ). The areas under the curve for contrast sensitivity was 0.32 (95% CI: 0.26, 0.38), proprioception (0.58; 95% CI: 0.52, 0.65), strength (0.41; 95% CI: 0.34, 0.47), reaction-times (0.66; 95% CI: 0.59, 0.72) and sway (0.70; 95% CI: 0.63, 0.75). The cut-off values for muscle strength, reaction times and postural sway were lower than those recommended for Australians. Fallers had significantly poorer fall risk scores than non-fallers ( $P < 0.001$ ).

**Discussion & Conclusion:** The PPA fall risk assessment tool is valid for use with older Singaporeans. The cut-off values for some tests however are lower than those recommended by the tool.

**PP-AH-28**

**A Molecular Biomarker for Glioblastomas: Methylguanine-DNA Methyltransferase Promoter Methylation Status by High Resolution Melting Real-Time Polymerase Chain Reaction**

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**Background/Hypothesis:** Epigenetic silencing of O6-methylguanine-DNA methyltransferase (MGMT) by promoter methylation is associated with longer survival in glioblastoma patients treated with alkylating agents. A high resolution melting (HRM) real-time PCR assay with high sensitivity/specificity/simplicity, low cost and rapid turnaround time was set up on the LightScanner 32(LS32) system to detect MGMT methylation level.

**Methods:** To create methylation status controls, CpGenome Universal Methylated DNA(Millipore Co.) and blood genomic DNA(as unmethylated control) were bisulfite-converted. The resulting 100% methylated was diluted with the 100% unmethylated DNA to give 75%, 50%, 25% and 10% of methylated DNA. PCR amplification was carried out with the LS Mastermix with incorporated LC Green dye (Idaho Tech) and a specific primer set. HRM analysis of the 94bp amplicon encompassing 6 CpG sites of the MGMT promoter region was made with the LS32 Amplicon Genotyping software. Assay validation with clinical samples is ongoing.

**Results:** With 20ng of template DNA, the amplification gives reproducible CT (threshold cycle) values of ~27 for all methylation standards. The 100% methylated and unmethylated DNA were easily distinguishable with different melt curves and melt peaks at different melt temperatures (T<sub>m</sub>). The normalised melting curves showed a reproducible dose-response type relationship with the 75% mix showing the greatest deviation from the unmethylated standard. With its HRM advantage, the assay is able to detect 10% of methylated DNA in a background of 90% unmethylated DNA.

**Discussion & Conclusion:** The HRM assay allows the detection of homogeneous methylation of CpGs in the MGMT promoter region, providing a diagnostic and prognostic biomarker for treatment decisions in glioblastoma patients.

**PP-AH-29**

**A Review of Infliximab at a Hospital Outpatient Setting**

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**Background/Hypothesis:** Infliximab was introduced as an outpatient treatment at the National University Hospital. The objective of this study was to review the outpatient use of infliximab, to evaluate precautions exercised before initiating therapy and to report the occurrence of side effects.

**Methods:** This is a retrospective study. It included all 21 outpatients treated with infliximab from August 2007 to 2009.

**Results:** Patients received infliximab for ankylosing spondylitis, rheumatoid arthritis, ulcerative colitis, psoriasis and psoriatic arthritis. Tuberculosis screening was performed for 90.5% of the patients. During infusion, 19% of the patients experienced a blood pressure increase of >20 mmHg. Two patients had systolic blood pressure >180 mmHg. On the other hand, 9.5% experienced a blood pressure drop of >20 mmHg. One had systolic blood pressure <90 mmHg. A patient receiving 10 mg/kg of infliximab for ulcerative colitis developed thrombocytopenia (platelet counts  $77 \times 10^9/L$ ). The risk benefit ratio needs to be carefully considered before using such high doses, especially for patients with known history of drug-induced thrombocytopenia. There were 28.6% of patients who developed anaemia. None of them had neutropenia. However, 42.8% had high neutrophil counts, which may be a sign of post-infusion infection.

**Discussion & Conclusion:** This study found the use of infliximab as an outpatient therapy to be safe and tolerable as long as guidelines were followed. To ensure all patients are screened for tuberculosis, the prescribing system can be upgraded to generate a pop-up that requires tuberculosis test results to be entered before prescribing infliximab. Current protocols for blood pressure management during infusion recommend that for >20 mmHg drop in blood pressure, infusion should be halted till symptoms subside. Suggestions were made to draft similar guidelines for managing blood pressure increase. Also, patient education should be continuously reinforced regarding possible adverse events.



**PP-AH-30**

**Demographical Differences in Vitamin D and Bone Turnover Markers**

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**Background/Hypothesis:** Vitamin D is essential for intestinal calcium absorption and plays a central role in maintaining calcium homeostasis and skeletal integrity. Serum 25-hydroxyvitamin D (25OHD) insufficiency has been shown to have adverse effects on calcium metabolism, which leads to increased bone turnover. Other biochemical markers associated with bone turnover are Carboxyterminal cross-linking telopeptide of bone collagen (CTX) and Procollagen type I N propeptide (P1NP).

**Methods:** An in house patient data set for 25OHD (n = 2843), CTX (n = 191) and P1NP (n = 64) comprising demographics was collected over a period of 8 months. Each assay was analysed and compared based on age group and gender.

**Results:** The prevalence of 25OHD deficiency and insufficiency (<30 µg/L) was 91.6% for women compared to 77.8% in men. Based on the data, 42.5% of females and 60.3% of males have 25OHD concentrations between 20-30 µg/L.

CTX levels are significantly lower in older age groups. The prevalence of low CTX levels (<0.5 µg/L) are 10.7%, 55.6% and 94.8% in age groups <20 years, 20 to 39 years and 40 to 59 years respectively. However, we noticed a gradual increase in women >60 years.

High P1NP levels (>50 µg/L) are seen in age groups <20 years (66.7%) and >50 years (54.5%) compared to 30 to 39 years (25%) and 40 to 49 years (13.6%).

**Discussion & Conclusion:** 25OHD levels are not age related but shown to be gender related. CTX and P1NP levels are age related and is seen to be gradually increased in post-menopausal women.

## PP-AH-31

### Dietitian Tele-Consults in Primary Care

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**Background/Hypothesis:** Several studies have shown that dietetic tele-consults aid behavioural change and improve dietary intakes. To date, no study has been conducted among primary care clients in Singapore to assess their willingness to use such a service. The purpose of this study was to assess the willingness of clients in primary care to use dietitian tele-consults and to determine how they would like the service to be conducted.

**Methods:** Existing dietetic clients at NHG Polyclinics, Singapore were surveyed over 3 weeks in October 2009. Respondents were randomly selected and interviewed over the phone to assess their interest in dietetic tele-consults. SPSS version 15 was used to analyse the data.

**Results:** Of the 80 respondents (59% response rate), 40% were keen on dietetic tele-consults. Most respondents had one or more chronic conditions (93%), aged between 41 and 60 years (87%) and had secondary education and above (88%). The main reasons for the disinterest were preference for the traditional face-to-face consult (75%) and being too busy (17%). Of those interested, most (81%) preferred the tele-consult to be as a follow-up from their first face-to-face consult. The preferred mode for the tele-consults was via the mobile phone (75%). Respondents were interested to discuss issues related to their previous consults (81%), alternate dietary options (70%) and additional nutrition tips (60%) during the proposed tele-consults.

**Discussion & Conclusion:** Most clients in primary care indicated a preference for face-to-face consults. Given the reported benefits of dietitian tele-consults and the interest in using it as a follow-up service to address dietary concerns, primary care institutions may potentially offer these services. Research should also be done to assess the effectiveness of tele-consults when used as a follow-up service.

**PP-AH-32**

**High Throughput Rapid Influenza A and B Screening**

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**Background/Hypothesis:** Since the 2009 pandemic outbreak, there has been an increased demand for influenza virus testing. To enhance testing capacity, a high throughput 96-well universal influenza A and B duplex real-time polymerase chain reaction in single tube format was developed.

**Methods:** Primers and probes targeting highly conserved regions of the influenza A matrix protein and influenza B hemagglutinin genes, respectively, were selected and optimised on LightCycler® 480 II system (Roche Molecular Diagnostics). Amplicon-cloned plasmid standards were serially diluted and amplified in duplicate to determine the lower detection limit. Clinical performance of the novel duplex assay was initially validated against an existing screening method and later, the subtyping assays. Clinical specificity was further tested by a panel of non-influenza respiratory viruses and influenza A/H5N1 and A/H7N4 from external quality assurance program.

**Results:** The influenza A and B assays had reproducible amplifications of  $5 \times 10^0$  to  $5 \times 10^7$  copies/reaction and  $5 \times 10^1$  to  $5 \times 10^7$  copies/reaction, respectively. Compared to the existing screening method, the in-house method detected 26/25 influenza A and 3/3 influenza B positive cases from 89 specimens. The extra positive sample detected by the in-house assay was later confirmed as influenza A/H1N1/2009. When performed in parallel with subtyping assays, the in-house method detected 161 influenza A-positive samples, which included 117 H1N1/2009 and 44 seasonal H1/H3 specimens. For influenza B, 26 cases were detected without further validation. There was no cross-reactivity against other respiratory viruses, including hMPV, hRSV, hPIV type 1 to 4, and hCoVs. Two H5N1 and one H7N4 specimens from external quality assurance program were correctly detected.

**Discussion & Conclusion:** During the clinical validation, the novel universal influenza A and B assay showed 100% sensitivity and 100% specificity, proving to be adequate for clinical utility.

**PP-AH-33**

**A Review of Intravenous and Oral Busulphan Use in Haematopoietic Stem Cells Transplant Patients in a University Hospital**

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**Background/Hypothesis:** Haematopoietic stem cell transplant (HSCT) is potentially curative for haematological malignancies. Before HSCT, patients undergo conditioning regimens to destroy cancer cells and induce immunosuppression. Oral busulphan was routinely used; but its narrow therapeutic index and inter-patient variability of absorption made it prone to cause acute toxicities, such as gastrointestinal toxicities, seizures, mucositis, and sinusoidal obstruction syndrome (SOS). This prompted the development of an intravenous (IV) formulation. There is currently no local data on the prevalence of toxicities related to oral and IV busulphan. This project aims to evaluate the prevalence of acute toxicities and compare the engraftment rates between oral and IV busulphan used in these regimens.

**Methods:** This is a retrospective review of patients who received busulphan at NUH between January 2004 and October 2009. A standardised data collection form was used to document relevant information. The difference in toxicities between oral and IV busulphan was compared. Overall efficacy was determined using days to engraftment.

**Results:** Eight patients were included in this study, 2 were on oral busulphan. Most patients had nausea, vomiting and diarrhea which were sufficiently controlled with metoclopramide, ondansetron and loperamide. One patient, however, required octreotide. Mucositis was also reported and this was managed by analgesics. Conversion of oral to IV medications was required in 3 patients and 2 patients were given total parenteral nutrition. Seizures and SOS were not observed. All patients engrafted within 100 days.

**Discussion & Conclusion:** There were no significant differences in the toxicities reported between oral and IV busulphan. These were adequately managed, and more severe complications were not observed probably due to the adequacy and efficacy of prophylactic measurements taken. The engraftment rates post transplantation were comparable for both routes.

**PP-AH-34**

**Post-Polyethylene Glycol Precipitation Prolactin Reference Interval**

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**Background/Hypothesis:** Circulating prolactin (PRL) consists of biologically inactive polymeric PRL and macroprolactin which contributes to pseudohyperprolactinemia. Samples are treated by Polyethylene glycol precipitation (PEGP) to exclude abnormal PRL when PRL is >800mIU/L. We aim to study the classification and compare the post-PEGP PRL samples in Laboratory of National University Health System to post-PEGP specific PRL reference interval.

**Methods:** All PRL results >800mIU/L, patient demographics and percentage recoveries dated from 1 January 2009 to 11 August 2010 were reviewed. Post-PEGP PRL levels were calculated and compared against published post-PEGP PRL reference intervals (male 61 to 196 mIU/L; female 66 to 278 mIU/L).

**Results:** Two hundred and forty four subjects studied showed that the mean and range of pre and post-PEGP PRL were 10414 mIU/L, 808 to 255,500 mIU/L and 8058 mIU/L, 96 to 273,385 mIU/L respectively. Their respective percentages recoveries were 70% and 3% to 107%. Among samples with PEGP recovery of <40%, 6 exceeded the reference interval (pre-PEGP PRL range: 1062 to 109800 mIU/L) indicating true hyperprolactinemia. However, for those within the greyzone recovery (40% to 60%), the post-PEGP PRL mean and range were 8115 mIU/L and 451 to 3646 mIU/L, exceeding the reference interval.

**Discussion & Conclusion:** As the data suggests, 2.5% of low PEGP recovery otherwise called pseudohyperprolactinemia, can be classified as hyperprolactinemia, warranting further investigations when a specific reference interval is applied. The use of a PEGP-specific reference interval can aid confident interpretation of recoveries within the greyzone by providing a definitive cutoff. Therefore, this indicates a need for the laboratory to provide a post-PEGP reference interval for meaningful interpretation of very high PRL.

**PP-AH-35**

**Home Visit by Case Manager Reduces Readmission**

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**Background/Hypothesis:** Chronic Obstructive Pulmonary Disease (COPD) is a common disease afflicting millions of people worldwide and has resulted into heavily burdened global disease. In Singapore, it is the eighth leading cause of death and the top six conditions for hospitalisation.

Currently, case managers have been providing patients with knowledge of the disease process and progression, reinforcing on compliance to medication and follow-up adherence. Coping strategies and energy conservation techniques were also shared. Other initiatives include encouraging patient to take flu or pneumococcal vaccination, attend pulmonary rehabilitation and providing smoking cessation counselling. Home care programs aim to improve disease management, quality of life and prevent disease exacerbation, thereby reducing hospital admissions.

**Methods:** Twenty patients have been identified and visited since November 2008. 20% (n = 4) of them are in Stage 2, 60% (n = 12) in Stage 3 and 20 % (n = 4) are in stage 4. Over 12 months, their readmission rates within 30 days before home visit are tracked. Readmission within 30 days post home visit will be monitored.

**Results:** Before initiation of home visitations, 40% (n = 8) of patients were reported having readmission within 30 days. A total of 34 episodes of readmission were reported among them. For post home visit, 55% (n = 11) were readmitted within 30 days. Their average length of stay per readmission is 4 days.

**Discussion & Conclusion:** Our results suggested an increase in readmission after post home visit. Case managers learnt the need to identify other services gaps such as linking social support for patient and their caregivers. With these initiatives, we aim improve the patient quality of life and reducing hospital readmission within 30 days.

**PP-AH-36**

**Rehabilitation Gains in Early Supported Discharge Patients**

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**Background/Hypothesis:** Early supported discharge (ESD) program consisting of home-based physiotherapy and occupational therapy for stroke patients has shown positive short-term functional outcomes. This study aims to investigate if rehabilitation gains after ESD program are maintained over 1 year.

**Methods:** The Modified Rankin Scale (MRS), Frenchay Activity Index (FAI) and performance of ambulation in the Clinical Outcome Variable Score (COVS) were determined before and after completion of ESD and at 1-year post-stroke. In addition, quality of life was assessed using Short Form-36 (SF-36 v.1) at 1-year post-stroke. Data from July 2007 to July 2010 was analysed using the SPSS v.14 paired t-test.

**Results:** Out of 158 ESD patients eligible for a 1-year follow-up, 98 were contacted successfully and 60 were lost to follow-up. No significant difference was found in MRS, FAI and COVS scores post-ESD between these 2 groups. The recruited patients (mean age: 66.2 years, SD11.3) received an average of 9.1 therapy sessions over 26.7 days (SD16.4). The patients showed improvement immediately post ESD. Proportion of patients with MRS 0 and 1 increased from 5.1% to 46.5%, as well as patients with COVS performance 6 and 7 increased from 5.1% to 47.9%; FAI improved from 16.0 (SD2.7) to 25.2 (SD7.3,  $P < 0.001$ ). Further improvement was achieved at 1-year post-stroke, with 70.4% attaining MRS 0 and 1; 70.4% attaining COVS performance 6 and 7. The mean FAI score was 31.2 (SD9.8) and the mean SF-36 score was 75.3 (SD 22.5).

**Discussion & Conclusion:** ESD patients demonstrated continuous improvement in MRS, COVS-performance and FAI scores. Future studies are required to compare the effectiveness of rehabilitation for stroke patients undergoing home-based ESD program and community step-down rehabilitation.

**PP-AH-37**

**Characteristics of Patients with Positive Hepatitis B Surface Antigen**

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**Background/Hypothesis:** Hepatitis B infection is caused by the hepatitis B virus and is associated with liver cirrhosis and hepatocellular carcinoma. It is transmitted through direct contact with blood and body fluids. Hepatitis B surface antigen is the first antigen that can be detected following a hepatitis B infection. The aim of this study is to investigate the distribution of hepatitis B surface antigen-positive Singaporean patients among the different gender, race and age groups.

**Methods:** In this retrospective study, National University Hospital patient results from past 2 years were used. Results from August 2008 to August 2010 were extracted from laboratory information system. Hepatitis B surface antigen test was performed on Siemens Advia Centaur analyser, using chemiluminescence immunoassay technology.

**Results:** From our data, 37% of the total were foreigners and 1213 Singaporeans (63%) were tested positive for hepatitis B surface antigen in the past 2 years. 58% of hepatitis B surface antigen-positive patients were male while 42% were female. 90% were Chinese, 6% were Malay, 1% were Indians and other ethnic races made up 3%. Highest hepatitis B surface antigen-positive rate occurred in the age group 51 to 60 years (27%). The lowest rate occurred among the young population (1 to 20 years) which made up 4% and the elderly (81 to 90 years) which made up 2%.

**Discussion & Conclusion:** Hepatitis B surface antigen was more common among males than females. The Chinese comprised an unusually high proportion since only 75% of Singaporean population is Chinese. The low hepatitis B surface antigen-positive rate among the 1 to 20 age group could be due to the vaccination program for newborns which was started in 1987. Adults who have not been immunised or infected by hepatitis B virus should be encouraged to go for hepatitis B vaccination.



**PP-AH-38**

**Binding Characteristics of Colloids for Nuclear Medicine Solid Gastric Emptying Studies**

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**Background/Hypothesis:** Tc-SC is regarded as the premier radiolabel for solid gastric emptying studies since it offers >95% solid binding after 3 hrs in simulated gastric conditions in cooked egg meals. This study aims to test the solid binding characteristics of other colloids: 99mTc-Hepatate (Tc-H: Tin Colloid) 99mTc-Nanocis (Tc-N: Rhenium Sulphide Colloid) as an alternative labelling agent.

**Methods:** The white and yolk of the eggs were treated as two independent solids labelled with Tc-H, Tc-N, and Tc-SC; suspended in simulated gastric juice (0.1M HCl + 0.5g/L pepsin) and activity ratio of the solid to liquid was measured with the gamma camera. A second experiment which simulates the Thomforde Model (JNMT 13:11-14,1985, Mayo Clinic & Foundation) was performed to investigate the effect of experimental set-up on the binding results.

**Results:** Binding of Tc-H in egg white and egg yolk were  $77\% \pm 4$  (n = 5) and  $59\% \pm 6$  (n = 4) respectively. Binding of Tc-H in the simulated Thomforde Model was 90% at 3 hours. Similar rate of solid to liquid transfer was observed for Tc-H and Tc-N. Egg yolk loses Tc-H to the gastric juice phase more easily than egg white.

**Discussion & Conclusion:** The presence of S in Tc-N did not increase percentage bound to solids. Percentage Binding to egg white of Tc-H after 3hrs in SGJ is markedly different from literature reports for Tc-SC (64% vs >95%). Literature on Tc-SC solid binding varies a great deal in the methods used and in the reported values. Tc-H and Tc-N bind to egg white as effectively as Tc-SC. Scrambled egg may empty more rapidly from the stomach than egg white alone.

**PP-AH-39**

**Virtual Reality as a Therapeutic Adjunct for Children with Cerebral Palsy in a School Setting: An Exploratory Study**

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**Background/Hypothesis:** Virtual Rehabilitation (VR) has been increasingly reported to be an effective and viable physiotherapy adjunct. In children with Cerebral Palsy (CP), the use of VR in therapy has been shown to improve motor function and increase interest toward therapy. However, previous studies were limited by use of expensive VR systems, single case studies or the lack of use of VR in a school setting. It is hypothesised that the use of VR would have positive effects on the upper limb function of children with CP, and would also increase their interest and enjoyment towards therapy.

**Methods:** Five to ten subjects aged 10 to 13 years with any form of CP undergo a 6-week intervention using the virtual reality game XAVIX-EYEHAND. Pre-post intervention scores of the following outcome measures are compared: 1) Quality of Upper Extremity Skills Test, 2) Brunel Balance Assessment and 3) Modified 9-Hole peg test. A Pre-Post test survey is to be completed by the subjects, their parents and their therapists.

**Results:** Physical improvements in balance and fine upper extremity function were found. Students enjoyed the games and were willing to have it complement their usual therapy. The teacher reported visible improvements in posture and endurance as the intervention progressed.

**Discussion & Conclusion:** It is feasible, to include a low cost, commercially available VR system as an adjunct to physiotherapy in the school setting. The school is keen to work out a way to incorporate VR in the school curriculum and provide the necessary resources. Future studies should look into using a larger and homogenous group, with a longer intervention period and a greater variety of VR games.

**PP-AH-40**

**Antimicrobial Stewardship Program in a Surgical High-Dependency Unit**

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**Background/Hypothesis:** Antimicrobial expenditures account for up to 30% of hospital drug budgets. Optimising use of antimicrobials can reduce healthcare cost and improve patient outcomes. In addition, reducing inappropriate use of broad spectrum antimicrobials may decrease selection pressure for drug-resistant pathogens.

**Methods:** An antimicrobial stewardship program (ASP) was started in a surgical high-dependency unit in October 2009. A prospective audit and feedback mechanism was employed for review of patients on 15 selected parenteral antimicrobials. Appropriateness for use was assessed based on indication, dose, route of administration, and duration of therapy. Recommendations were made by infectious disease physicians to primary teams in writing. Outcomes were analysed for a period of 9 months after initiation of the program. Antimicrobial usage was monitored before and after the start of ASP.

**Results:** Of 716 cases reviewed, third and fourth generation cephalosporins (27%), metronidazole (21%), and carbapenems (17%) were most commonly encountered. There were 350 recommendations made, involving mainly streamlining of therapy (65%), escalation of therapy (10%) and dose adjustments (10%). 75% of recommendations were accepted, resulting in estimated patient savings of \$21k. Of these, 71% had clinical and/or microbiological response. The median length of hospital stay for audited patients was also observed to drop from 19 to 14.5 over the period. Consumption of parenteral antimicrobials was found to decrease by 4%, with cephalosporins, metronidazole and carbapenem use reduced by 5%, 12% and 4% respectively.

**Discussion & Conclusion:** An ASP can save cost for patients and possibly improve patient outcome. The reduction in antimicrobial consumption may translate into lower drug expenditure and possibly limit emergence of antimicrobial resistance.

**PP-AH-41**

**Immunophenotype of Normal Peripheral Blood B and T Lymphocytes**

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**Background/Hypothesis:** The Haematology Section of the Department of Laboratory Medicine in Tan Tock Seng Hospital started flow cytometry services in 2010 to characterise B and T lymphoproliferative disorders. As a quality process and a reference for reporting of abnormal samples, we determined the normal expression patterns of the cellular markers used on the peripheral blood of normal individuals.

**Methods:** Thirty-two anonymised blood samples from individuals presenting for health screening were analysed using the 6-color FACSCanto™ II flow cytometer. B lymphocytes were analysed for CD19, CD20, CD22, CD5, CD10, CD23, CD25, CD38, CD45, CD103,  $\kappa$  and  $\lambda$  light chains. T lymphocytes were analysed for CD2, CD3, CD5, CD7, CD4, CD8, CD25, CD45 and HLA-DR. Various patterns of expression, ratios, % positivity compared to a fluorescence-minus-one control and minor populations relevant to the analysis of abnormal samples are explored.

**Results:** Among the 32 samples analysed, there was an equal representation of males and females. The median age is 41 years and Chinese predominate. Among the B lymphocytes, the median  $\kappa$ : $\lambda$  ratio is 1.3. The median % of B lymphocytes expressing CD5, CD10, CD23 and CD38 are 36%, 10%, 83% and 84% respectively. Among the T lymphocytes, the median CD4:8 ratio is 1.4. Among the 3 T cell subpopulations (CD4+, CD8+ and double negative (DN)), CD3 expression is strongest in the DN and weakest in the CD8+ subpopulation. CD5 expression is strongest in the CD4+ and weakest in the DN subpopulation. In some individuals, there is a significant group of DN and/ or CD8+ T lymphocytes which are completely CD5 and/ or CD2 negative.

**Discussion & Conclusion:** This reference for normal individuals is mainly applicable to the combination of fluorochromes and monoclonal antibodies used in the Tan Tock Seng Hospital Flow Cytometry Laboratory. However, certain findings can be used by all immunophenotyping practitioners to analyse B and T lymphoproliferative malignancies.

**PP-AH-42**

**Seroprevalence of Hepatitis C Virus Antibody and Hepatitis C Virus Recombinant Immunoblot Assay Banding Pattern**

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**Background/Hypothesis:** Hepatitis C infection is associated with liver cirrhosis and hepatocellular carcinoma. The aim of this study is to determine the seroprevalence of HCV viral antibody and HCV RIBA banding patterns.

**Methods:** Hepatitis C viral antibody was analysed on the Siemens Advia Centaur analyser using chemiluminescence immunoassay technology. Reactive and grey-zone reactive samples were confirmed using the HCV RIBA (anti-HCV ELISA-3) strip Immunoblot Assay.

**Results:** Seven thousand six hundred and fifty HCV tests were performed from January to July 2010 at the National University Hospital. Seven thousand four hundred and eighty-seven (97.9%) were non-reactive, 10 (0.13%) were grey zone reactive (COI 0.8 to 1.00), and 153 (2.0%) were reactive. Of 1609 blood donors, none were positive and only 3 were grey zone reactive. One hundred and fifty-one positive and grey zone reactive sera were tested for confirmation using INNO-LIA HCV Score, a 3rd generation line immunoassay (LIA). One hundred of these (66%) were confirmed positive. Seventy-two percent were male. Twenty-seven percent were Chinese, 21% Malays, 6% Indians and 30% were foreigners. Their ages ranged between 17 to 84 years old. Core peptide 1(C1) band showed reactivity 97% of the time, C2 91%, E2 50%, NS3 94%, NS4 79%, and NS5 44%.

**Discussion & Conclusion:** The seroprevalence of HCV viral antibody in our hospital is 2%. HCV infection is more common among males. A significant proportion of HCV infected patients are foreigners. The most common HCV antigens detected are C1, C2 and NS3.

**PP-AH-43**

**The Effects of Circadian Rhythm on Quadriceps and Hamstring Muscle Strength in Adult Males**

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**Background/Hypothesis:** Studies show circadian rhythm affects processes like sleep, hormones, feeding and muscle strength (Manfredini, 1996). Isometric and dynamic maximal voluntary contraction (MVC) is weakest from 4 to 6am and strongest from 17 to 19h (Nicolas et al 2007). Evidence demonstrates that daily variations in muscle strength vary from 3% to 21.5% (Atkinson (1993), Coldwells (1994)).

**Methods:** The study was done to determine the effects of circadian rhythm on maximal volume production of quadriceps and hamstring muscles on adult males. If as expected, results show that it has a positive effect, it would impact an athletic population who must perform optimally at specific times. Twenty-one subjects did 3 sets of 8 MVC of quadriceps and hamstrings. Inclusion criteria were consenting males age 18 to 40 years. Exclusion criteria were; females, hip/knee disease, non-united lower limb fractures, metal implants in the hip/knee, steroid use (>3 months), epilepsy, cardiac insufficiency, PVD, aneurysms, anti-coagulants, x-ray/chemotherapy (<3 months), acute muscle/ligament tears, neurological conditions, severe osteoporosis, malignancy in the lower limb. They were tested at 08:00 and 17.00. Data collected was peak torque, peak torque per body-weight and quadriceps/hamstrings ratio.

**Results:** Statistical analysis was done using Microsoft Excel. To determine significant differences between the morning and evening, a paired Student's test was used. A score of (<0.05) was significant. Results showed that maximal force production was significantly stronger in the afternoon in both quadriceps (179.1 am, 187.18 pm) and hamstrings (92.3 am, 103.78 pm) ( $P < 0.05$ ). The results of the morningness/eveningness questionnaire showed all participants bar two to be neither type or moderately evening.

**Discussion & Conclusion:** Results showed that muscle strength is greater in the evening. As stated, this could affect the athletic population expected to perform at specific times and impact preparation for competition.

**PP-AH-44**

**Perception of Heart Failure Patients on End-of-Life Care**

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**Background/Hypothesis:** End-Stage Heart Failure (ESHF) patients experience end-of-life (EOL) issues that are similar to advanced cancer patients. However, ESHF patients may be less aware of EOL care options, resulting in suboptimal treatment and relief of distress and suffering.

**Methods:** A cross-sectional survey of patients on regular follow-up of at least 1 year with the Heart Failure Service (HFS) in Tan Tock Seng Hospital (TTSH) was performed from April to September 2009. This survey was created by the authors to assess patients' awareness of EOL options, by measuring the perceived importance of the options available in a novel EOL program offered by TTSH. As these perceptions might be influenced by their current care experience, patients' satisfaction with their current clinical care was also surveyed. The survey was administered by a Case Manager with the HFS.

**Results:** We surveyed 240 patients. Their mean age was  $67.6 \pm 11.1$  years, 60.4% were male, and the average duration of Heart Failure (HF) was  $2.8 \pm 1.4$  years. Ethnic distribution was 59.2% Chinese, 24.6% Malay, and 14.2% Indian. Most were in New York Heart Association (NYHA) Functional Class 2, with 21.7% in NYHA Class 3. Those in NYHA 3 were older ( $70.3 \pm 10.8$  years) compared to NYHA 2 ( $66.8 \pm 11.2$  years),  $P = 0.046$ . Duration of HF was similar in NYHA 2 and 3 ( $P = 0.753$ ). All patients were initially unaware of the EOL program. After accounting for the influence of patients' perception of physician's competence, NYHA Class 3 patients were 64% less likely to value substitution of clinic visits with home visits ( $P = 0.026$ ).

**Discussion & Conclusion:** It is possible that the greater the functional impairment, the more likely the realisation of the gravity of their condition. In the traditional model of care, patients will seek formal consultation at the hospital rather than at home.

EOL care for ESHF is an emerging area of clinical concern, warranting continued research. There is a need to discuss EOL options with ESHF patients.

**PP-AH-45**

**Genotypic Thiopurine S-Methyltransferase Testing: A Direct Sequencing Approach**

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**Background/Hypothesis:** Thiopurine S-methyltransferase (TPMT) is an enzyme involved in the metabolism of thiopurine drugs. TPMT genotyping can predict rapid and poor metabolizers of the drug, allowing personalised dosing to avoid under-dosing and toxicity, respectively. TPMT genetic variance occurs as single nucleotide polymorphisms (SNPs), making restriction fragment length polymorphism (RFLP) analysis and allele-specific real-time polymerase chain reaction (PCR) inadequate. A direct sequencing method was developed to screen for SNPs within exons 1 to 9.

**Methods:** Primers flanking exons 1 to 9, in 2 overlapping fragments, of the TPMT mRNA were designed. Complimentary DNA, reverse transcribed from TPMT mRNA was amplified using HotStarTaq (Qiagen) and gel purified. Genetic sequence of the purified product was analysed on the ABI 3130 analyser (Applied Biosystems). Twenty-four clinical samples containing TPMT \*1, \*3A, \*3C and \*6 SNPs, which had been assigned as such by other methods in another laboratory, were analysed. After the initial evaluation, this assay was applied on 9 routine clinical samples from inpatient requests.

**Results:** Sequencing analysis correctly identified 1 TPMT\*1 (wild type), 1 TPMT\*3A, 20 TPMT\*3C, and 2 TPMT\*6 SNPs from the 24 samples. Electropherograms showed high quality sequence read throughout the 9 exons for all the samples assigned by the sequencing analysis software. All 9 routine samples analysed thus far yielded wild type genotype.

**Discussion & Conclusion:** The presence of a TPMT pseudogene on human chromosome 18q21.1 precluded the use of genomic DNA as the preferred target. A significant advantage of this assay over RFLP and allele-specific PCR is the ability to detect all possible SNPs within exons 1 to 9, including future novel SNPs, providing cost and time efficiency.



**PP-AH-46**

**Surveillance of Genogroups I and II Norovirus Circulation in Singapore**

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**Background/Hypothesis:** An outbreak involving the epidemic GII.4 norovirus genotype occurred locally in October 2006. We have conducted an epidemiological survey to determine persistence of the GII.4 norovirus amongst subsequent infected patients, and to monitor for presence of other norovirus genotypes in Singapore. In all, 414 surveillance and clinical samples were processed between January 2008 and June 2009.

**Methods:** RNA extracted from the stools of either patients with diarrhoeal symptoms (clinical samples) or from food handlers (surveillance samples) were first screened with a sensitive reverse transcription-PCR (RT-PCR) method we developed in-house, which detects both norovirus genogroups I and II. Positive cases were then genotyped using a published method. For genotyping, amplicons from the viral capsid VP1 region were purified and sequenced. These sequences were then subjected to phylogenetics analysis using ClustalX (sequence alignment), Bioedit (sequence-editing), Modeltest3.7 and PAUP4.0 (phylogeny analysis), with DNA sequences of all known genotypes downloaded from the NCBI nucleotides database serving as reference sequences in the phylogeny construction.

**Results:** We found 1 GI- and 9 GII-positive cases among the 414 screened (2.42%). Only 7 of the GIIs detected were successfully genotyped, due to the lower sensitivity of the genotyping assay. Phylogeny analysis showed 5 GII.4 and 2 GII.3 genotypes.

**Discussion & Conclusion:** Our results showed that there are other norovirus genotypes circulating in Singapore other than the GII.4 genotype. Excluding the 2 untypable GII samples, GII.4 strain had a dominance of 62.5% amongst the remaining 8 norovirus-infected cases, and the proportion of GI to GII genogroups is 1:9 in our study population.

**PP-AH-47**

**A Highly Sensitive Norovirus Detection Assay**

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**Background/Hypothesis:** A highly sensitive reverse transcription-polymerase chain reaction (RT-PCR) assay targeting the highly conserved overlapping region of ORF1 and 2 was developed to detect norovirus in stool samples before genotyping for the surveillance of circulating norovirus strains in Singapore. We compared the efficacy of our method with that of Vinje et al (2004), which was primarily developed for genotyping the norovirus strains and which targets the highly variable capsid VP1 region. Both assays are able to discriminate the GI and GII norovirus subgroups.

**Methods:** Both assays were performed on 100 stool samples collected from food handlers (surveillance samples) or patients with diarrhoea (clinical samples). Amplified products from both assays were detected by 3% agarose gel electrophoresis. Positive bands, identified by concurrently run GI and GII controls, were excised from the gel and sequenced for confirmation of identity. Serial dilutions of cloned plasmids constructed with GI and GII inserts were used to determine the lower detection limit of the in-house assay.

**Results:** Our method detected 21 positive cases: 1 with GI and 20 with GII strains, and these results were confirmed by DNA sequencing (100% sensitivity and 100% specificity). This assay was able to detect down to 10 copies/ reaction using cloned plasmid. By comparison, the Vinje method detected 14 GII cases only.

**Discussion & Conclusion:** Our clinical validation using 100 samples denotes that the gel-based RT-PCR method we had developed is highly sensitive, with a cut-off lower detection limit of 10 copies/reaction in stools, and is able to differentiate GI and GII norovirus subgroups.

**PP-AH-48**

**Studying Neonatal Body Composition by MRI**

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**Background/Hypothesis:** Body composition in early may reflect in-utero developmental influences and predict incidence of adult metabolic disease. Abdominal obesity can be present at birth and differ markedly among different ethnicities. Body composition of neonates can be studied using MRI.

**Methods:** Neonates enrolled in the GUSTO study (n = 70; Chinese (27;15F/12M), Malay (23; 7F/16M) and Indian (20;13F/7M)) of 34 weeks gestation and weight  $\geq 2$ Kg were imaged (abdomen and pelvis; T1-weighted MRI; 1.5T scanner) within 4 to 21 days after delivery. Abdominal region was defined to extend from the superior section of the diaphragm to the sacrum. Abdominal adipose tissue was divided into subcutaneous (Absub) and internal (Abint). Deep subcutaneous (DS) tissue (the fatpads located posteriorly) was present within abdominal and pelvic images. Volumes of adipose tissue were determined using an in-house MATLAB package consisting of automatic (adaptive filtering, watershed transform of local standard deviation) and manual routines. Volumes were normalised by neonate weight at MRI day and compared (t-test) across ethnicity and gender.

**Results:** Mean weight and age at MRI day was similar among ethnic groups. Mean normalised volume (ml/Kg) for Abint was greater in the Chinese neonates ( $8.4 \pm 2.4$ ) than in the Indian ( $7.3 \pm 1.4$ ;  $P = 0.04$ ) and Malay neonates ( $7.3 \pm 2.0$ ;  $P = 0.07$ ). Absub in Indian neonates ( $29.8 \pm 6.1$ ) was greater than in Malay neonates ( $26.9 \pm 4.8$ ;  $P = 0.1$ ). DS in Indian neonates ( $6.4 \pm 2.6$ ) was also greater than in Malay neonates ( $5.34 \pm 1.6$ ;  $P = 0.12$ ). Significant gender differences were found for Absub in Chinese (F:  $31.3 \pm 6.8$ , M:  $26.1 \pm 4.1$ ;  $P = 0.02$ ) and Malay (F:  $30.1 \pm 2.8$ , M:  $25.5 \pm 4.1$ ;  $P = 0.01$ ) neonates and for DS in the Malay (F:  $4.9 \pm 1.4$ , M:  $6.4 \pm 1.6$ ;  $P = 0.05$ ).

**Discussion & Conclusion:** Our in-house fat analysis package (under development) is proving to be a valuable research tool. Differences in volumes of adipose tissue appear to exist at birth among the ethnic and gender groups in this study.

**PP-BSTR-01**

**Maturation of Fve-Stimulated Dendritic Cells is T Cells-Dependent**

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**Background/Hypothesis:** Fve is a 14.6 kDa protein isolated from the mushroom *Flammulina velutipes* and shown to have immunomodulatory and adjuvant properties in cancer immunotherapy. The aim of this study was to understand the immunomodulatory effects of Fve on T cells and dendritic cells (DCs). We hypothesised that maturation of Fve-stimulated DCs occurred in T cells-dependent manner.

**Methods:** Purified splenic T cells and bone marrow-derived DCs were cultured separately and in combination in the presence or absence of Fve. The surface markers expression profiles of the *in vitro* cultured T cells and DCs with or without Fve stimulation were examined by flow cytometry.

**Results:** We observed that bone marrow-derived DCs did not upregulate major histocompatibility complex (MHC) class II, CD40, CD80, and CD86 upon Fve stimulation, which indicated that they remained immature. In contrast, purified CD4<sup>+</sup> and CD8<sup>+</sup> T cells were activated as shown by the upregulation of CD137 (4-1BB), CD69, CD25, CD44 and down-regulation of CD62L upon stimulation with Fve. Furthermore, co-culture of DCs and T cells in the presence of Fve was capable of driving DCs maturation.

**Discussion & Conclusion:** Fve alone could provide direct stimulation to T cells resulting in their activation. On the contrary, upon Fve stimulation, DCs remained in the immature state. The results from the co-culture of DCs and T cells in the presence of Fve suggested that DCs required the helper role from T cells to undergo maturation.

## PP-BSTR-02

### Nanoparticulate Chitosan Modification of Polymethylmethacrylate

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**Background/Hypothesis:** Polymethylmethacrylate (PMMA) bone cement is widely used in the fixation of arthroplasties. The material is generally biologically inert and does not permit direct bonding of bone. This lack of osseointegration may result in aseptic loosening of cemented implants, which can ultimately result in implant failure. Chitosan is a non-toxic naturally occurring biopolymer which has antibacterial properties. In this study, we investigated whether PMMA modified with nanoparticulate chitosan conferred any enhancement of cell functions compared to standard and antibiotic-impregnated bone cements, as well as its cytotoxicity profile and effect on mechanical properties.

**Methods:** Chitosan nanoparticles were prepared using the ionic gelation method and characterised with scanning electron microscopy (SEM). The nanoparticles were mixed with PMMA powder (Depuy) at different weight ratios of 5%, 10% and 15%. Cell adhesion and proliferation were performed with mouse osteoblast cell line MC3T3-E1. Cytotoxicity of the substrate materials was measured using MTT assay kit (BioAssay Systems). Mechanical testing was done using the 3-point bending test on an Instron machine, yielding the bending modulus.

**Results:** Cell functions were enhanced with the addition of nanoparticulate chitosan. Optimal concentration was at 10% weight ratio. Cytotoxicity assays were not statistically significant across all substrate groups. Bending modulus was reduced with the addition of nanoparticulate chitosan but remained above acceptable limits for the structural integrity of bone cement.

**Discussion & Conclusion:** This study has shown that modification of bone cement with nanoparticulate chitosan confers enhancement of biological interactions between the originally inert substrate and osteoblastic cells, without demonstrable cell toxicity or prohibitive mechanical effects. This technique may thus be of interest in the potential development of bone cements that have the capacity to promote osseointegration.

## PP-BSTR-03

### A Reliable and Effective Model of Osteoclastogenesis

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**Background/Hypothesis:** Bone is a dynamic tissue and osteoclastogenesis is an important process in the study of this continuous remodeling. There are various ways of osteoclast formation, including the fusion of circulating mononuclear precursor cells and the induction of monocytic cells. However osteoclast generation is difficult and interexperimental variation is often very high. Therefore in this study we investigated a novel coculture system with transwells in simulating a stable bone resorption model with minimal variation.

**Methods:** RAW 264.7 (mouse monocyte macrophage cell line) and MC3T3-E1 (mouse osteoblast cell line) were obtained from American Type Culture Collection for coculture studies. Cells were cultured in a coculture system separated by a transwell membrane (0.4 µm pore size, Costar, Corning). Cultures were stained for Tartrate resistant acid phosphatase (TRAP) positivity using a commercial kit (Sigma Aldrich, USA). Resorptive capability was assessed by plating cells onto dentine slices in 96 well plates and evaluated by scanning electron microscopy (SEM).

**Results:** TRAP positive cell formation was highest in the coculture system compared with the culture of osteoclasts via mononuclear cells or monocytic cell induction. Pit size and area resorbed were also highest in the dentine slices plated with the multinucleated cells formed from the coculture system. Interexperimental variation was the lowest in the coculture system.

**Discussion & Conclusion:** In this study we have developed a reliable and efficient coculture system for the generation of osteoclasts from RAW 264.7 cells. The assay described here will enable clinical diseases associated with bone loss such as arthritis to be studied without the associated difficulties of osteoclast generation and interference from interexperimental variation.

## PP-BSTR-04

### Plasmodium Falciparum Aha1 in Protein Interaction

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**Background/Hypothesis:** Protein folding and activation mediated by the molecular chaperone Hsp90 require the assistance from a group of proteins termed co-chaperones. The co-chaperone Aha1 interacts and promotes the activation of Hsp90's client proteins, many of which are signalling and regulatory proteins key to cellular development. Recently, the *Plasmodium falciparum* Hsp90 (PfHsp90) has been recognised as a promising drug target for malaria inhibition. However, the function and regulation of PfHsp90 in the malaria parasite remain enigmatic. In view of the importance of Aha1 in modulating Hsp90's function, the putative homologue in *P. falciparum*, PfAha1, is characterised in this study.

**Methods:** The putative PfAha1 was cloned and expressed as a recombinant protein using the heterologous *Escherichia coli* expression system and purified to near homogeneity. GST pull-down assay was employed to investigate the interaction between the putative PfAha1 and PfHsp90.

**Results:** The putative PfAha1 was solubly expressed as a 44kDa recombinant protein with a C-terminal His<sub>6</sub>-tag. Using the GST pull-down assay, PfAha1 was shown to bind PfHsp90 only in the presence of MgCl<sub>2</sub> and ATP.

**Discussion & Conclusion:** Results from the binding assay indicate that *P. falciparum* encodes a functional PfAha1 co-chaperone that is capable of interacting with PfHsp90. The requirement of MgCl<sub>2</sub> and ATP for their association suggests that PfAha1 is likely to bind PfHsp90 at the late stage of the chaperone cycle, characterised by Hsp90 in the ATP-bound conformation. The results of this study would facilitate subsequent investigation on the regulatory role of PfAha1 on the chaperone function of PfHsp90.

## PP-BSTR-05

### Mitogen-Activated Protein Kinases from Parasitic Protozoa

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**Background/Hypothesis:** In humans, aberrations in the mitogen-activated protein kinase (MAPK) pathways have been associated with numerous pathological diseases including cancer, neurological disorders, and inflammatory diseases. As such, signalling molecules within these pathways have been targeted for therapeutic purposes. Given the feasibility of treating human diseases with MAPK inhibitors, there is an increasing interest on whether parasitic diseases could also be treated by targeting MAPKs of the pathogens. With this in mind, this work aims to provide an overview of MAPKs from 3 parasitic protozoa: *Plasmodium falciparum*, *Leishmania major* and *Trypanosoma cruzi*. Additionally, greater insights into these parasite MAPKs were procured using a selection of biocomputational tools.

**Methods:** Amino acid sequences encoding MAPKs from *P. falciparum*, *L. major* and *T. cruzi* were retrieved from the PlasmoDB and TriTrypDB databases. These sequences were analysed and compared using biocomputational tools, including MATGAT, ClustalW and PHYLIP.

**Results:** Data-mining revealed a total of 2, 15 and 16 MAPKs in *P. falciparum*, *T. cruzi* and *L. major*, respectively. These kinases were observed to be phylogenetically distant from the human MAPKs. On average, they share 34% to 48% primary sequence similarities and 22% to 29% primary sequence identities with the human MAPKs. In addition, the classical TXY activation motif of MAPKs has been found to be conserved in 78% of these parasite MAPKs.

**Discussion & Conclusion:** *T. cruzi* and *L. major* were found to possess a larger number of MAPKs as compared to *P. falciparum*. This suggests the possibility that different MAPKs may be activated during varying stages of the parasites' growth. As these parasite kinases are not close homologues of the human MAPKs, further functional and biochemical analyses of the parasite MAPKs could authenticate if they are potentially useful drug targets.



**PP-BSTR-06**

**Regulatory Control of Human Liver Progenitor Cells**

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**Background/Hypothesis:** Human liver progenitor cells are potentially useful for a wide variety of clinical applications such as transplantation, bioartificial liver, drug development and gene therapy. Current gaps in understanding of the key mechanisms that drive progenitor cells proliferation and maturation have limited the realisation of their full potential. We aimed to determine the key message signals that drive progenitor cell proliferation and differentiation in developing fetal liver and determine their implication in regenerative medicine.

**Methods:** Human fetal liver from 11 weeks to 24 weeks gestation were obtained with full consent and analysed with IHC and qRT PCR for growth factor, extracellular matrix and liver specification factors.

**Results:** EPCAM/CD44+ progenitor cells appear at 10 weeks and undergo surge in proliferation at 18 to 20 weeks of gestation before dwindling in frequency. This was accompanied by increase in albumin and CYP450 gene expression, although at levels still at 20% compared to the adult normal liver. The key transcription factors that showed >2 fold upregulation in 10 to 14 weeks were SHH, DLL and DTX1, consistent with specification. At 18 to 21 weeks, EGF, FGF4 and BMP3 were upregulated >2 fold compared to 10 week fetal liver as well as normal liver. Comparison with cirrhotic liver showed similar increase in FGF4 and EPCAM expression. To test if FGF was driving the proliferation, FGF supplementation in fetal liver progenitor cultures showed 30% increase in proliferation with maintenance of immunophenotype. Withdrawal of FGF resulted in differentiation and premature death.

**Discussion & Conclusion:** Corroboration of FGF effect on progenitor cell proliferation is noted with both in vivo and ex vivo models. These growth factors may be potential targets of intervention to expand progenitor cells for regenerative purposes.

**PP-BSTR-07**

**Optimal Design of Tumor Pathological Experiments**

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**Background/Hypothesis:** Cancer diagnosis is very crucial for exploiting the benefits of available treatment modalities. Presently, pathological studies based on multi-cellular tumour spheroid experiments have made a greater impact in grading the tumour cells. These experiments closely resemble in vivo tumour growth experiments. The effect of microenvironment, therapeutics and cell-cell interactions on tumour growth is better understood and treatment regimens can be planned accordingly. Many mathematical modelling works have been done to extract the physiological reasons and to test different hypotheses on multi-cellular tumour spheroids growth.

**Methods:** The famous experimental work on EMT6/Ro mouse mammary carcinoma cell spheroids are taken as a case study. A model based optimal design of experiments is performed to suggest optimal microenvironment conditions. We have employed a mechanistic mathematical model developed by us for tumour growth based on nutrients diffusion, such as glucose and oxygen.

**Results:** The optimal concentration of glucose and oxygen to be maintained in culture medium is found to be 5.5 mM and 0.07 mM, respectively.

**Discussion & Conclusion:** Application of mathematical modelling can aid in unravelling influential tumour markers and develop diagnostic protocols that can be useful to clinicians.

## PP-BSTR-08

### Parkin Suppresses Breast Cancer Cell Proliferation

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**Background/Hypothesis:** Although mutations in the parkin gene are frequently associated with familial Parkinsonism, emerging evidence suggests that parkin also plays a role in cancers as a putative tumour suppressor gene (TSG). Characterisation studies showed that parkin is localised within the common fragile site (CFS) of chromosome 6, FRA6E, where it is the third most frequently deleted CFS in several tumour types. In addition, parkin expression is found to be frequently reduced or absent in a variety of tumour biopsies and tumor cell lines, including breast and ovarian cancers. These observations thus compel us to examine the potential candidacy of parkin as a TSG by studying its effect on breast cancer cell proliferation.

**Methods:** Real-Time PCR, Western blotting and immunohistochemistry  
BrdU assay and population growth assay  
Colony formation assay, *in vivo* NOD-SCID/J mouse model, migration assay.  
Flow cytometry  
Lentiviral-mediated knockdown of parkin

**Results:** Parkin expression is significantly reduced in breast cancer cell lines and primary breast cancer samples. Restoration of parkin expression in a parkin-deficient breast cancer cell line, MCF7, significantly reduces their migration rate and also markedly reduces their proliferation rate both *in vitro* and *in vivo*. Interestingly, parkin is found to reduce the proliferation rate of MCF7 cells by promoting their arrest at the G1 cell cycle phase. Finally, siRNA-mediated depletion of parkin expression in MCF7 stably expressing parkin reverses parkin inhibitory effects on MCF7 proliferation rate.

**Discussion & Conclusion:** Our results suggest that parkin function could be compromised in breast cancer cells as a result of its aberrant down-regulation. Restoring parkin expression not only mitigates proliferation rate of MCF7, it also reduces their migration. Importantly, these negative effects of parkin are abolished as a result of siRNA-mediated parkin knockdown. Collectively, our results strongly support a role for parkin as a TSG.

**PP-BSTR-09**

**Computer-Aided Diagnosis of Breast Cancer Using Ultrasound Images**

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**Background/Hypothesis:** Breast cancer is the most common type of cancer prevalent in Singapore women. Detection of breast cancer at an earlier stage can help in better diagnosis and reduced mortality rate through enhanced therapy planning. Traditionally, mammography has been the preferred method for detecting breast cancer. While relatively simple, the high rate of false positives obtained using mammography technique has made ultrasound imaging an attractive alternate diagnostic technique. However, the high inter-observer variability associated with ultrasound imaging renders it more as a supplementary technique to mammography than as a standalone technique.

**Methods:** A set of ultrasound images of 10 breast cancer patients has been utilised in this study. The general algorithm for computer-aided diagnosis (CADx) systems involves 4 steps: preprocessing, segmentation, feature extraction and selection, and classification. Different CADx systems can be realised by performing each step incorporating various possible methodologies.

**Results:** Various preprocessing techniques were used to improve ultrasound images. Non linear filters were found to be more effective compared to linear filters. Region of interest (ROI) i.e tumour was extracted from the image with the help of different segmentation techniques. A combination of edge detection techniques with segmentation seems to extract a better set of morphological and textural features.

**Discussion & Conclusion:** The extracted features can be classified into benign and malignant using the developed analysis tools. Use of suitable CADx systems to assist radiologists in analysing the ultrasound images can help in reducing the inter-observer variation.

## PP-BSTR-10

### Suppression of Matrix Metalloproteinases MMP7 and MMP9 in Nasal Polyposis by Glucocorticosteroids

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**Background/Hypothesis:** Increase of inflammatory cells is an important feature of nasal polyposis (NP). Matrix metalloproteinases (MMPs) play an important role in leukocyte migration during the airway inflammation via breaking down the extracellular matrix. The anti-inflammatory effect of glucocorticosteroids (GC) on NP is widely accepted. However, there is limited data regarding the expression of MMPs and their response to GC treatment in NP. We sought to investigate: (i) the relationship between the infiltration of inflammatory cells and the expression level of MMP7/MMP9; and (ii) the effect of GC on the expression of these 2 MMPs in NP.

**Methods:** NP tissues from 12 Chinese patients with bilateral polyps were obtained before and after oral GC treatment; Inferior turbinate (IT) tissues from 8 patients with septal deviation were obtained without GC treatment and served as controls. mRNA levels of MMP7 and MMP9 were determined by real-time RT PCR. Cellular infiltration and protein levels of MMP7 and MMP9 were evaluated by histo- and immunohistochemistry.

**Results:** mRNA expression of MMP7 and MMP9 was up-regulated in GC-naive NP versus controls; but the level of MMP7 and MMP9 mRNA were significantly decreased in NP after GC treatment. A positive staining of MMP7 and MMP9 was found in some epithelial cells in both NP and controls but with no significant difference among them. In lamina propria, numbers of MMP7 and MMP9 positive cells were significantly increased in GC-naive NP as compared to controls, and were reduced in GC-treated NP tissues. In addition, GC strikingly reduced cell counts of neutrophils in NP tissues. Immuno-staining also showed co-localisation of MMP7 and MMP9 with neutrophils.

**Discussion & Conclusion:** These findings demonstrate that MMP7 and MMP9 are involved in neutrophil infiltration in NP; while the reduction of MMP7 and MMP9 may be associated with the decrease of neutrophil recruitment in NP by GC therapy.

**PP-BSTR-11**

**Detection of Biofilm in Chronic Rhinosinusitis Using Live Cell Staining and Confocal Scanning Laser Microscopy**

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**Background/Hypothesis:** Biofilms are increasingly recognised as having an etiological role in chronic rhinosinusitis (CRS). Most of the studies are performed in Caucasians from western countries. Whether biofilms have any regional specificity is largely unknown.

**Methods:** Eleven local CRS patients undergoing endoscopic sinus surgery were recruited for the study. Mucosal tissues were harvested from the maxillary sinus, middle turbinate and posterior nasal space (PNS) during surgery and subjected to LIVE/DEAD BacLight (Invitrogen) cell staining and confocal scanning laser microscope (CSLM ) for quick biofilm determination.

**Results:** Preliminary data showed that 80% patients had bacterial biofilms in at least 1 location of mucosa. Biofilm colonisation was seen in 50% of middle turbinate biopsies, 40% maxillary sinus biopsies and 50% posterior nasal space biopsies. There were no significant differences in the colonisation rate in these various locations. When a 3D construction was created from the CLSM data, the biofilm represented a typical multilayered community, with bacteria evident within the tissue.

**Discussion & Conclusion:** From our data, there is significant biofilm colonisation in CRS patients. Biofilm can be detected using BacLight/CSLM. Further work needs to be done to determine specific bacterial and fungal species using Fluorescent in situ hybridization (FISH). This technique may also have a potential significance in elucidating the aetiology/pathogenesis of bacterial infection.

## PP-BSTR-12

### Identifying Potential *Plasmodium Knowlesi* Cysteine Proteases

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**Background/Hypothesis:** *Plasmodium knowlesi*, originally a primate malaria parasite, was recently reported to cause human malaria in Singapore and in South East Asia. Emergence of *P. knowlesi* as a human malaria parasite prompts the need for a better understanding of the parasite's biology, in particular cysteine proteases responsible for hemoglobin degradation. Hemoglobin degradation is a vital process that provides the parasite with amino acids necessary for development and subsequent infection. Studies have shown that treatment of *Plasmodium falciparum* with cysteine protease inhibitors causes arrest in the parasitic development *in vitro* and cures *Plasmodium*-infected mice of malaria, demonstrating their potent antiparasitic activities *in vivo*. Hence, the objective of this study is to identify putative cysteine proteases in *P. knowlesi* via *in silico* analysis.

**Methods:** Data mining in PlasmoDB was carried out to identify potential *P. knowlesi* cysteine proteases. Computational analysis was subsequently performed using ClustalW to analyse the protein sequences and 3D models were generated using the Swiss Model program.

**Results:** Data mining yielded 3 gene sequences that may encode for cysteine proteases in *P. knowlesi*. Subsequent analysis of their protein sequences via multiple sequence alignment revealed that functional domains found in falcipains (*P. falciparum* cysteine proteases) are highly conserved in all 3 *P. knowlesi* candidates. In addition, their 3D models display a unique haemoglobin binding motif which is essential for haemoglobin recognition.

**Discussion & Conclusion:** Through *in silico* analysis, 3 *P. falciparum* falcipain homologues were found encoded in the genome of *P. knowlesi*. Their protein domains were observed to be conserved, suggesting that they may share similar functions *in vivo*. Biochemical characterisation would endorse the functional roles of these cysteine proteases in *P. knowlesi*.

**PP-BSTR-13**

**Inhibition of Autophagy by Andrographolide Enhances Chemo-Sensitivity of Cancer Cells to Cisplatin**

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**Background/Hypothesis:** Andrographolide (Andro), a diterpenoid lactone isolated from traditional herbal medicine *Andrographis paniculata*, is known to possess anti-inflammatory and anticancer activity. In this study, we sought to examine the effect of Andro on lysosome function and late stage of autophagy and evaluate whether suppression on autophagy by Andro could sensitise cancer cells to a chemotherapeutic drug cisplatin.

**Methods:** We utilised DAPI staining to detected apoptotic cell death; the colony formation assay was used to investigate the long-term effect of Andro and cisplatin on cell proliferation; western blot was used to determine protein expression; confocal microscopy was used to detect the effect of Andro on autophagosome and lysosome fusion, and the GFP-LC3 puncta; and in vitro protease activity assay for detection of Cathepsin B and Cathepsin L enzymatic activity.

**Results:** First, we found that Andro significantly enhances LC3-II and p62 protein level without promoting autophagic flux; Andro has similar effect as chloroquine in blocking the maturation process of autophagy. Meanwhile, cisplatin treatment could increase autophagic flux in cancer cells. Therefore, Andro-mediated lysosome dysfunction dramatically blocks cisplatin-induced autophagy and enhances cell death in cancer cells.

**Discussion & Conclusion:** These observations collectively suggest that Andro could be a promising anti-cancer agent via its potent inhibitory effect on autophagy. Inhibition of autophagy by Andro enhanced chemosensitivity of tumour cells to cisplatin suggests a potential therapeutic strategy using Andro in combination with conventional agents for treatment of cancer.



**PP-BSTR-14**

**Constitutive mTOR Activation Suppresses Autophagy and Sensitises TSC2<sup>-/-</sup> Cells to Cell Death**

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**Background/Hypothesis:** Autophagy is an evolutionary conserved catabolic process that degrades cytoplasmic constituents under stress or starvation conditions to mediate cell survival. In eukaryotes, this process is negatively regulated by mammalian target of rapamycin (mTOR). Dysregulated mTOR activity has been showed in many cancer signalling pathways. Tuberous sclerosis complex (TSC) is an autosomal disorder characterised by benign tumour formation in multiple organs with neurological diseases. TSC protein acts as a tumour suppressor that downregulates mTOR activity. At present, the underlying linkage of autophagy suppression due to hyperactivation of mTOR activity has never been reported. We hypothesise that impaired autophagy due to mTOR hyperactivation in TSC2<sup>-/-</sup> cells sensitises TSC2<sup>-/-</sup> cells to oxidative stress or starvation mediated cell death.

**Methods:** Here, we treated TSC2 cells with various cell death stimuli including sodium nitroprusside, TNF $\alpha$ , hypoxia and amino acid starvation (EBSS) stimuli. We then investigated the role of mTOR hyperactivation in TSC2<sup>-/-</sup> cells with nutrients addition and performed gene knockdowns through siRNAs to suppress or induce autophagy.

**Results:** When compared to TSC2<sup>+/+</sup> cells, we found that in TSC2<sup>-/-</sup> cells, the basal level of autophagy marker, LC3II is lower while p62, another protein aggresome marker of defective autophagy, is higher. Moreover, more apoptotic cells were seen in TSC2<sup>-/-</sup> cells when induced with cell death stimuli and also when its mTOR activity is upregulated with nutrients, IGF-1 and leucine. Knockdown of ATG7 further sensitises TSC2<sup>-/-</sup> cells in response to amino acid starvation conditions, while raptor knockdown reduced apoptosis in TSC2<sup>-/-</sup> cells.

**Discussion & Conclusion:** Taken together, data from our study indicate that mTOR hyperactivation suppresses autophagy in TSC2<sup>-/-</sup> cells and thus sensitises these cells to cell death.

**PP-BSTR-15**

**Autophagy: A Major Player in the Regulation of Fibroblast Apoptosis?**

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**Background/Hypothesis:** Autophagy is an evolutionary conserved process in which intracellular membrane structures sequester proteins and organelles for lysosomal degradation. At present, the functional relationship between autophagy and cell death remains unclear. The concept of autophagy as a cell survival mechanism is supported by evidence showing enhanced death in cells or organisms with deficiency of ATGs. We hypothesised that the resistance of Atg 5<sup>-/-</sup> MEFs (Atg5 knockout mouse embryonic fibroblast cells) to apoptotic cell death is independent of autophagy and Atg5 gene autophagy may not be a major player in apoptotic cell death.

**Methods:** We examined three Atg5<sup>-/-</sup> MEFs derived from different clones A, C and D with various cell death stimuli including sodium nitroprusside, TNF $\alpha$ , H<sub>2</sub>O<sub>2</sub>, hypoxia and amino acid starvation stimuli. We also tested cellular response to these death stimuli using Atg5 inducible cell line with DOX (doxycycline) which is derived from a single clone. Atg7 gene knockdown through siRNA was performed to suppress autophagy to further confirm our hypothesis.

**Results:** Atg5<sup>-/-</sup> MEFs-A are more resistant to cell death induced by a variety of cell death stimuli. Atg5<sup>-/-</sup> MEFs-C are more sensitive while Atg5<sup>-/-</sup> MEFs-D do not have obvious difference in response to cell death stimuli. The results from Atg5 inducible cell line showed that DOX-induced ATG5 deletion do not have significant different cellular response to these death stimuli. Similar results can be found through silencing Atg7 gene which is a key component of autophagy.

**Discussion & Conclusion:** The resistance of Atg5<sup>-/-</sup> MEFs to cell death is independent of autophagy and Atg5 gene alone. Clonal variation determined different cellular response to same cell death stimuli. Taken together, autophagy may not be a major player in fibroblast apoptosis. Moreover, we propose that using an ideal inducible system is necessary for better understanding of the functions of autophagy in cell death control.

**PP-BSTR-16**

**Induction of Autophagy by Free Fatty Acid via PKC Activation by Diacylglycerol Independent of mTOR Regulation**

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**Background/Hypothesis:** Lipotoxicity refers to the cytotoxic effects of excess fat accumulation in cells that are not meant for lipid storage and has been implicated as one of the causes of the metabolic syndrome. Autophagy is an evolutionary conserved catabolic process that degrades cytoplasmic constituents under stress or starvation conditions to mediate cell survival. In this study, we sought to find out if excess fatty acid stimulation using palmitic and oleic acid, 2 of the most common free fatty acids in the bloodstream can induce autophagy to protect non-adipocytes against cytotoxic effects of lipid accumulation and work out the signalling mechanism involved in lipid induced autophagic process.

**Methods:** Western blots were used to determine protein levels of various protein markers involved in autophagic process after treatment; confocal microscopy was used to detect the changes in number of GFP-LC3 puncta after treatment and accumulation of lipid droplets; and LC-MS was used to determine changes in the levels of various lipids in the cells after treatment.

**Results:** Initial results show that autophagy flux can be increased and p62 protein level decreased in non-adipocytes like fibroblasts and hepatocytes during treatment with palmitic acid but not oleic acid. Increases in the levels of ceramide species after treatment were observed but inhibition of ceramide synthesis did not inhibit autophagy induction by palmitic acid. Inhibition of classical PKC signalling was able to stop autophagy induction, implicating the role of diacylglycerol in activation of autophagy.

**Discussion & Conclusion:** These results suggest that induction of autophagy by fatty acid stimulation depends on the species of fatty acid and increase in the amount of specific diacylglycerol species might activate PKCs to induce autophagy. This induction of autophagy may be important for cell survival during excessive lipid accumulation and further work will be carried out to answer this question.

**PP-BSTR-17**

**Optimising Human Hepatocytes from Marginal Livers for Cellular Therapeutics**

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**Background/Hypothesis:** The curative potential of liver transplantation for liver disease has been limited by the availability of donor organs. Significant steatosis of donor liver renders the organ unsuitable for transplantation and has been rejected. We hypothesise that these marginal livers still contain hepatocytes that can be optimised to be used for cellular therapeutics in liver diseases.

**Methods:** Male mice were fed with high-fat diet to induce liver steatosis, following which, steatotic hepatocytes were isolated by perfusion procedure. Selected drugs were used to optimise those cells with a 72 hours treatment ex-vitro. The alamarBlue assay, 10-N-Nonyl acridine orange (NAO) assay, and thiobarbituric acid reactive substances (TBars) assay were operated. Cell transplantation was done to test the ability to survive and identified by y-chromosome in situ hybridisation.

**Results:** Steatotic liver was induced after 14 weeks feeding. Liver perfusion yielded 30 million hepatocytes. The cyclic-AMP and prostaglandin E2 played significant ability of reversibility. alamarBlue results showed treated cells were more proliferative and maintained longer than non-treated ones. 10-N-Nonyl acridine orange (NAO) assay's results indicated less apoptosis activity to treated-cells. Lipid metabolism activity became stronger after treatment, providing evidence that cells were reversed. Treated-cells transplanted into mice model liver injury showed engraftment and were identified by in situ hybridisation after 2-weeks post-transplantation.

**Discussion & Conclusion:** Steatotic cells treated with prostaglandin E2 and cyclic-AMP showed successful salvage and strongly supported our hypothesis. The higher proliferation, less apoptosis activity, and stronger lipid metabolism activity all indicate the possible usage of drug-optimised steatotic hepatocytes in cellular therapeutics and provide us a potential source of cells for rescue of liver diseases in the future.

## PP-BSTR-18

### Social Media for Research Recruitment

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**Background/Hypothesis:** Recent years have witnessed a surge in internet usage among youths. This is a potentially powerful means of engaging participants in research. The Longitudinal Youth-At-Risk Study (LYRIKS) is aimed at youths deemed to be at risk of developing severe mental illnesses. To reach our target audience, we aim to exploit social media tools in order to raise awareness of youth mental health and increase recruitment rates.

**Methods:** An amalgam of social media platforms typically utilised by Singaporean youths were selected, namely Facebook, Twitter and Blog. Our approach involved creating and maintaining a Facebook account for current and potential LYRIKS participants to join. A LYRIKS logo was designed to allow for visual identification of the study. Avatars for each LYRIKS member were added for a personal touch. Youth-friendly materials were put up to heighten interest as well expand network in our account. To complement and reinforce our Facebook engagement efforts, a Twitter account and a Blog were consequently established.

**Results:** From its inception in July 2010, the LYRIKS Facebook account has 180 friends, with 2 expressing interest to join the study as participants. The blog has received 363 hits, with 94 visits from Singapore and 17 worldwide. The 6 blog posts have garnered 9 comments in total. Twitter has gathered 4 followers and is actively following 12 tweeters. Issues surrounding the launch of the Facebook page or account were acknowledged and resolved at each stage of development.

**Discussion & Conclusion:** Social media platforms are the new marketing media of the future. However, these cannot be utilised in isolation, thus by reinforcing existing tools with the latest available media, we hope to promote youth mental health awareness more robustly to boost recruitment rates. Our current strategy is in its developmental stages and necessitates close monitoring.

## PP-BSTR-19

### Clinical Bioinformatics - A Timely Research Tool

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**Background/Hypothesis:** During the recent influenza A/H1N1/2009 pandemic, as yet unaffected countries (like Singapore) followed the clinical severity of the infection in affected countries (like Mexico), in order to prepare adequately for when the pandemic eventually arrived. However, the extraction and cross-comparison of clinical data from traditional paper records often makes such clinical assessments difficult.

**Methods:** A novel data roaming technology was piloted by NUHS clinicians/ scientists to anonymise, assemble and link records of patients from many "siloes" clinical databases into a single view for every patient. All synonyms of the searched terms were matched within a SNOMED-like dictionary developed at NUHS. Positive and negative fuzzy and proximity searches were possible on any free text, database field, keywords or numerical quantities within reports using a built-in natural language processor.

**Results:** This technology allows clinicians to search and cross-link millions of clinical documents, while the search engine creates a unique database summarising all the targeted data from, potentially, many patients over many years. Such a cross-linked database greatly simplifies the testing of an individual or a combination of clinical parameters as potential prognostic indicators for any given condition.

**Discussion & Conclusion:** This novel clinical bioinformatics tool supports the speedy retrieval of data for clinical research. Clinicians and researchers are able to raise and rapidly answer specific questions about certain aspects of disease that would have previously entailed exhaustive and laborious manual searching through hard copy patient medical records. Perhaps most importantly, the implementation of a 2-Factor authentication and traceability in our audit trails safeguards patient confidentiality. Although limited by the current extent of electronic patient record keeping, as this increases, the power and versatility of such cross-linking technology tools will rise.

## PP-BSTR-20

### The Effect of Peroxisome Proliferator-Activated Receptor Agonist Rosiglitazone on the Expression Profile of Subcutaneous vs Visceral Adipocytes

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**Background/Hypothesis:** Adipose tissue from visceral and subcutaneous compartments may be metabolically different. To determine the gene profiling of depot-specific adipose tissue, 2 sets of paired human subcutaneous and visceral adipocytes were subjected to transcriptomic microarray analysis. We also tested the effects of PPAR $\gamma$  agonist rosiglitazone on adipogenesis in visceral vs subcutaneous adipocytes.

**Methods:** Preadipocytes were isolated from subcutaneous and visceral adipose tissue and cultured in vitro. The cells, grown in DMEM, serum free medium and supplemented with high glucose (24.98 mmol/l) were treated with 1  $\mu$ mol/l rosiglitazone maleate (GSK) for 48h. Total RNA was extracted. Agilent Human Whole Genome microarray (4 $\times$ 44K) was used and data were analysed by Genespring. Pathway studio and Fisher Exact List were used to construct the molecular pathways.

**Results:** Expression profile showed 949 differentially expressed genes. In the basal level, 372 genes were upregulated and 577 were downregulated (fold-change  $\geq 1.5$ ;  $P < 0.05$ ). The targets were involved in Jun-PAX2 signaling, required for cell differentiation (MAPK9, 1.6-fold-down; MAPK10, 7.3-fold-up) and Angiopoietin STAT signaling, contribute to the vascular development (AGNPT1, 4.3-fold-down). However, only 153 genes showed significant differential expression in rosiglitazone treatment, 45 genes upregulated and 108 genes downregulated (fold-change  $\geq 1.5$ ;  $P < 0.05$ ). The predicted target were known to be involved in Pentose-phosphate pathway, in glycolysis, fatty acid synthesis (PGLS, 1.5-fold-up) and EphrinR-STAT signaling in the formation and remodeling of the capillary network (EFNA4, 2.1-fold -up).

**Discussion & Conclusion:** Depot-specific adipocytes showed significant differential expression in metabolism-related genes. Validation of the genes may help in the understanding of adipogenesis and reveal potential molecular therapeutic targets.

## PP-BSTR-21

### Identification of Differentially Expressed Serum Proteins in Individuals with Type 2 Diabetes and Impaired Fasting Glucose

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**Background/Hypothesis:** Type 2 diabetes (T2D) accounts for about 80% of diabetes. Current understanding of mechanisms underlying the development of impaired fasting glucose (IFG) and T2D is not complete. We hypothesise that serum proteins in T2D, IFG and healthy individuals are differentially expressed and may serve as potential early biomarkers, improving our understanding in pathogenesis of T2D and yield potential therapeutic targets.

**Methods:** Male adults, aged 21 to 70 years, seen in Alexandra Hospital for Health Screening from Jul to Sep 2008 were recruited. Individuals were categorised based on fasting glucose (FG), T2D (FG  $\geq 7.0$  mmol/L), IFG (FG: 6.1-6.9 mmol/L) or control (CTL)(FG  $\leq 5.6$  mmol/L). Serum from T2D, IFG individuals and CTL with normal blood pressures (BP), desirable lipid profiles, matched for age and body mass index (BMI), were compared. Protein analysis was performed using 2-dimensional differential in-gel electrophoresis (2D-DiGE). Signal intensities were analysed by one-way ANOVA and differences were considered significant when  $P < 0.05$ .

**Results:** We enrolled 181 males. Of these, there were 11.60% and 8.29% males with T2D and IFG respectively. We randomly selected 7 T2D, 7 IFG and 6 CTL. Mean age was  $48.50 \pm 7.30$  and BMI ( $\text{kg/m}^2$ ) was  $25.16 \pm 3.89$ . FG (mmol/L) were: CTL ( $4.35 \pm 0.49$ ), IFG ( $6.33 \pm 0.10$ ), T2D ( $10.83 \pm 4.55$ ) ( $P < 0.05$ ); BP and lipid profiles were not significantly different. We identified 21 protein spots differentially expressed in the 3 groups ( $P < 0.05$ ); 10 were upregulated and 11 downregulated in diseased compared to CTL. Mass spectrometry and database searching allowed spot identification (results pending). We will validate these proteins by western blot/ ELISA in a larger cohort.

**Discussion & Conclusion:** Results suggest that proteins are differentially expressed in serum from matched T2D, IFG and CTL. Identification of these proteins might be potential biomarkers for early diagnosis of individuals with IFG and T2D, allowing for early diagnosis and treatment.



## PP-BSTR-22

### Expression of Embryonic Epsilon Haemoglobin Positive Erythroblasts in Chromosomally Abnormal Neonates

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**Background/Hypothesis:** In humans, haemoglobin switching may be interrupted in chromosomally abnormal fetuses/neonates and there are reports on the expression of embryonic epsilon globin in trisomy conditions. Trisomy 18 (T18), is the second most common autosomal trisomy in the newborns and their long term survival is rare. To date there is no information on embryonic epsilon-haemoglobin switching during the development of T18 individuals. We hypothesised that epsilon-haemoglobin positive erythroblasts persist in T18 neonates.

**Methods:** Cord blood from newborns (n = 3) diagnosed antenatally with trisomy 18 syndrome, and from 20 normal newborns were processed using density gradient centrifugation and magnetically-activated cell sorting to obtain glycophorin-A-(GPA)-positive fetal erythroblasts. Presence of epsilon-globin within cytoplasm was determined by immunocytochemistry. Chromosomal aneuploidy was confirmed with fluorescence in situ hybridisation (cFISH). Mann-Whitney test was used to analyse data.

**Results:** Epsilon globin positive fetal erythroblasts were identified only in cord blood of newborns with Trisomy 18 compared with normals. In all 3 cases of Trisomy 18, primitive erythroblasts were epsilon-globin positive ( $P < 0.001$ ) Nucleated erythroblast with 3 signals for chromosome 18 were observed by cFISH.

**Discussion & Conclusion:** Observation of epsilon-globin positive fetal erythroblasts in T18 term cord blood is in agreement with the detection of Hb-Gower 2 in Trisomy13, which suggests that normal haemoglobin switching is disturbed in trisomies. Delay in switching-off of epsilon-globin expression in fetus in pregnancies complicated by maternal diabetes mellitus was also reported Al-Mufti et al., (2004). These observations imply that the embryonic epsilon-globin is activated beyond fetal life in abnormal conditions such as Trisomy18.

**PP-CR-01**

**Efficacy of Using Glycopyrronium Bromide Weekly for Four Weeks in the Iontophoretic Treatment of Palmar Hyperhidrosis**

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**Background/Hypothesis:** Palmar hyperhidrosis is a form of primary focal hyperhidrosis and is clinically characterised by excessive sweating of the palms that impairs a person's occupational and social function. Iontophoresis is an established treatment modality for palmar hyperhidrosis. The aim of this study was to evaluate the efficacy of using glycopyrronium bromide iontophoresis in the treatment of palmar hyperhidrosis via quantitative measurements, and subjective improvement via satisfaction and severity scores.

**Methods:** This was an open-label study, including patients diagnosed with primary hyperhidrosis and not on any form of treatment for hyperhidrosis for the past 1 month. These patients underwent weekly treatments of iontophoresis with glycopyrronium bromide for 4 weeks. Objective measurements, subjective scores and side effects experienced were recorded.

**Results:** Twenty patients completed weekly iontophoresis treatments with glycopyrronium bromide. There was a significant mean improvement of 21.5 mg/min ( $P = 0.001$ ) between baseline and post-treatment gravimetric measurements. Patients who had a higher baseline sweat output experienced a greater percentage improvement in sweat reduction (Pearson's correlation = 0.40). After 4 iontophoresis treatments, all patients experienced dryness of the palms, with a mean of 4.9 days. All patients reported an improvement in satisfaction scores and 80% reported an improvement in subjective severity scores. No serious side effects were encountered during the study.

**Discussion & Conclusion:** Weekly iontophoresis using glycopyrronium bromide is an effective treatment for palmar hyperhidrosis and the benefit may be greater in patients with more severe baseline disease.

**PP-CR-02**

**This abstract has been removed.**

**PP-CR-03**

**A Case of Myeloid Sarcoma with Unusually Florid Skin Manifestations**

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**Background/Hypothesis:** Myeloid sarcoma (MS) is an uncommon extramedullary tumour of malignant myeloid cells which predominantly occurs concurrently with or after the onset of acute myeloid leukaemia (AML), with a predilection for the skin, bone and soft tissues. Rarely, MS can develop in the absence of haematologic disease. The early recognition of cutaneous MS is important because a late diagnosis is associated with poor prognosis.

**Methods:** We report a rare case of MS with unusually florid skin manifestations preceding the development of AML.

**Results:** A 76-year-old Chinese man presented with a 5-month history of extensive asymptomatic skin tumours over his face, trunk and limbs, with no evidence of leukaemia in the peripheral blood at presentation. Skin biopsy was consistent with that of MS. His skin tumours continued to enlarge progressively, and subsequent bone marrow examination was diagnostic of AML. He responded poorly to palliative chemotherapy and electron beam therapy, and passed away from intracranial haemorrhage from suspected brain metastases 6 months after his diagnosis.

**Discussion & Conclusion:** Due to its rare occurrence, MS poses a diagnostic challenge in the absence of peripheral haematological involvement. The early and accurate diagnosis of MS is crucial as the disease favours an aggressive course with rapid transformation to acute leukaemia. Early administration of AML-type chemotherapy before leukaemic transformation may reduce the risk of systemic progression and mortality.

**PP-CR-04**

**Coronary Risk in Kawasaki Syndrome among Patients from Different Ethnic Groups**

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**Background/Hypothesis:** Kawasaki syndrome is a childhood multisystem vasculitis of unknown aetiology with a predilection for the coronary vasculature. We assessed the risk of coronary artery involvement in a 15-year cohort of patients looking specifically for racial predispositions to coronary outcomes.

**Methods:** Information on all children with Kawasaki syndrome treated in our hospital between 1995 and 2009 was extracted from our ongoing standing database. Demographic, laboratory and imaging data of patients from different racial groups were compared.

**Results:** There were 227 patients studied with males making up 59.0% (134/227) and females 41.0% (93/227). The racial distribution was Chinese 81.9% (186/227), Malays 15.0% (34/227) and Indians 3.1% (7/227).

The odds ratio for coronary artery involvement in Malays compared to Chinese was 0.77(95% CI: 0.3 to 1.99;  $P = 0.592$ ) and Indians compared to Chinese was 0.60(95% CI: 0.70 to 5.13;  $P = 0.641$ ). There was no significant difference in age, duration of fever prior to admission, on admission leucocyte counts, erythrocyte sedimentation rates, albumin, platelet, haemoglobin and C-Reactive Protein levels between the racial groups.

**Discussion & Conclusion:** Indian and Malay children may be at lower risk of coronary artery involvement from Kawasaki syndrome compared to Chinese children.

**PP-CR-05**

**Comparison of Dementia Screening Instruments in Nursing Home Residents**

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**Background/Hypothesis:** The debilitating comorbidity of dementia is frequently under-diagnosed in the nursing home population. The current study aims to explore the diagnostic utility of the Severe Impairment Rating scale (SIRS) versus 3 previously validated screening instruments for the detection of dementia in this setting.

**Methods:** Fifty-one elderly residents without other prior psychological diagnoses from 2 nursing homes were evaluated using SIRS, Abbreviated Mental Test (AMT), Chinese Mini-Mental State Examination (CMMSE), and clock drawing test (CDT) alongside global (Functional Assessment Staging, FAST), functional (Barthel Index) and mood (Geriatric Depression Scale, GDS-15) assessment. Dementia diagnosis was determined by a blinded clinician using DSM-IV criteria. Correlations and receiver-operator-characteristics (ROC) curves with corresponding sensitivity (Sn) and specificity (Sp) were performed.

**Results:** Dementia was diagnosed in 36 subjects (70.6%). They were older (mean age  $81.1 \pm 10.7$  years vs  $73.2 \pm 13.8$  years,  $P < 0.05$ ) and more functionally impaired compared to the non-demented subjects (mean Barthel  $18.1 \pm 20.8$  vs  $41.0 \pm 23.4$ ,  $P < 0.05$ ). Using a cutoff of 23/24, SIRS had good diagnostic performance (AUC 0.85) and demonstrated better specificity compared with locally validated cutoffs of the other 3 instruments (SIRS: Sn 80%, Sp 78%; AMT: Sn 100%, Sp 13.3%; CMMSE: Sn 100%, Sp 26.7%; CDT: Sn 97.1%, Sp 28.5% using Shulman's scoring system). SIRS was significantly correlated with FAST ( $r = -0.49$ ,  $P < 0.005$ ), but not the other 3 instruments.

**Discussion & Conclusion:** The better rule-in accuracy and significant correlation with global function among frail nursing home residents make SIRS a more suitable cognitive screening test in this population.

**PP-CR-06**

**Erb:YAG Laser Resurfacing for the Treatment of Hypertrophic Scars**

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**Background/Hypothesis:** Hypertrophic and keloid scars are traditionally treated either via scar massage with silicon-based scar creams, intra-lesional injections of steroid or surgical revision. This paper aims to determine the efficacy of Erb:YAG laser resurfacing in the treatment of these scars.

**Methods:** Patients with hypertrophic or keloid scars were treated with a combination of 1 pass of Erb:YAG skin remodeling laser at 100 um depth (4 mm spot size) and 3 passes of fractionated Erb:YAG laser 800 mJ (7x7 grid). This was done at monthly intervals. Photographs and objective measurements of scar length, greatest width and thickness were taken at these monthly intervals. A subjective patient survey on satisfaction with the scar thickness and colour was also carried out. A total of 3 patients with 5 scars were treated in this pilot study.

**Results:** All patients reported satisfaction with lightening of scar colour but minimal reduction in scar thickness and size. Objective measurements also did not show significant scar size or thickness reduction.

**Discussion & Conclusion:** Erbium:YAG laser resurfacing may be a useful adjunct in the lightening of pigmented scars but appears to have minimal effect in the reduction of scar thickness which may be better treated by traditional means.

**PP-CR-07**

**Spontaneous Cavernous Internal Carotid Artery Aneurysm - Spectrum of Typical and Atypical Presentations and Radiological Findings**

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**Background/Hypothesis:** Spontaneous cavernous internal carotid artery aneurysms are uncommon. Those patients who present with epistaxis usually have massive bleeds. Less commonly, these patients may present instead with multiple minor bleeds. Radiological imaging often reveals bony erosion of the sphenoid sinus wall associated with an adjacent aneurysm. However, there are occasions where these typical features are not present, consequently misleading the clinician with dire consequences.

**Methods:** Using images from 2 dissimilar but instructive cases and reviewing the literature, we shall highlight the possible pitfalls in the evaluation of such patients, especially with regards to radiological investigations.

**Results:** Dehiscence of the sphenoid sinus wall is a key feature seen in cavernous internal carotid artery (ICA) aneurysms on computerised tomography (CT) scan. However such areas of dehiscence may sometimes not be clearly seen on standard non contrast CT sinus because they are masked by calcification along the aneurysm/vessel wall or from chronic hematoma within the sinuses, both of which may abut the areas of dehiscence giving the impression that the sinus wall is generally intact. Near-complete or extensive opacification of the sphenoid sinus is also widely expected to be seen from a bleeding cavernous ICA aneurysm that has bled massively and recently. However, partial opacification may instead be observed if the quality of the scan was compromised with radiodense packing material, or if the bleed occurred some time prior to the scan.

**Discussion & Conclusion:** Cavernous ICA aneurysm typically presents with massive epistaxis. However one must be aware of the less common presentation of multiple minor bleeds. Dehiscence of the sphenoid sinus wall may not always be well seen. Associated extensive sphenoid sinus opacification may also be masked by radiodense packing material. The clinician should be mindful of such pitfalls to avoid any unfortunate delays in managing this condition, and before a catastrophic bleed occurs.



**PP-CR-08**

**Blue Nevus of the Sino-Nasal Cavity - A Differential Diagnoses of Malignant Melanoma**

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**Background/Hypothesis:** Blue nevi are uncommon melanocytic proliferations occurring mostly in the skin and occasionally in the mucosae. Blue nevi of the sinonasal cavity are however extremely rare. Even then, it is useful for the clinician to be aware and think of this benign condition as a differential diagnosis when confronted with a pigmented mucosal lesion of the sino-nasal cavity, especially when the more common pathology is the malignant melanoma.

**Methods:** We review all the cases reported in the literature to date (5 including ours), and present endoscopic and microscopic pictures, to highlight the important features that will help a clinician and pathologist distinguish this entity from the dreaded malignant melanoma.

**Results:** Blue nevi tend to be small (average 2 mm) and asymptomatic while malignant melanomas tend to be larger with symptoms including epistaxis, nasal congestion and nasal obstruction. On histological examination, the blue nevi differ in various ways from a malignant melanoma such as bland nuclei, inconspicuous nucleoli, and absence of peripheral inflammation.

**Discussion & Conclusion:** Blue nevi should be in a clinician's list of differential diagnosis for pigmented lesions in the sino-nasal cavity, despite its rarity. Instead of the deadly malignant melanoma, it may be initially suspected by its small size and asymptomatic nature. Histological examination is required for definitive diagnosis, with the key microscopic features as described.

**PP-CR-09**

**Is Intraoperative Frozen Section Assessment of Sentinel Lymph Nodes Worth Our While?**

**SQH LU**

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**Background/Hypothesis:** Sentinel lymph node (SLN) biopsy is now the standard of care for small invasive cancers without clinically palpable lymph nodes. Full axillary nodal dissection (ALND) is reserved for cases where the SLN is positive. Intraoperative SLN assessment is performed with frozen section (FS) analysis at our institution and allows ALND to be performed at the same setting. We have reviewed our data to determine the accuracy of FS and whether it prolongs operative times.

**Methods:** A retrospective review was performed of 225 patients who underwent SLN biopsy between 1 January 2006 and 1 July 2009. Intraoperative FS was routinely performed in a pre-operative diagnosis of invasive cancer. SLN biopsy was performed for selected cases of DCIS (high grade and large tumours), but FS was not done in these cases.

**Results:** One hundred and forty-two patients underwent wide local excision (WLE) with SLN biopsy; FS was not done in 14 (9.9%). Eighty-three patients underwent mastectomy and SLN biopsy, FS was not done in 18 (21.7%). SLN was positive in 64 patients of 193 patients (33.2%). In the 32 patients in whom intraoperative FS was not done, none had a positive SLN. The false negative rate for intraoperative FS of SLN was 20.3% (13 of 64 patients). These cases were found to have micrometastasis on histological examination of the permanent sections. Intraoperative FS was found to have a sensitivity of 79.7% and a specificity of 100%; positive predictive value (PV) of 100% and negative PV of 94.0%. Intraoperative FS did not significantly prolong the operative times.

**Discussion & Conclusion:** Intraoperative FS does not significantly prolong the surgery. Intraoperative FS was found to have a high sensitivity and specificity, but was inadequate for the detection of micrometastasis. FS therefore is an efficient method of assessing SLN status intraoperatively, and is useful in helping the surgeon decide whether to proceed with ALND.

**PP-CR-10**

**Analysis of Glycated Haemoglobin Levels in Chinese, Malays and Indians with Normal Fasting Glucose Levels**

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**Background/Hypothesis:** Recently a Glycohemoglobin (GHb) value of >6.5% has been recommended for the diagnosis of diabetes. Glycation of haemoglobin has been found to be increased in Blacks and Hispanics compared to Caucasians. The aim of this study is to investigate whether ethnic differences exist in GHb between Chinese, Malays, and Indians with normal fasting glucose values.

**Methods:** Over a time period of 1 year from June 2007 to June 2010, paired fasting glucose and GHb values were extracted from the laboratory information records. Glucose values were measured using glucose oxidase enzyme assay on the Advia2400 platform. GHb values were measured by ion-exchange high-performance liquid chromatography (HPLC) method on the BioRad Variant II platform. Data were analysed using Microsoft Excel spreadsheet.

**Results:** Data from a total of 2509 individuals (1516 male and 993 females) with fasting glucose levels between 4.5 and 6.0 mmol/l were analysed. Males had an average fasting glucose of 5.29 mmol/l with a mean HbA1c of 5.89% and females had an average fasting glucose of 5.29 mmol/l with a mean HbA1c of 5.88%. Seventy-six percent were Chinese, 12% Malays and 10% Indians. The mean fasting glucose of all Chinese was 5.29 mmol/l and the mean HbA1c 5.85%. The mean fasting glucose of all Malays was 5.26 mmol/l and mean HbA1c 5.92%. For Indians, the mean fasting glucose was 5.29 mmol/l and mean HbA1c 6.13%.

**Discussion & Conclusion:** Differences in HbA1c values exist between ethnic groups with normal fasting glucose values, with Indians having the highest HbA1c values followed by Malays and Chinese having the lowest HbA1c values.

**PP-CR-11**

**The Use of Vertical Rectus Abdominis Myocutaneous Flap for Post-Mastectomy Defect Cover of Large Breast Tumours**

**YS TAN**

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**Background/Hypothesis:** Although primary chemotherapy is the mainstay of therapy for advanced breast cancers, surgery is still needed for local control in selected patients. In such cases, the post-mastectomy defect is often too large to allow for primary skin closure. Split skin grafts were previously used, but in recent years, our institution has moved towards using the vertical rectus abdominis myocutaneous (VRAM) flap. We present our results here.

**Methods:** A retrospective review was performed of 13 patients who underwent a VRAM flap from 1 January 2008 to 30 September 2009.

**Results:** Median patient age was 61 years. Nine were Chinese and 4 were Malays. Median tumour size at the time of presentation was 100 mm (range, 30 to 150 mm); all had skin involvement. Nine patients (69.2%) received primary chemotherapy, but either had no clinical response or progressively enlarging tumours. At the time of surgery, 7 patients (53.8%) had fungating tumours and 5 patients had clinical chest wall involvement. Mean operative time for both the mastectomy and VRAM flap was 279 minutes. Two patients developed major postoperative complications; 1 developed a haematoma requiring surgical evacuation and haemostasis, and another partial flap loss requiring debridement. There were 3 minor complications; 2 patients developed superficial wound infections and 1 elderly patient required inpatient rehabilitation for functional decline. Median hospital stay was 10 days (range, 6 to 40 days). Radial resection margins were clear in all 13 cases, although there was involvement of the deep margin in 3. Most patients re-started systemic therapy or radiotherapy within 3 weeks of surgery.

**Discussion & Conclusion:** Our review shows that the VRAM flap is a good option for the coverage of a large post-mastectomy defect. It is associated with few complications and a relatively short hospital stay. More importantly, the recovery is short and subsequent therapy is not unduly delayed.

**PP-CR-12**

**Preoperative Computed Tomography Diagnosis of Small Bowel Ischemia**

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**Background/Hypothesis:** Small bowel ischemia (SBI) can be associated with high rates of morbidity and mortality. Accurate determination of this condition on Computed Tomography (CT) allows for prompt surgical intervention, but is often challenging in practice. The aim of this study was to measure the prevalence of various CT features considered to be signs of small bowel ischemia.

**Methods:** A coded database of consecutive patients seen at a single institution from the period between 2001 and 2009 was reviewed, of which 35 patients with histological evidence of SBI were selected.

All CT scans were retrospectively reviewed by a single radiologist trained in abdominal imaging, who was blinded to the CT report and histopathological findings. The following CT findings were tabulated: abnormal bowel mucosal enhancement, pneumatosis intestinalis, vascular occlusion, complicated ascites and portovenous gas. The prevalence of the various CT findings were then calculated.

**Results:** The average age of the patients was 63.7 years (range, 57 to 69), with slightly more males than females (6:5). The prevalence of the various CT findings were as follows: abnormal bowel enhancement (65.7%), vascular occlusion (25.7%), complicated ascites (20.0%), pneumatosis intestinalis (11.2%), and portovenous gas (5.7%).

**Discussion & Conclusion:** Among the CT imaging signs of SBI, abnormal mucosal enhancement occurred with highest frequency in our series. Complicated ascites is not an uncommon finding and may be under-reported. Portovenous gas and pneumatosis intestinalis are uncommon and should not be used as determinants for excluding SBI.

**PP-CR-13**

**When Mohs Micrographic Surgery Cannot Be Completed; What Can We Learn?**

**WP TAN**

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**Background/Hypothesis:** Mohs micrographic surgery has been accepted as the best treatment option for non-melanoma skin cancers over the head and neck region where tissue conservation is important. However, very rarely, it may have to be prematurely terminated even when tumour margins are still known to be positive for invasive tumour. We describe our experience in the management of these patients.

**Methods:** This was a retrospective case records review of all patients treated with Mohs micrographic surgery between January 2009 and June 2010 at our department.

**Results:** A total of 6 patients were identified during this period. One patient with underlying dementia was unable to tolerate further surgery after a single stage and the remaining patients had unresectable disease. All of these 5 patients with unresectable disease had recurrent basal cell carcinoma which had been treated with either surgery or radiotherapy previously. One patient had tumour extending into the external auditory canal, which was inaccessible under local anaesthesia, 2 patients had persistent tumour involving the episclera and the remaining 2 had persistent disease down to bone. The remaining persistent disease was managed by a variety of methods.

**Discussion & Conclusion:** Though usually rare, incomplete Mohs surgery due to unresectable deep disease most frequently involves recurrent, large tumours commonly located over the medial canthus, nose and ear. Preoperative imaging studies may be useful in such patients and a multidisciplinary management is often necessary.

**PP-CR-14**

**The Two Wheel Deal - Severity and Pattern of Injuries in Motorcycle Accidents - A Single Centre Experience**

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**Background/Hypothesis:** To determine and compare the distribution and severity of injuries between motorcyclists and pillion riders, and identify injury clusters contributing to high mortality and morbidity.

**Methods:** Retrospective data on motorcycle accident victims admitted to a trauma centre between 1 January and 31 December 2006 were collated. Demographics, clinical parameters in Emergency Department (ED), mechanism of injury of motorcyclists and pillion riders, injury distribution and severity, and outcomes were analysed. Victims who died in ED and patients admitted were included. Patients more than 65-years-old and those discharged from ED were excluded.

**Results:** Two hundred and forty-four patients were included; mean age was 24.4. Two hundred and twenty-two (91.0%) were riders; 215 (88.1%) of the patients were male. Twenty-two (9.0%) of the patients were pillion riders, of which 15(68.2%) female pillion riders. Two hundred and thirty-six (96.7%) were admitted; 8 (3.3%) died in ED. Top 3 mechanism of injuries were skidding (n = 66, 27.1%), head on (n = 66, 27.1%), side on (n = 51, 20.9%). Mean ISS of riders 16.1; mean ISS of riders who died 44.6; mean ISS of pillion riders 15.9. Distribution of 3 most frequent injuries among those who died in ED were chest (AIS = 3.9), head (AIS = 2.9), abdomen (AIS = 2.7). Injuries among riders who were admitted were chest (AIS = 2.9), head(AIS = 2.8), abdomen(AIS = 2.8). Statistically significant injuries among pillions who were admitted were chest (AIS = 3.1), head (AIS = 2.8), limbs (AIS = 2.8).

**Discussion & Conclusion:** Preliminary analysis shows that severity of chest injuries are related to mortality and morbidity of patients. Pillion riders suffered more limb injuries than motorcyclists.

**PP-CR-15**

**Brain Computer Interface Based Robotic Rehabilitation for Upper Limb Hemiplegia Following Stroke**

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**Background/Hypothesis:** A feasibility pilot clinical study was carried out to determine if non-invasive electroencephalograph (EEG)-based Brain Computer Interface (BCI) using the NeuroComm BCI platform paired with a clinically proven MIT-MANUS shoulder-elbow robot (BCI-MANUS) was superior to MANUS robotic training for upper limb paresis poststroke.

**Methods:** A randomised clinical trial of 26 stroke patients with upper limb hemiplegia (Fugl-Meyer assessment (FMA) 4-40/66) and BCI-compatible resting brain states was conducted. Subjects were randomised into 2 supervised training groups comprising 18 hours over 4 weeks each of BCI-integrated robotic therapy (BCI-MANUS) or MANUS robotic therapy. Independently assessed standardised outcome parameters at baseline, weeks 2,4 and 12 included FMA scores, Motor subscales of the Functional Independence Measure (FIM), pain using Visual Analogue Scale (VAS) and arm spasticity using the Modified Ashworth Scale score (MAS).

**Results:** Altogether, 26 subjects (mean age 50.5 years, 16 males, mean duration post stroke 313.9 days) were recruited. (15 BCI-MANUS and 11 MANUS). Mean total FMA scores at week 0,2,4, and 12 improved for both groups: 26.3 (10), 27.4 (12.0), 30.8 (13.8), 31.5 (13.5) for BCI-MANUS, and 26.5(18.2), 31.2 (20.5), 32.9 (21.5) and 33.9 (20.2) for MANUS group.( $P = 0.51$ ) There were no significant changes between both groups for primary outcome of FMA scores, MI, grip strength, FIM scores, pain VAS or spasticity scores. The drop out rate was 1/26 without adverse effects.

**Discussion & Conclusion:** Due to inherent latencies in BCI algorithm detection to operate BCI-MANUS robot compared with MANUS robot, training repetitions between both groups were vastly different: 1000/hour for the MANUS and 140/hour for the BCI-MANUS group. BCI based robotic therapy employing attention-based motor imagery techniques to operate an effector arm is safe and acceptable, and has similar efficacy as MANUS robotic therapy in hemiplegia.



**PP-CR-16**

**Identification of Anterior Shoulder Dislocations by Triage Nurses in an Emergency Department - Effectiveness of a Shoulder Injury Training Course - Education and Practice**

**SJ JUAN**

*Emergency Medicine, Tan Tock Seng Hospital, Singapore*

**Background/Hypothesis:** To evaluate the effectiveness of a 'shoulder injury training course' for triage nurses in an emergency department.

**Methods:** A pre-post study was conducted to evaluate the effectiveness of a course that trains triage nurses to identify anterior shoulder dislocations in an emergency department (pre-period 1 May to 30 September 2009 and post-period 15 March to 15 April 2010). All triage nurses attended a series of lectures on how to identify different types of shoulder injuries and the use of x-ray to confirm the clinical judgement. The number of true anterior shoulder dislocations flagged at triage, as opposed to misdiagnosis such as shoulder contusions, acromioclavicular joint disruptions, clavicle fractures and proximal humerus fractures, were analysed before and after the training program. Patients with posterior, inferior dislocation, fractured distal humerus, open fractures, dislocations that were spontaneously reduced, re-attendance and those with pre-existing x-rays were excluded.

**Results:** In the pre study group, there were 485 patients with shoulder injuries. Of those included, 115 (33%) cases were anterior shoulder dislocation. Triage nurses correctly identified 78 of 115 (67.8%) cases (sensitivity 68%; 95% CI: 59 to 76). Of the 233 (67%) who did not sustain a dislocation, 213 (91.4%) were accurately diagnosed (specificity 91%; 95% CI: 87 to 94). Preliminary results from the post study period showed a significant 22% increase ( $P = 0.036$ ) in the diagnostic accuracy of anterior shoulder dislocations (sensitivity 90% (95% CI: 69.9 to 97.2 compared to 68% in the pre study group). The diagnostic accuracy of identifying patients without a dislocation also increased post training to a specificity of 97.1% (95% CI: 90.2 to 99.2) from 91% observed in the pre study period.

**Discussion & Conclusion:** This training course drastically improved the accuracy in identifying anterior shoulder dislocations by emergency department triage nurses.

**PP-CR-17**

**Effect of Radiofrequency of the Inferior Turbinates by CelonLab ENT on Olfaction and Taste.**

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*Ear Nose Throat, Tan Tock Seng Hospital, Singapore*

**Background/Hypothesis:** Radiofrequency of the inferior turbinates (RFIT) is a popular treatment modality for persistent nasal blockage secondary to hypertrophic inferior turbinates. It is highly effective, minimally invasive with low complication rates, and can be performed in an outpatient clinic without the need for hospitalisation, general anaesthesia, and with minimal downtime. The aim of this study is to investigate the effects of RFIT on olfaction and taste sensation

**Methods:** A prospective observational study at an otolaryngology department of tertiary referral hospital in Singapore has been undertaken. Patients were assessed before and up to 2 months after RFIT (by CelonLab ENT) using Sniffin' Sticks extended test battery and basic taste test. Other factors evaluated include and skin prick test, symptoms score using visual analogue scale (VAS) and sino-nasal outcome test (SNOT22), clinical examination, and acoustic rhinometry.

**Results:** Fifteen patients were included (10 men, 5 women). Mean age was 23.4 years. Skin prick test was allergy positive for all patients. There was a statistically significant improvement of VAS for symptoms of blockage ( $P < 0.001$ ), rhinorrhea, and post nasal drip ( $P < 0.05$ ), SNOT22 scores ( $P < 0.001$ ), and acoustic rhinometry results ( $P < 0.01$ ). Hyposmia was noticed in 10 patients before RFIT. Five patients with hyposmia showed improvement at 1 week ( $P < 0.05$ ), but not at 8 weeks after RFIT ( $P > 0.05$ ). Six patients (4 normal, 2 hyposmic) showed insignificant reduction in their smell scores ( $P > 0.05$ ). There was no significant alteration of the taste in any of the subjects ( $P > 0.05$ ).

**Discussion & Conclusion:** RFIT is a safe and simple procedure that relieves symptoms of nasal blockage in patients with hypertrophic inferior turbinates secondary to allergy or other forms of rhinitis. This is the first study to suggest its potential benefits on improvement of olfaction in patients with allergic rhinitis.

**PP-CR-18**

**Normal Values of Peak Nasal Inspiratory Flow among Adult Chinese Population in Singapore**

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**Background/Hypothesis:** Peak nasal inspiratory flow meter (PNIF) is a clinical device used to determine the extent of nasal airway patency and degree of nasal obstruction. It is cheap, simple, portable, and easily performed test that can be performed in both primary and secondary medical care centres to aid diagnosis of sino-nasal diseases. The purpose of this study is to establish normative PNIF data in relation to age, sex, and height for the healthy adult Chinese Singapore population.

**Methods:** Prospective study at Otolaryngology department of Tan Tock Seng Hospital in Singapore. The aim is to investigate the normal values of PNIF in the healthy adult Singapore population with correlation to age, sex, height, BMI, race, and peak expiratory flow rate.

**Results:** Eighty-six Chinese subjects were enrolled (54 females and 32 males). All fulfilled the criteria of the study being non-smokers, non-asthmatic, without nose or paranasal sinuses problems or previous surgeries, with ages ranging from 18 to 79 years and a mean age of 42.8 years. Data were statistically analysed and tables were produced relating PNIF to age, sex, and height. In the univariate analysis, we found that age, height, gender and weight were significantly associated with highest PNIF. However, forward stepwise regression revealed that height was the only independent factor significantly associated with PNIF. PNIF increased by 1.95 (95% CI: 1.19 to 2.71) for every cm increase in height ( $P < 0.001$ ).

**Discussion & Conclusion:** PNIF is of great importance for the study of nasal patency, evaluation of the degree of nasal obstruction, and making treatment decision. This is the first attempt to find out the normal values from such an informative, simple, useful, non invasive outpatient-clinic-based test of the nasal airway for the adult Singapore population. It shall serve as a reference to enhance the utilisation of such tests as part of the general evaluation of patients with sino-nasal diseases at the ENT out-patients clinics.

**PP-CR-19**

**Effect of Uvulopalatopharyngoplasty on Olfaction and Taste - A Pilot Study.**

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**Background/Hypothesis:** The goal of UPPP is to reduce snoring and obstruction through elimination of redundant mucosal folds, obstructing tonsils, and excess soft palate. Alternation of taste has been documented as a potential complication since UPPP involves reduction of redundant palatal tissue which contains taste buds. However, potential effect of UPPP on olfaction has yet to be determined. Therefore, the aim of this study is to investigate the effects of UPPP on olfaction and taste

**Methods:** A prospective clinical study was conducted in a tertiary Otolaryngology referral hospital in Singapore. Patients who underwent UPPP for OSA in the absence of any sinonasal diseases, were invited to participate. Assessment of olfaction and taste was conducted pre-operatively and 1 week and 3 months postoperatively using Visual Analogue Score (VAS) and Sniffins' Sticks test battery operated by a single consultant.

**Results:** Initially, 15 patients participated in the study. Five defaulted and 3 refused testing postoperatively after initial consent was taken. Thus, in total 7 patients completed the study (1 woman, 6 men; mean age 50 years). All patients had abnormally low smell scores pre-operatively. Four showed improvement in olfaction at 1 week and 3 months after surgery, 2 documented no change in their smell score, and 1 had decreased smell score at both visits after surgery although subjectively denied any alternation in his ability to smell. Improvement in smell 1 week after surgery was marginally significant ( $P < 0.05$ ), yet was insignificant 3 months later ( $P > 0.05$ ). As for taste, 3 showed no change and another 3 showed improvement of taste score which was statistically insignificant ( $P < 0.05$ ). The same patient who had decreased smell also reported decreased taste.

**Discussion & Conclusion:** This pilot study suggests that UPPP may improve olfaction. This supports that nasal airflow plays a role in olfaction. However, our sample size is small and further studies are warranted.

**PP-CR-20**

**Comparison of the Efficacy of Two Different Inferior Turbinate Radiofrequency Devices - A Prospective Randomised Single-Blinded Study**

**NAT ALSHAIKH, SDC LO**

*Ear Nose Throat, Tan Tock Seng Hospital, Singapore*

**Background/Hypothesis:** Radiofrequency of inferior turbinates (RFIT) is an effective treatment for inferior turbinate hypertrophy. To date, there is no single study in the literature comparing the efficacy of different RFIT devices. The aim of this study is to compare the outcome of RFIT using two different devices (CelonLab ENT and Surgitron® Dual Frequency RF/120 IEC).

**Methods:** A prospective randomised single-blinded study was performed at an otolaryngology department of tertiary referral hospital in Singapore. Patients were randomised into 2 groups, and the number recruited was determined by power analysis. Procedure, perioperative care, and medications were standardised and performed by the same surgeon for all patients. Before and after the procedure, patients were assessed by clinical examination, acoustic rhinometry, Sino-Nasal Outcome Test (SNOT22), and Visual Analogue Scale (VAS) for nasal blockage.

**Results:** Thirty patients underwent RFIT (15 subjects in each group). Both devices independently resulted in significant improvement of SNOT22 ( $P < 0.01$ ), VAS symptom scores ( $P < 0.001$ ), and acoustic rhinometry measures ( $P < 0.01$ ). However, between the 2 devices there were no significant differences in any of the above outcome measures ( $P > 0.05$ ). Regarding olfaction, both devices showed significant improvement of smell scores for initially hyposmic patients at 1 week after surgery ( $P < 0.05$ ), yet at 8 weeks after surgery no significant difference was noticed between the 2 groups ( $P > 0.05$ ). No complications have been reported in either group.

**Discussion & Conclusion:** RFIT is a safe, minimally invasive, and effective procedure for reduction of nasal obstruction secondary to hypertrophy of the inferior turbinates. There seems to be no major difference in the outcome between the 2 radiofrequency devices tested in this study.

**PP-CR-21**

**Non-Traumatic Out-of-Hospital Arrests: Initial Cardiac Arrhythmia, Circadian Differences and Cause of Death**

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**Background/Hypothesis:** OHA is an international health issue. There is an urgent need to better understand the key factors that affect OHA survival. This study looks at the profiles of patients who suffered an OHA.

**Methods:** In this retrospective study, the medical records of all patients who died upon arrival at Tan Tock Seng Hospital, Emergency Department (TTSH ED) between 1 January 2009 and 31 December 2009 were reviewed.

**Results:** Within the study period, there were a total of 275 OHA, 5 (1.8%) traumatic and 270 (98.2%) non-traumatic cases. Emergency Medical Service (EMS) conveyed 247 (91.5%) of OHA and 23 (8.5%) arrived by self-transport. The incidence of non-traumatic OHA was 14 per 10,000 ED attendees, predominantly male (72.2%). The commonest initial cardiac arrhythmia recorded on scene by paramedics was asystole (54.1%) followed by pulseless electrical activity (34.8%). 161 (59.6%) patients collapsed during the day (0600 - 1759 hours). Patients found in ventricular fibrillation peaked in the morning (1020hours). All OHA were started on cardiopulmonary resuscitation, intubated, given intravenous adrenaline, and all ventricular fibrillation was electrically defibrillated en-route by the paramedics. Despite continued resuscitative efforts in the ED, all remained in asystole. The State Coroner reviewed 266 (96.7%) OHAs, of which, 96 (36%) were subjected to post mortem. Among patients with asystole at scene, acute coronary syndrome (55.2%), hypertensive heart disease (13%) and bronchopneumonia (5.2%) were the three commonest cause of death. The commonest cause of death for ventricular fibrillation at scene was acute coronary syndrome (76.7%), of which 10 (43.5%) had no pre-existing medical conditions.

**Discussion & Conclusion:** In our study population, majority of patients had asystole as their presenting arrhythmia at scene. OHA with ventricular fibrillation demonstrated significant circadian differences and the underlying cause of death was acute coronary syndrome.

**PP-CR-22**

**ST Elevation Myocardial Infarct: Modes of Arrival, Door to Balloon Time and its Impact on Morbidity and Mortality**

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**Background/Hypothesis:** Timely reperfusion is crucial in reducing the amount of myocardial damage in STEMI. This study aims to examine patients with STEMI, their modes of arrival to the emergency department (ED) and its impact on door-to-balloon (D2B) time.

**Methods:** A retrospective study, the medical records of 619 patients with an admitting diagnosis of STEMI from Tan Tock Seng Hospital, Emergency Department between 1 January 2009 and 31 December 2009 were reviewed. Data were extracted from the electronic records of the emergency case notes and inpatient discharge summaries.

**Results:** Among 619 patients, 363 (58.6%) arrived by Emergency Medical Services (EMS) and 256 (41.4%) by self-transport. 330 (53.3%) patients underwent emergency angiography. 313 (94.9%) were treated with percutaneous coronary intervention (PCI), 8 (2.4%) with coronary artery bypass grafting (CABG) and 9 (2.7%) were conservatively managed. The D2B time was significantly shorter in patients who arrived by EMS (60 vs. 82 minutes;  $P < 0.001$ ). There was no difference in D2B time between patients who arrived in the day (0600 - 1759 hours) or at night (1800 - 0559 hours). Chest pain, shortness of breath and diaphoresis were the 3 commonest presenting symptoms regardless of their mode of arrival. Previous myocardial infarction, PCI or CABG did not influence the mode of transport. Patients who arrived by EMS had a higher incidence of cardiogenic shock (20.7% vs 11.7%;  $P = 0.020$ ) and were significantly older (63 vs 59 years;  $P = 0.004$ ) than arrivals by self-transport. Patients who arrived by EMS had a higher in-hospital mortality rate (12.1% vs 5.1%;  $P = 0.003$ ) and a longer mean length of stay compared to those who arrived by self-transport (6 vs 4 days;  $P = 0.004$ ).

**Discussion & Conclusion:** In our study population, patients with STEMI who used EMS tend to be older and had a higher incidence of in-hospital mortality and morbidity although their D2B time was shorter compared to those who arrived by self-transport.

**PP-CR-23**

**A New Approach for Forehead Lipoma Excision**

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**Background/Hypothesis:** Lipoma is one of the most common benign tumors. Excision of lipoma on the forehead can leave quite visible scars. Whilst many surgical techniques have been described to minimise facial scarring, direct excision may leave conspicuous scar and the endoscopic techniques can be time-consuming and require sophisticated equipment. To achieve better aesthetic outcome, a new approach using pretrichial incision was performed.

**Methods:** The incision was made in a zig-zag pattern as used in Minimal Access Cranial Suspension lift (MACS lift) to allow the increase in length and bevelled through the hair follicles to allow hair regrowth through the scar. Lipoma is excised after careful elevation of the subcutaneous plane under direct vision to preserve a uniform thickness of the subcutaneous tissue.

**Results:** Three male patients had their forehead lipoma removed using this technique. Lipomas were 2 to 3cm in diameter. All had no postoperative complications. All cases were done in day surgery and discharged home on the same day. In our 6 month to 3 year follow-up period, all patients did not have any evidence of recurrence and the previous pretrichial incision had been completely hidden by newly grown hair.

**Discussion & Conclusion:** The technique described can be used as an alternative for forehead lipoma excision to reduce the cost of expensive instruments as well as operative time while improving the aesthetic outcome.



**PP-CR-24**

**Endoscopic Approach for Excision of Forehead Lipomas and Osteomas: Our Institution's Experience**

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**Background/Hypothesis:** Forehead lumps are commonly excised for cosmetic reasons. They are usually performed via a traditional open excision technique. In the Asian population, open excision commonly results in a pigmented scar which tends not to fade with time. The endoscopic technique permits minimal scars behind the hairline. The magnification allows a good identification of anatomical structures and decreased risk of numbness. This study aims to describe our institution's experience with endoscopically assisted removal of forehead lipomas and osteomas.

**Methods:** We describe here a case series of 9 patients, in whom a minimally invasive technique was employed for the removal of a forehead lipomas and osteomas via an endoscopic, subperiosteal approach. Outcome measures included operative time, patient satisfaction and complications.

**Results:** A total of 5 osteomas and 4 lipomas were excised endoscopically were excised endoscopically. The dimensions of the masses removed ranged from  $0.5 \times 0.5$  cm to  $3.0 \times 3.0$  cm. All were confirmed by histological examination to be lipoma or osteoma. The patients were followed-up for an average period of 5 months. There were no residual masses or recurrences and no complications of numbness or paraesthesia. All the patients were very satisfied with the endoscopic option.

**Discussion & Conclusion:** Surgical feasibility of endoscopic removal of osteomas and lipomas of the forehead and its excellent outcome in cosmetic results and patients' satisfaction are discussed in this series. Its advantages include absence of visible scars, non-traumatic dissection, and magnification of anatomical structures.

**PP-CR-25**

**Chronic Actinic Dermatitis in Asian Skin: A Clinicopathological and Photobiological Study of Singaporean Patients**

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**Background/Hypothesis:** Chronic actinic dermatitis (CAD) is the second most common idiopathic photodermatosis in Singapore behind polymorphic light eruption. In this study, we examine the characteristics of chronic actinic dermatitis in the heterogeneous group of Singaporean patients.

**Methods:** The photobiological features of all patients treated for chronic actinic dermatitis at a tertiary dermatology centre in Singapore over a 5 year period were retrospectively examined.

**Results:** Fifty-eight patients were diagnosed to have CAD from January 2005 to December 2009. The mean age at diagnosis was 62 years (range, 35 to 83), with a racial distribution of 41 (70.7%) Chinese, 6 (10.3%) Indians, 8 (13.8%) Malays and 3 (5.2%) Others. There were 47 (81.0%) males and 11 (19.0%) females (ratio 4.27:1). Forty-nine (84.5%) patients had Fitzpatrick's skin type IV, 9 (15.5%) had skin type V. Three (5.2%) were HIV positive. The face and upper limbs were involved in 58 (100%) patients, while the trunk and lower limbs were involved in 30 (51.7%) and 8 (13.8%) patients respectively. Fifty-five patients (94.8%) had lowered minimal erythema dose (MED) to UVB (MED <90 J/cm<sup>2</sup>), 35 (60.3%) to UVA (MED <100 J/cm<sup>2</sup>), but none to Visible Light. Twenty-three patients (39.7%) had lowered MED to UVB alone, 3 (5.2%) had lowered MED to UVA alone. Thirty-two patients (55.2%) had lowered MED to UVB and UVA. Patients were followed-up for a median of 8 months. All were treated with photoprotection and topical steroids. Eighteen (31.0%) required courses of oral prednisolone and 8 (13.8%) required treatment with azathioprine. One patient was treated with methotrexate.

**Discussion & Conclusion:** In the Singaporean population, CAD was seen more commonly in elderly Chinese males of Fitzpatrick skin type IV. Phototest results showed decreased MED to UVB and UVA in 94.8% and 60.3% of patients respectively, none to visible light. All patients were treated with photoprotection and topical steroids. However, 31.0% required oral Prednisolone, while 13.8% required Azathioprine.

**PP-CR-26**

**Gender Differences in Risk Factors, Angiographic Severity, Treatment and In-Hospital Mortality of Patients with ST Elevation Myocardial Infarct**

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**Background/Hypothesis:** Coronary heart disease is the leading cause of mortality and morbidity for both women and men. Although men are affected in greater numbers, women have been shown to have worse outcomes and higher mortality. This study aims to examine gender differences in risk factors and treatment, and their association with mortality after ST elevated myocardial infarct (STEMI).

**Methods:** This was a retrospective study in which the medical records of 619 patients with an admitting diagnosis of STEMI from Tan Tock Seng Hospital, Emergency Department (TTSH ED) between 1 January 2009 and 31 December 2009 were reviewed.

**Results:** Of the 619 patients, 123 (19.9%) were women and 496 (80.1%) men. Four hundred and forty-nine (72.5%) patients underwent coronary angiography. One hundred and seventy (27.5%) patients did not undergo coronary angiography, majority (65.3%) were elderly aged  $\geq 65$  years (men 34.1% and women 31.2%). There was no significant difference between gender for the number and distribution of diseased coronary vessels. Elderly women (aged  $\geq 65$  years) were more often treated conservatively (67%) while those younger women (aged  $< 64$  years) were frequently treated with a coronary artery stent (62.1%). In-hospital mortality rate was significantly higher for women than men (6.5% vs 3.8%,  $P = 0.013$ ). Amongst the patients treated conservatively, elderly women had the highest in-hospital mortality when compared to the other patients (women  $\geq 65$  years 19.2% vs women  $< 64$  years 2.7%; men  $\geq 65$  years 13% vs men  $< 64$  years 6.8%). Compared to men, women were significantly older ( $P < 0.001$ ; 95% CI: 12.6 to 17.6), more likely to have a history of hypertension (73.2% vs 50.2%;  $P < 0.001$ ), and diabetes (45.5% vs 28.2%;  $P < 0.001$ ) and less likely to be smokers (12.2% vs 57.7%;  $P < 0.001$ ) or consume alcohol (0% vs 10.1%;  $P < 0.001$ ).

**Discussion & Conclusion:** Elderly women who were treated conservatively had the highest in-hospital mortality during the early management of STEMI.

**PP-CR-27**

**Epidemiology of Childhood Psoriasis: A Study of 263 Patients at the National Skin Centre**

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**Background/Hypothesis:** The aim of this study is to present the clinical and epidemiological profile of childhood psoriasis in Singapore.

**Methods:** This is a retrospective cross-sectional study. All patients under 16 years of age who were diagnosed with psoriasis between January 2004 and December 2009 at the National Skin Centre were included. A total of 263 patients were analysed.

**Results:** Of the 263 patients, 113 (43%) were Chinese, 72 (27%) were Malay, 55 were Indian (21%) and 23 (9%) were of other races. There were 108 (41%) males and 155 (59%) females, with a male to female ratio of 1:1.44. The average age at onset of disease was 8.21 years, with a range from 1 month to 15 years. The mean age of onset was  $7.89 \pm 3.70$  years in males and  $8.44 \pm 3.36$  years in females. The mean age at first presentation was  $9.76 \pm 3.14$  years in males and  $9.93 \pm 3.10$  years in females. The scalp was the most common site involved at first presentation [176 (67%) cases], followed by the extensor surfaces of the limbs [100 (38%) cases] and the nails [102 (39%) cases]. Chronic plaque psoriasis was the most common clinical subtype at first presentation [146 (55.5%) cases]. Four patients (1.5%) had guttate psoriasis and 4 patients (1.5%) had pustular psoriasis at first presentation. Only 1 patient (0.4%) had psoriatic arthropathy. A positive family history was present in 47 (18%) patients.

**Discussion & Conclusion:** Our study shows a female preponderance with predominant scalp involvement. Guttate lesions were uncommon, and a family history of psoriasis was infrequently noted. This sheds light on the characteristics of childhood psoriasis in our local population.

**PP-CR-28**

**Chronic Lymphoedema - A Review of Cases, Negative Pressure Wound Therapy and the Literature**

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**Background/Hypothesis:** Wound management utilising sub-atmospheric pressure has come a long way since the mid 20th century. Now negative pressure wound therapy (NPWT) is quite common place in our daily work. Chronic lymphoedema is a notoriously debilitating disease with no known cure. It can impair function of the affected limb, cause intractable pain and recurrent infections.

**Methods:** We review 3 patients retrospectively, who had multiple different presentations and etiology. We present various indications for surgery, the various techniques including Charle's and van der Walt's procedures, negative pressure wound therapy usage, as well as their follow-up.

**Results:** Two patients had good recovery post surgery, whilst 1 had to have a revision surgical procedure. Of the 3 patients, only 1 had relapse of the lymphoedema in certain parts of areas treated previously and sought a repeat procedure.

**Discussion & Conclusion:** Chronic lymphoedema is a notoriously debilitating disease with no known cure and various techniques of management. Left untreated, it can even lead to sarcomatous formation over a period longer than 10 years. The surgical procedures described for this disease are excisional management like debulking and liposuction, or physiological reconstruction by means of lymphovenous anastomosis. Low level laser therapy has also been described for the management for this disease. In addition to removing the excess accumulated fluid and reducing its size, our observation is that NPWT softened the hard fibrotic tissue of the affected lower limb.

**PP-CR-29**

**Advance Care Planning in Nursing Homes**

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**Background/Hypothesis:** Structured Advance Care Planning discussions (ACP) using "Respecting Choices®" framework were conducted in 6 local voluntary nursing homes (VNH) by trained hospital staff working from a local hospital. Preferences for medical care expressed by residents or next-of-kin (NOK) may provide an alternative to current care plan of returning residents to hospital during medical crises.

**Methods:** Residents and next-of-kin (NOK) were invited for advance care planning discussions using "Respecting Choices®" framework from 1 September 2009 till 31 August 2010. Residents were selected based on presence of advanced medical conditions and prognosis according to GOLD standards framework, their mental status and modified Shah Barthel Index <30. Preferences for future medical care related to cardiopulmonary collapse and types of medical intervention (see below) were assessed together with the usual patient demographics, decision making capacity (DMC) and NOK as proxy when DMC was impaired. This presentation describes the results obtained.

**Results:** To be submitted later

**Discussion & Conclusion:** Meaningful ACP discussions could be obtained from VNH residents.

**PP-CR-30**

**Gender Differences in the Clinical Manifestations of Patients with ST Elevation Myocardial Infarct**

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**Background/Hypothesis:** Coronary heart disease is the leading cause of mortality and morbidity for both women and men. However, women often present with "atypical" symptoms that can complicate the diagnostic work-up. This study aims to identify gender-related differences in patients with STEMI.

**Methods:** In this retrospective study, the medical records of 619 patients with an admitting diagnosis of STEMI from Tan Tock Seng Hospital, Emergency Department between 1 January 2009 and 31 December 2009 were reviewed. We extracted the data from the electronic records of the emergency case notes and inpatient discharge summaries.

**Results:** Of the 619 patients studied, 123 (19.9%) were women and 496 (80.1%) men. Among patients with chest pain, 61% of women and 68% of men came by ambulance. All patients within study cohort were admitted for further management. Patients who presented with chest pain had a shorter length of stay as compared to those who did not present with chest pain (mean: 4.6 days vs 7.3 days;  $P = 0.006$ ). Women were more likely than men to have no chest pain (70% vs 85%;  $P < 0.001$ ). Among women with no chest pain, the 5 commonest "atypical symptoms" were shortness of breath (43.2%), vomiting (21.6%), giddiness (18.9%), nausea (16.2%) and drowsiness (13.5%). In-hospital mortality was higher in women compared to men (15.4% vs 7.7%;  $P = 0.013$ ). Women were significantly older than men (mean: 73.7 vs 58.6;  $P < 0.001$ ) and had higher rates of hypertension (73.2% vs 50.2%;  $P < 0.001$ ) and diabetes mellitus (45.5% vs. 28.8%;  $P < 0.001$ ).

**Discussion & Conclusion:** Clinical manifestations of patients with STEMI appear to be different between genders. Women often present with "atypical" symptoms of STEMI compared to men.

**PP-CR-31**

**A Comparative Study of Ultraviolet Light A1 Phototherapy Versus Betamethasone Valerate 0.1% Cream for Chronic Vesicular Hand Eczema**

**NH SAID, KS LIM, WS CHONG, CTS THENG**

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**Background/Hypothesis:** Ultraviolet light A1 (UVA-1) phototherapy has recently been shown to be effective in the treatment of chronic vesicular hand eczema. The aim of study is to determine the efficacy and assess side-effects of UVA-1 phototherapy in the treatment of chronic vesicular hand eczema in comparison to topical corticosteroids.

**Methods:** Forty-seven patients with chronic vesicular hand eczema were recruited in this prospective, randomised, open-label study comparing UVA-1 phototherapy with betamethasone valerate 0.1% cream for chronic vesicular hand eczema. Twenty-four patients were randomly assigned to UVA-1 phototherapy while 23 patients were treated with topical corticosteroids. UVA-1 phototherapy was administered 3 times a week for 6 weeks to the study patients in comparison to twice a day use of the topical corticosteroid. Degree of improvement was assessed using the Dyshidrotic Area and Severity Index (DASI). Side effects were also assessed. Both groups of patients had their DASI scored at third, sixth and twelfth weeks after initiation of treatment.

**Results:** Forty of 47 patients completed the study. There was a statistically significant decrease in the mean DASI scores at the third, sixth and twelfth week in both treatment groups. There was no statistically significant difference in the mean DASI scores between the 2 treatment modalities at the end of the twelfth-week treatment period. There was a significantly greater mean reduction of DASI subscores of itch in the UVA-1 treated group when compared to corticosteroid treated patients. The tolerance of all the patients to treatment in the UVA-1 treatment group was good except for post-phototherapy pigmentation which was seen in 18 of the 24 patients.

**Discussion & Conclusion:** Localised UVA-1 phototherapy is as effective as topical corticosteroids for the treatment of chronic vesicular hand eczema. UVA-1 phototherapy is superior to topical steroids in terms of reduction in itch in our patients. Post-phototherapy pigmentation is a common side effect of UVA-1 phototherapy.



**PP-CR-32**

**Approach to Bleeding in Mandibular Condylar Fracture - An Algorithm**

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**Background/Hypothesis:** The close proximity of the maxillary artery to the mandibular subcondyle puts it at great risk of injury; either from trauma to the subcondylar portion of the mandible or iatrogenically during exposure of the fracture. The close proximity of the facial nerve and the bony anatomy further compounds the difficulty of achieving effective haemostasis.

**Methods:** The authors have encountered a case of a massive bleeding from a pseudoaneurysm of the maxillary artery after subcondylar fracture. Embolisation was performed to secure haemostasis. A review of literature was performed and an algorithm of management for bleeding in mandibular condylar fractures is proposed.

**Results:** An algorithm for management of bleeding in mandibular condylar fractures is proposed.

**Discussion & Conclusion:** Embolisation of the maxillary artery is more predictable in securing haemostasis. It is recommended as the initial treatment of choice when local measures and/or direct ligation of the bleeding vessel is not possible.

**PP-CR-33**

**A Case of Adult Onset Still's Disease in Pregnancy**

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**Background/Hypothesis:** Adult onset Still's disease (AOSD) is a systemic inflammatory disorder of unknown etiology characterised by spiking fever, evanescent skin rash, arthritis, and involvement of various organs. The diagnosis is one of clinical suspicion, requiring the exclusion of infection, malignancy, and systemic disease. Laboratory tests are non-specific and reflect heightened immunological activity

**Methods:** We report a case of a 32-year-old female with clinical features typical of adult-onset Still's disease in pregnancy.

**Results:** Laboratory investigations have excluded infection, malignancy and systemic disease. She responded well with oral steroids.

**Discussion & Conclusion:** AOSD, although uncommon, has characteristic constellation of clinical and laboratory features and should be considered in the differential diagnosis of pyrexia of unknown origin associated with a rash and arthralgia. The diagnosis is one of clinical suspicion and it is essential that infections, malignancy and other rheumatic diseases are excluded.

**PP-CR-34**

**Ethnic Variation in the Correlation between Fasting Serum Glucose Concentration and Glycated Haemoglobin**

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**Background/Hypothesis:** Clinical recommendations that target identical glycated haemoglobin (HbA1c) in all races is based on the premise that the relationship between HbA1c and glucose concentration is the same for all races. Since a racial difference has been seen in African Americans and Whites we sought to determine if the relationship between fasting serum glucose (FSG) concentration and glycated haemoglobin (HbA1c) is different in the three ethnicities in Singapore.

**Methods:** In this retrospective cross-sectional study, we examined the degree of correlation between HbA1c and FSG levels and also explored for ethnic differences in this relationship. All pertinent data was collected from a sample of 589 patients with type 2 diabetes (392 Chinese, 97 Indians, 89 Malays) who underwent a phlebotomy for FSG, glycated hemoglobin (HbA1c) and serum creatinine levels simultaneously at the Diabetes and Endocrine centre between 1 January 2008 to 31 May 2008. A multivariate linear regression model was created using Stata statistical software package.

**Results:** For any given value of FSG, the HbA1c is higher in the Malays relative to the Chinese. Using a multivariate model with HbA1c as the outcome variable, differences between the Chinese and Malays remained statistically significant after adjustment for age, gender, serum creatinine concentrations, BMI and duration of diabetes ( $P = 0.005$ ). The coefficient of correlation in the Chinese was 0.29 and 0.38 in the Malays.

**Discussion & Conclusion:** In this cohort of diabetic patients, Malays had higher HbA1c for any given FSG relative to the Chinese. Further studies such as continuous glucose monitoring (CGMS) are required to elucidate the percentage contribution by the FSG out of the daily blood glucose profile to the overall HbA1c by ethnicity, since the extent that FSG relates to HbA1c is different between the Chinese and the Malays. The possibility of race exerting an independent effect on this relationship will need confirmation and future clarification.

**PP-CR-35**

**Lightning Injuries: A Case Series**

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**Background/Hypothesis:** Singapore, albeit a small country, has one of the highest lightning activities in the world. However, injuries related to this spectacular weather phenomenon are under-reported and rarely a subject of study. Most reported cases dealt with lightning-caused fatalities but lightning-caused accidents are not always fatal. Actual reported international data showed that about 80% of lightning victims survived, with or without after effects. This study reviewed the cases of lightning-related injuries who presented to Tan Tock Seng Hospital, Emergency Department.

**Methods:** This is a case series of 5 patients. All cases were seen at the Tan Tock Seng Hospital, Emergency Department. The circumstances surrounding their injury and their presentation and symptomatology were reviewed.

**Results:** Of the 5 patients included in this study, 2 were diagnosed with rhabdomyolysis, 1 suffered from sensory-neural hearing loss, and one patient had a mild conjunctivitis as a result of tissue inflammation. Other symptoms included retrograde amnesia, parasthesia, tinnitus, and a single episode of seizure which resolved spontaneously. All our patients survived the ordeal and were discharged well back to their premorbid states.

**Discussion & Conclusion:** In our study, 3 possible mechanisms of injury were identified - through a side flash which occurred when the lightning hit the tree and travelled partly down that tree before a portion jumped to the nearby victims; through the concussive effect of the shock waves produced by the lightning; and through step voltage mechanism wherein the lightning after hitting the tree travelled into the ground where victims were standing. However, it is noteworthy to mention that victims of lightning strike are likely the result of multiple combinations of these mechanisms of injury rather than just caused by a single event. All our patients survived and thus further support existing evidence that lightning-caused accidents are not always fatal and that victims may survive with no or little side effects given proper medical treatment.

**PP-CR-36**

**Perioperative Care of Obstructive Sleep Apnea**

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**Background/Hypothesis:** Obstructive sleep apnea (OSA) is associated with increased perioperative morbidity and mortality. Patients at risk of OSA as determined by a pre-anesthesia screening questionnaire based on the validated American Society of Anesthesiologist checklist were divided into 2 groups for comparison: (1) those who proceeded to elective surgery under an OSA risk management protocol without undergoing formal polysomnography preoperatively (2) those who underwent polysomnography and any subsequent OSA treatment as required before elective surgery. We hypothesised that it is at least clinically safe and acceptable for patients to proceed for elective surgery without delay for polysomnography, resulting in no differences in postoperative outcome between these 2 groups.

**Methods:** A retrospective review of all patients (n = 470) presenting to pre-anesthesia clinic between January 07 and June 08 and identified to have OSA risk on screening questionnaire was conducted. The incidence of postoperative complications for each category of OSA severity (mild, moderate, severe) was compared between the 2 study groups. We also compared the agreement of OSA severity as determined by screening questionnaire versus formal polysomnography.

**Results:** There is no statistically significant difference in the incidence of respiratory (14.3% vs 13.3%), cardiac (3.3% vs 3.0%) and neurologic complications (0.6% vs 0.0%) between groups 1 and 2 respectively ( $P > 0.05$ ). There is good agreement of OSA severity between the screening questionnaire and formal polysomnography (kappa coefficient = 0.953).

**Discussion & Conclusion:** There was no significant increase in postoperative complications in patients managed on the OSA risk management protocol. With this protocol, it is clinically safe to proceed with elective surgery without delay for formal polysomnography or any subsequent OSA treatment. There is good agreement of OSA severity as determined by screening questionnaire with formal polysomnography.

**PP-CR-37**

**Prediction of Fat-Free Mass from Bioelectrical Impedance in Infants**

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**Background/Hypothesis:** Bioelectrical impedance analysis (BIA) for assessing body composition is widely used but predictive equations for estimating body composition in infants are lacking, thus limiting its use. Neonatal body composition may have significant impact on adult's health as altered developmental plasticity can have long term metabolic consequences.

**Methods:** This preliminary analysis consists of 42 subjects from the GUSTO birth cohort study aged 4 to 21 days. BIA was measured using the Impedimed SFB7 bioimpedance spectroscopy device that measures resistance and reactance at 256 frequencies (4 to 1000 kHz). Predictive equation for a single frequency (50 kHz) was developed by multiple linear regression and using fat-free mass (FFM) derived from air displacement plethysmography (PEAPOD<sup>®</sup>) as a reference standard for body composition assessment.

**Results:** Based on the regression model, FFM predicted from BIA resistance index [ $\text{Length}^2/\text{R50}$  ( $\text{cm}^2/\Omega$ )], where R50 is the resistance at 50 kHz, had a correlation coefficient (adjusted R square) of 0.524 and root mean square error (RMSE) of 0.237 kg. Using body weight alone, the correlation coefficient was 0.820 (RMSE = 0.146). In multiple regression, when including both BIA resistance index and body mass, the correlation improved with an adjusted R square 0.868 (RMSE = 0.124). Thus a combination of BIA resistance index and body mass had a better prediction of FFM. Although multicollinearity existed between body mass and BIA resistance index, the ability of predicting FFM is not affected. From the model, the predictive equation for FFM is derived as  $\text{L}^2/\text{R50} \times \text{L}^2/\text{R50 coefficient} + \text{weight} \times \text{weight coefficient} + \text{constant coefficient}$ . Thus for the present sample,  $\text{FFM} = \text{L}^2/\text{R50} \times 0.1466 + \text{weight} \times 0.56 + 0.4142$ .

**Discussion & Conclusion:** Our findings and predictive equation supports the use of BIA as a valuable research tool for convenient, cost effective and reliable body composition assessment of infants, which can be extended to home visits and not confined to hospital setting.

**PP-CR-38**

**Thyroid Nodules : Ultrasound Features, Fine Needle Aspiration Cytology and Final Histology : A Retrospective and Correlative Study in a Tertiary Hospital**

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**Background/Hypothesis:** Thyroid nodules are common and the frequency of a malignant nodule is about 5% (1). A recent study suggests a Thyroid Imaging Reporting and Data System (TIRADS) which helps to classify the nodules, assess the risk of malignancy and identify nodules that need fine needle aspiration cytology (FNAC) (2). We hypothesised that the TIRADS system would be useful in predicting the risk of malignancy in thyroid nodules.

**Methods:** All the patients who underwent ultrasound (US) guided FNAC for thyroid nodules in 2006 were included. Data regarding the FNAC results and the histology (for operated cases) were collected. The US images of the thyroid nodules were graded according to the TIRADS system by 3 endocrinologists, using the nodule with the most suspicious features to grade the goitre. In discrepant cases a consensus was obtained and this grading was used to corroborate with the FNAC and histology.

**Results:** A total of 112 patients underwent US guided FNAC. FNAC results were inconclusive for 7, benign for 87, suspicious or malignant for 18 cases. Of the 86 US images reviewed, 16 cases were classified as TIRADS 2 and 3. A correlation analysis of the US features and the FNAC results revealed that all 16 patients under TIRADS 2 and 3 were benign on FNAC. In 3 operated patients, the final histology was benign nodular goitre. The rest of the 13 cases have remained stable on follow-up over the last 4 years. In the 2 patients who were classified as TIRADS 6, final histology confirmed malignancy. The rest of the 68 cases were classified as TIRADS 4 and of these, 58 had benign features on FNAC and 10 had features suggestive of malignancy.

**Discussion & Conclusion:** All the patients with TIRADS 2 and 3 were benign. This suggests that the TIRADS classification can help to identify nodules with a very low risk of malignancy and this may help to reduce the number of FNACs. A larger prospective study will help to further validate the TIRADS classification.

**PP-CR-39**

**Safety and Efficacy of Functional Endoscopic Sinus Surgery in Children**

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**Background/Hypothesis:** Functional endoscopic sinus surgery (FESS) is less commonly performed in children than in adults. This study aims to determine the patient profile, safety and efficacy of FESS in a cohort of paediatric patients who underwent FESS surgery at our centre.

**Methods:** The case notes of 20 consecutive patients under 18 years of age who had FESS by the senior author between 2004 to 2009 were reviewed retrospectively. All FESS was performed under CT image guidance. Data was collected on patient demographics, related medical history, perioperative and surgical details, as well as post-surgical recovery and follow-up.

**Results:** Our cohort consisted of 13 males and 7 females with an average age of 9 years and 10 months (5 years 5 months to 16 years). There were 12 Chinese, 2 Malays, and 6 of other races. Three patients had complications of acute sinusitis (invasive aspergillosis, subepidural abscess, frontal osteomyelitis) and 17 patients had chronic sinusitis that had failed medical therapy. The leading associated factors were allergic rhinitis (65%), adenoid hypertrophy (50%) and nasal polyposis (25%). Two patients had cystic fibrosis, 2 patients had acute leukaemia, and 2 patients had immunodeficiency. All patients experienced resolution of nasal congestion and rhinorrhea post-operatively. There were no complications of orbital, base of skull or any other postoperative bleeding. There was no CSF leak or nasolacrimal duct injury. One patient died of systemic fulminant aspergillosis despite multiple wide-field nasal debridement surgeries. The remaining patients were followed-up for an average of 1 year 5 months. Three patients (15%) experienced recurrence of symptoms (averaging 15 months post-surgery), which resolved with medication.

**Discussion & Conclusion:** FESS can be safely performed in children and is effective in the treatment of both chronic sinusitis and complications of acute sinusitis.



**PP-CR-40**

**Interesting Cases of Secondary Hypertension in Pregnancy**

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**Background/Hypothesis:** Secondary hypertension is a correctible cause of hypertension occurring in about 5% to 10% of all hypertensive patients. Our aim is to discuss the presentation and management of 5 cases of endocrine hypertension diagnosed during pregnancy.

**Methods:** Case series of Secondary hypertension in pregnancy.

**Results:** We identified 5 patients with endocrine hypertension during pregnancy, 3 of whom had Cushing's syndrome from adrenal adenoma and the other 2 patients had phaeochromocytoma. Three patients presented with uncontrolled hypertension (first trimester), 1 with hypertension (second trimester) and 1 patient who was normotensive presented with headaches (second trimester). Diagnosis of Cushing's syndrome was confirmed biochemically and a unilateral adrenal adenoma was found radiologically in 3 patients. The tumour was excised laproscopically (second trimester in 2 patients and early third trimester in the third patient). Pregnancies were complicated by severe preeclampsia and intrauterine growth retardation in 2 patients requiring caesarean delivery at 30 weeks gestation. Blood pressure normalised in 2 patients postoperatively, 1 patient required atenolol postpartum. Twenty-four hour urinary free catecholamines and metanephrines were diagnostic in 2 patients with phaeochromocytoma and adrenal tumour was confirmed radiologically. Spontaneous miscarriage occurred in 1 patient at 11 weeks' gestation. The other patient had an uneventful pregnancy and was delivered by caesarean section at 37 weeks. Both patients underwent surgical resection of the tumour postpartum after adequate alpha and beta blockade therapy.

**Discussion & Conclusion:** A high index of suspicion is required to diagnose secondary causes of hypertension in pregnancy. Biochemical test results must be interpreted with knowledge of how pregnancy affects their values during pregnancy. Investigations to localise endocrine tumours are limited to ultrasound and MRI which avoid radiation exposure to the fetus. Timing of surgery is affected by the gestation at diagnosis.

**PP-CR-41**

**Optimal Image Settings for Computed Tomography of Hepatocellular Carcinoma**

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**Background/Hypothesis:** To determine if commercially available image settings for computer tomography (CT) scans are optimal in viewing hepatocellular carcinoma (HCC) lesions.

**Methods:** Fifty consecutive patients were retrieved from a surgical database of known HCC with multiphasic contrast enhanced abdominal CT studies performed between 2008 and 2010. The same image slice was modified to show the lesion in a liver window (WL), a soft tissue window (WST) as well as a theoretical calculated window (WT). The WT level and width for each phase were derived from the mean CT attenuations of normal livers and tumours from a different dataset of 27 patients. Three readers with 0, 5 and 12 years of experience in interpreting abdominal CT's ranked the images, in random order, based on how clearly the lesions were seen. Statistical analyses for each phase were performed using Friedman's test with post hoc pairwise comparison.

**Results:** In the arterial and portal venous phases, the most experienced reader ranked WT and WL equally good but better than WST ( $P < 0.05$ ), while the other 2 readers ranked WT significantly better than WL and WST. For the delayed and unenhanced phases, all readers ranked WT significantly better than WL and WST.

**Discussion & Conclusion:** Regardless of reader experience, the optimal window for detection of HCC lesions on CT scans in all phases is the theoretical calculated window, rather than commercially available window settings, with the exception of the arterial and portal phases for the most experienced reader where the liver and theoretical calculated windows were equivalent.

**PP-CR-42**

**Treatment Induced Hepatitis B e Antigen Seroconversion is Less Durable than Spontaneous Seroconversion**

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**Background/Hypothesis:** An important endpoint of clinical treatment of chronic hepatitis B (CHB) is HBeAg seroconversion. However, the importance of this endpoint has been questioned. We sought to examine differences in HBeAg seroconversion and seroreversion rates in spontaneous compared to treatment induced seroconverters

**Methods:** CHB Clinic patients who were HBeAg positive with and without treatment with oral nucleoside analogues (lamivudine, adefovir and entecavir) were followed for HBeAg seroconversion and seroreversion. Durability was defined as maintained anti-HBe and HBeAg loss. Predictors of these HBeAg seroconversion were evaluated by multivariate analysis. Data were analysed by Kaplan Meier, log rank test and Cox regression.

**Results:** There were 835 HBeAg chronic hepatitis B patients who were followed-up with HBeAg seroconversion developing in 278 patients. During a mean follow-up of 7 years, spontaneous seroconversion occurred in 47% of patients compared to 61% after oral nucleoside therapy ( $P < 0.001$ ). A significant difference was still maintained after Cox Regression adjustment for differences in baseline variables ( $P < 0.001$ ). However, seroreversion occurred in 25.8% of treated seroconverters but only 8.5% of spontaneous seroconverters ( $P < 0.001$ ). No differences in HBeAg seroconversion and seroreversion rates were found between patients treated with lamivudine and adefovir but there were too few entecavir-treated patients who had stopped therapy to evaluate seroreversion. Predictors of HBeAg seroconversion were patients with baseline ALT abnormal (OR = 2.2, 95% CI: 1.6 to 2.8), lower baseline HBV DNA (OR = 1.2, 95% CI: 1.13 to 1.31).

**Discussion & Conclusion:** HBeAg positive CHB patients treated with nucleoside analogues achieved a significantly higher rate of HBeAg seroconversion compared to spontaneous seroconverters but this was blunted by the significantly higher rate of seroreversion. Treatment-induced seroconversion was less durable than spontaneous seroconversion.

**PP-CR-43**

**Prevention is Better than Cure: Risk Factors for Pneumonia Mortality in a Singapore Hospital**

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**Background/Hypothesis:** Pneumonia is the third leading cause of death in Singapore. Broad spectrum antibiotics are advocated for all critically ill pneumonia patients because of the perceived importance of antibiotic resistance in mortality. We examined the risk factors for in-ICU (Intensive Care Unit) mortality among patients with pneumonia.

**Methods:** A prospective observational study was conducted from July 2007 to July 2008 of all patients with pneumonia who stayed in the medical/surgical ICUs of National University Hospital for more than 24 hours. Pneumonia was defined and classified according to Infectious Diseases Society of America/American Thoracic Society guidelines.

**Results:** Of the 213 patients admitted to the ICUs with pneumonia, 69% were male with mean age 60.7(SD18.7). Of them, 46.5% had Community Acquired Pneumonia (CAP). Fifty (23.4%) of them had multi-drug resistant organism (MDRO) associated pneumonia: 28-Methicillin resistant *Staphylococcus aureus* and 12-gram-negative pathogens resistant to more than 3 classes of antibiotics. A Cox proportional hazards survival analysis indicated Hospital Acquired Pneumonia (HAP) (HR2.2, 95% CI: 1.12 to 4.29), APACHEII score (HR1.1, 95% CI: 1.04 to 1.15) and age (HR1.02, 95% CI: 1.01 to 1.04) to be independently associated with in-ICU mortality while infection with MDRO was not (unadjusted HR1.03, 95% CI: 0.55 to 1.91).

**Discussion & Conclusion:** Mortality in critically ill patients with pneumonia depends primarily on their age, severity of illness and hospital acquisition. MDRO are not independently associated with mortality, thus broad spectrum antibiotic therapy may not be indicated for all pneumonias. Instead of routinely using expensive broad spectrum antibiotics to treat all patients, simple measures such as bed elevation, pulmonary toilet and early mobilisation may be more important in reducing pneumonia mortality in Singapore.

**PP-CR-44**

**Management of Complex Septal Deformity in the Twisted and Saddled Asian Nose**

**NAT ALSHAIKH, SDC LO**

*Ear Nose Throat, Tan Tock Seng Hospital, Singapore*

**Background/Hypothesis:** The nasal septum plays a major role in the midline support of the external nasal framework, maintenance of normal nasal homeostasis, and defining external nasal profile and nasal tip position. The aim of this study is to determine the functional and aesthetic outcome of reconstruction of the nasal septum in septorhinoplasty.

**Methods:** A prospective case series of all consecutive patients who underwent septorhinoplasty for complex septal deformity in our institution over a 1 year period has been examined.

**Results:** A total of 14 patients were included (11 men, 3 women, mean age 29.9 years). Nine had a history of nasal trauma and 2 were revision cases with previous surgery performed in another institution. All patients presented with severe nasal blockage and external nasal deformity. Polydiacoxone foil was utilised in all cases, consisting of 12 primary & 2 revision cases. All required an open approach and underwent extra-corporeal septoplasty. Concurrent tip sculpture was performed in 7, and osteotomies in 10 patients. The septum required extra re-inforcement with spreader graft in only 2 patients. Nine patients presented with pre-operative saddle, 7 required augmentation with autologous grafts, and 2 were limited to supratip area and were corrected by septoplasty. Median follow-up period was 9 months (range, 2 to 16 months). Satisfactory nasal breathing was achieved in all but 2 patients with allergic rhinitis whose nasal mucosal oedema required continued nasal steroid treatment.

**Discussion & Conclusion:** The results of the current series in Asians are comparable to previous case series published by the senior author on Caucasian patients. In many cases donor site morbidity secondary to autologous cartilage harvest can be avoided using the technique described here.

**PP-CR-45**

**Septorhinoplasty: Experience from Tan Tock Seng Hospital Singapore**

**NAT ALSHAIKH, SDC LO**

*Ear Nose Throat, Tan Tock Seng Hospital, Singapore*

**Background/Hypothesis:** Septorhinoplasty is among the commonest procedures performed by otolaryngologists worldwide. The aim of this study is to present our experience of septorhinoplasty, particularly with respect to functional and aesthetic sequelae.

**Methods:** A prospective clinical case series of all consecutive patients who underwent septorhinoplasty over a 1 year period in an Otorhinolaryngology department of a tertiary hospital in Singapore was conducted.

**Results:** Over a 1 year period, 42 cases of septorhinoplasty were performed (12 women, 30 men) with age range between 18 and 67 years (average 30.2 years). Thirty-one were Chinese, 14 Malay, and 7 Indians. Eight were revision cases operated before in another institution, 17 patients gave a history of nasal trauma, and 10 had associated allergic rhinitis. Surgical indications included aesthetic (6 cases), functional (11 cases), and both (25 cases). All cases were performed as day surgery. In 27 patients, inferior turbinates hypertrophy contributed to the functional problem and received concurrent radiofrequency reduction. Thirteen septorhinoplasties underwent the closed approach and 29 the open approach. Silicone implants were removed from 2 revision cases. Twenty cases required autologous cartilage grafts, and homologous cartilage graft was used in one revision case. Complications included a secondary nasal bleed that was managed conservatively, and one recurrence of previous saddle deformity due to resorption of the autologous cartilage graft. Median follow-up period was 9 months (ranged from 2 to 16 months).

**Discussion & Conclusion:** With appropriate preoperative counselling, and detailed understanding of patients' expectations, outcome can be excellent. Major complications and need for revision surgery in our experience is consistent with data from the medical literature.

**PP-CR-46**

**Follow-Up for Diabetes Mellitus and Hypertension: A Community-Based Study in a Singaporean Residential Estate**

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**Background/Hypothesis:** Diabetes mellitus and hypertension are common chronic diseases locally. Close follow-up can ensure monitoring of control and thus help to prevent complications and reduce disease burden. We aim to identify the impact of various demographic factors on compliance to follow-up in diabetic and hypertensive patients.

**Methods:** This study was a secondary analysis of data collected from a cross-sectional survey of residents in Tampines aged above 21 using an interviewer-administered questionnaire. A total of 180 respondents reported presence of diabetes mellitus and/or hypertension and their follow-up habits. Bivariate and multivariate analyses were employed to examine the association between demographic characteristics and follow-up for diabetes mellitus and/or hypertension.

**Results:** Out of the 180 respondents (diabetes mellitus: 78 (43.3%); hypertension: 154 (85.6%); diabetes mellitus & hypertension: 52 (28.9%), 157 (88.2%) respondents were followed-up by a doctor. In bivariate analysis, those with post-secondary education ( $X^2 = 5.679$ ,  $P = 0.017$ ) and who lived in 4-room or more HDB flats ( $X^2 = 6.191$ ,  $P = 0.013$ ) were less likely to be followed-up for conditions. After adjusting for other factors, patients living in 4-room or more HDB flats (odds ratio: 3.30; 95% CI: 0.83 to 13.12) and with post-secondary education (odds ratio: 2.44, 95% CI: 0.75 to 7.95) were still more likely to default follow-up.

**Discussion & Conclusion:** Patients of higher socioeconomic status (SES) are less likely to go for follow-up for their diabetes and/or hypertension, contrary to common belief. Our postulated reasons include patients' self-perceived ability to manage disease well. Patients of higher SES may feel they have the knowledge and means to seek help should a complication occur, while those of lower SES may follow the doctor's advice more closely as this may be the only avenue they have. Further studies should be done.

**PP-CR-47**

**Anatomic Retro-Apical Technique of Synchronous Urethral Transection: Novel Approach for Ameliorating Apical Margin Positivity during Robotic Radical Prostatectomy**

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**Background/Hypothesis:** Positive surgical margins during radical prostatectomy are an undesirable outcome that predispose to earlier biochemical recurrence, occurring most frequently at the prostatic apex. We examine the effect of a novel synchronous approach to apical dissection during robotic-assisted radical prostatectomy (RARP) on apical and overall margin positivity.

**Methods:** Synchronous urethral transection commenced via a retro-apical approach was adopted in 209 consecutive patients undergoing RARP by a single surgeon between April and September 2009. The apical margin rates for this cohort were compared to those of 1665 previous patients who received conventional urethral transection via an anterior approach after DVC ligation. Outcomes were adjusted for differences in clinicopathologic variables. All radical prostatectomy specimens were processed according to standard institutional protocols, and examined by dedicated genitourinary pathologists. Margin positivity location was identified as apex, posterior, posterolateral, bladder neck, anterior, base, or multifocal.

**Results:** Patients receiving synchronous urethral transection had significantly lower apical PSM compared to the control group (1.4% vs 4.4%,  $P = 0.04$ ), as well as lower overall PSM (5.26% vs 9.8%,  $P = 0.032$ ). This marked improvement in the retro-apical cohort occurred despite a significantly higher incidence of aggressive cancer (pT3a or higher) documented on final specimen pathology (16% vs 10%,  $P = 0.027$ ).

**Discussion & Conclusion:** Synchronous urethral dissection during RARP improves circumferential visualisation and precise dissection of the prostatic apex and membranous urethra, resulting in significantly lower apical and overall surgical margin positivity.



**PP-NA-01**

**Is Team-Based Learning Feasible in Hospital-Based Nursing Education?**

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**Background/Hypothesis:** Hospital-based continuing nursing education (CNE) is often done through didactic lectures. This teaching method, however, does not create active learners who are self-motivated and engaged. Team-based learning (TBL) is a teaching technique which provides an alternative to lectures in both small and large-group settings. This study aims to explore the feasibility, engagement and attitudes towards TBL among senior nurses in the hospital setting.

**Methods:** We conducted a pilot study of TBL with case-based approach to teach general cardiology during an Advanced Nurse Clinician (NC) Course. First, each participant attempted a set of 8 multiple-choice questions individually with answers recorded using an audience response system (Classroom Performance System software). Next, the participant discussed the same questions with his/her team and provided a group response. After each group response, the facilitator summarised the key learning points underpinning the question. Participants' engagement and preference for TBL were measured using a self-reported Likert scale instrument.

**Results:** Nineteen NCs divided into 4 groups participated in the study. Participants had an average of 17.7 years of nursing experience (range, 10 to 30). Overall, 95% of the participants reported a high level of self-engagement and fellow participant-engagement in class discussion. All of them reported that they had a chance to share their answers or have their questions addressed. The majority (79%) felt that they were active learners in class and 16% felt they learnt most from either their own discovery or from other participants' contributions. All found TBL more enjoyable than conventional lectures.

**Discussion & Conclusion:** TBL is an enjoyable learning method for nurses and is preferred over traditional didactic lectures. It promoted a high level of participant engagement and interaction in class.

**PP-NA-02**

**Nurses' Perspective towards Evidence-Based Practice: A Descriptive Study**

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**Background/Hypothesis:** Evidence-based practice (EBP) has become increasingly important in healthcare. However, nurses' knowledge, skills, attitudes and barriers in EBP will affect the application of EBP in healthcare settings. In order to promote EBP effectively, we need to identify and address nurses' knowledge, skills, attitudes and barriers in application of EBP. The aim of this study is to investigate knowledge, skills, and attitudes of nurses towards EBP, and explore barriers faced by local nurses.

**Methods:** A descriptive cross-sectional study using survey questionnaire.

**Results:** A total of 1518 questionnaires were distributed and 1144 filled-in forms (75.4%) were received. About one-third of RNs answered the question of 'What is EBP' correctly. A quarter of RNs perceived themselves as proficient and excellent in EBP skills. 'Identify clinical problems' (31.5%), 'conduct online literature search' (28.9%) and 'distinguish types of questions' (28.5%) were perceived as the most excellent EBP skills by the RNs. With regard to attitudes towards EBP, about 27.8% of RNs displayed positive attitudes towards EBP. Overall, 18.36% of RNs perceived presence of barriers to adopt EBP and lack of time was rated as the major barrier (55.3%). 'Identification of clinical issues' (71.6%), 'implementing recommendations to practice' (69.2%) and 'understanding what is EBP' (68.7%) were perceived as the most important training areas of EBP by RNs.

**Discussion & Conclusion:** The study found that implementing EBP may be feasible as barriers towards adopting EBP do not seem to be a major area of concern. However, majority of RNs displayed negative attitudes towards EBP and have limited understanding and skills in EBP.

**PP-NA-03**

**Impact of Hypoglycaemia Teaching on Inpatient Nurses' Knowledge**

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**Background/Hypothesis:** Hypoglycaemia is an undesirable event. It increases morbidity and mortality. The goal of treatment for people with diabetes is to maintain euglycaemia without hypoglycaemia episodes. Hospitalised patients are at a higher risk of developing hypoglycaemia due to the strict inpatient glycaemic control and their critical health status. Thus, a great responsibility lies with the ward nurses. Nurses need to identify hypoglycaemia and promptly treat these hypoglycaemia episodes appropriately.

**Methods:** A 40-minutes teaching module was designed to improve inpatient nursing management. A short quiz was conducted before and after the teaching session. Results of the quiz were tabulated using descriptive statistical methods.

**Results:** A total of 91 pre- and post-teaching results were analysed. Before the teaching session, less than 80% of the nurses were aware that a capillary blood glucose of less than 4.0 mmol/L was considered hypoglycaemia (n = 69). More than 1/3 of the nurses thought that hypoglycaemia treatment should be initiated when reading falls below 3.0 mmol/L (n = 32), instead of 4.0 mmol/L. More than 50% took 30 minutes and longer to repeat a capillary blood glucose check after providing glucose drink.

Post-teaching results showed tremendous improvement. Nearly 100% of the nurses knew that i) hypoglycaemia occurs when capillary blood glucose is less than 4.0 mmol/L ii) hypoglycaemia treatment should be initiated when reading falls below 4.0 mmol/L iii) a sachet of dextrose powder in the pantry contains 15 grams of glucose and iv) a repeat check after 15 minutes should be done after hypoglycaemia treatment.

**Discussion & Conclusion:** Regular teaching sessions for the ward nurses are useful and necessary to improve knowledge pertaining to inpatient hypoglycaemia nursing management.

**PP-NA-04**

**Patients Characteristics Referred to Diabetes Nurse Educators**

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**Background/Hypothesis:** Diabetes mellitus is the seventh commonest cause of death in Singapore. Increasingly, the patients seeking treatment in Tan Tock Seng hospital have diabetes as one of their comorbidities. Patients with poor glycemic control have worse health outcomes and develop diabetic-related complications. The focus of Diabetes Nurse Educator (DNE) service is to achieve optimal glycemic control, through providing diabetes education and promoting self management.

**Methods:** Descriptive analysis was done on the statistics of patients referred for DNE service in year 2009. Results from this review will provide information on the future education and quality improvement initiatives from the DNE department.

**Results:** A total of 2677 patients were referred for DNE service in year 2009. Out of the 2677 referrals, 75% were inpatients, 18% were outpatients and 7% were from Emergency department short stay ward. About 13% of them were newly diagnosed diabetes and 18% required hypoglycaemia education. Almost half the patients required more than 1 session of diabetes education. Phone follow-up review was provided for 19% of these patients. More than 50% of the patients referred to DNE service were from the department of General Medicine. Orthopaedics department referrals constituted 14%. The percentages of the patients on oral medications and insulin were 55% and 37%, respectively.

**Discussion & Conclusion:** Most of the patients referred for DNE service were inpatients and one-fifth of these patients required hypoglycaemia education. Analysis on age, language spoken and health literacy could be done in future studies to improve DNE service.

**PP-NA-05**

**Chief Complaint at Triage**

**R JASMANI**

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**Background/Hypothesis:** The emergency department (ED) is constantly pressured to characterise the patients it treats while having to concurrently deal with overcrowding and cost containment issues. Few EDs have been able to analyse their case mix, care processes, workloads, manpower justifications or patient outcomes until recently. A system that enables the ED to categorise patients and define similar case-mix groupings would inadvertently assist in describing in patient demographics, workloads, staffing and resource needs.

**Methods:** The Canadian Emergency Department Information Systems (CEDIS) is a program developed by Canadian emergency departments to form the basis of future ED case-mix groups. This system would facilitate research and benchmarking and also clinical quality improvements. The CEDIS chief complaint list is compiled by emergency physicians, nurses, administrators and researchers active in data management and ED informatics. The CEDIS list was chosen because of its comprehensive patient presenting complaint list and that it already has International Classification of Diseases (ICD) -10 attachments to ensure accurate data entry.

**Results:** Many common patient presenting complaints have no corresponding ICD-10 codes. We sought to solve this issue through the CEDIS Presenting Complaint List, which would assist in categorising case mixes, care processes, workloads, manpower justifications and statistical collection. A daily audit process by nurses ensures accurate CEDIS chief complaint selection.

**Discussion & Conclusion:** Aging populations, overcrowding and the drive to improve efficiency have strengthened the demand for clinical, research and administrative data. Several pertinent databases have been created for this purpose, and that is to list a specific set of chief complaints which would improve patient outcomes eventually.

**PP-NA-06**

**Challenges Faced by Infection Control Nurses during Construction and Renovation**

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**Background/Hypothesis:** Guidelines on construction, renovation and demolition were initially formalised when Tan Tock Seng Hospital (TTSH) underwent the Joint Commission International (JCI) accreditation in 2005. This abstract traces the projects from year 2008 to 2010 and the challenges encountered.

**Methods:** Two auditing tools were used to assess the infection control risk to both the patients and healthcare workers. The first was the "Infection Control Risk Assessment" (ICRA) matrix, which is used to determine the level of precautions and infection control involvement prior to each renovation project. The second, a check list was also used for daily or weekly inspections throughout the project period. Stop-work order will be issued in the event of any non-compliance to infection control recommendations and lifted when infection control measures are appropriately in place.

**Results:** Forty-nine projects were completed from 2008 to July 2010 of which a total of 7 stop-work orders were issued, as a result of non compliance. Of the 7 stop-work orders, 3 were related to unnoticed gaps in the hoarding while 4 were due to dust generating works done without prior notification or inadequate hoarding.

**Discussion & Conclusion:** Ensuring full compliance to the infection control recommendations remains a challenging task as project managers and renovation contractors do not fully appreciate the relationship of their work to infection risks and the Infection Control Nurses (ICN) are not always on site. Other challenges include last minute notifications of the projects to the ICN, which affected inspection schedules. In addition, there were instances whereby ward-based initiatives or IT developments, were not made known to the ICN prior to renovation works. Construction, renovation and demolition works continue to post challenges to the Infection Control team in its role of Infection Prevention.

## PP-QHSR-01

### Providing Safer and Timelier Access to Care

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**Background/Hypothesis:** The project kicked off with a retreat entitled "Big Squeeze" in October 2009 with involvement from Clinicians, Allied Health, Nursing & Administrators. The purpose was to examine the care we provide to Emergency Patients and identify improvements to put the patient first by providing care in a timely, efficient and safe manner and cope with the limited bed situation.

**Methods:** The team focused on reducing waste and delay in the process using the lean methodology. This hospital wide initiative also spun off several supporting improvement projects.

**Results:** The attendees reached a consensus on several key improvements, the key one being providing patients with defined specialist care within 2 hours of Emergency Department (EMD) decision to admit.

The key achievements are:

1. With the set up of a general EMD referral clinic "hot clinic" or "hot slot" for urgent Specialist Outpatient Clinic (SOC) referrals to be seen the same day or next day, the percentage of appointments given within requested date has increased from 48.3% to almost 100%.
2. The majority of patients now receive defined specialist care within 2 hours of decision to admit; either through timely admission to ward or through activation of discipline doctors to review the patient at EMD. The activation down to EMD has achieved an encouraging 68% response rate from a baseline of 0% (benefitting 456 patients as at 15 April 2010).
3. With the spread of discharge planning initiatives including setting an expected date of discharge (EDD) within 48 hours of admission and improved discharge processes, the percentage of discharges before 12 noon has tripled from less than 10% in 2008 to 28% in April 10.

**Discussion & Conclusion:** By using a systems-thinking approach to problem solving, considering the ensuing effects, evidence-based guidelines and the end-to-end patient experience, our patients are able to obtain access to more co-ordinated, timely and ultimately safer care.

## PP-QHSR-02

### Measuring the Mental Health of a Nation

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**Background/Hypothesis:** The Singapore Mental Health Study (SMHS) is a national epidemiological study on the Singapore population. The study aims to establish the prevalence of mental disorders in adult Singapore residents, describe the current use of mental health services (both Western and traditional services) and the level of unmet need, and identify facilitators and barriers to mental health treatment.

**Methods:** The SMHS is a population-based, cross-sectional epidemiological study that aims to recruit 6500 Singapore Residents (including Singapore Citizens and Permanent Residents) aged 18 years and above. The frame was stratified by age and ethnic groups to obtain a disproportionate stratified random sample of eligible residents. Respondents are assessed using the Composite International Diagnostic Interview (CIDI), the South Oaks Gambling Screen (SOGS) and the Fagerstrom test for Nicotine Dependence (FTND) to screen for mental disorders, pathological gambling and nicotine dependence, respectively. Relevant socio-demographic data are also collected.

**Results:** Till date 2747 respondents have participated in the survey. The mean age of the respondents was 41.2 (14.4) years. One thousand three hundred and sixty-eight (49.8%) were females and 1379 were males (50.2%). Six hundred and eighty-two (24.8%) were of Chinese ethnicity, while 1081 (39.4%) were Malays, 873 (31.8%) were Indians and 111 (4.0%) belonged to other ethnicities.

**Discussion & Conclusion:** The study will provide a wealth of hitherto unavailable information on the rates of mental illness, the social and economic impact of such disorders in Singapore, and the help-seeking behaviours of those with mental illness.



**PP-QHSR-03**

**Mode of Payment for Chronic Disease Treatment at Outpatient Services among Residents Staying in 1 to 2 Room Housing Development Board Apartments**

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**Background/Hypothesis:** Healthcare costs put a significant strain on the financial resources of patients with chronic disease, more so for low income individuals. This study describes the modes of payment by which patients aged 18 years or older with chronic diseases and residing in 1- to 2-room flats pay for outpatient services.

**Methods:** As part of a community-based needs assessment to aid in planning, a house-to-house survey was conducted in 4 blocks of 1- to 2-room Housing Development Board (HDB) apartments in Toa Payoh from Jun to Aug 2009. The blocks were purposively selected based on the high health service utilisation at Tan Tock Seng Hospital among their residents. The developed questionnaire collected information on demographics, self-reported chronic diseases of interest (diabetes, hypertension, hypercholesterolaemia, heart disease, stroke, renal failure, asthma and Chronic Obstructive Pulmonary Disease (COPD)), self-rated health status, health service utilisation and mode of payment.

**Results:** Out of 778 respondents, 376 (48%) had at least 1 of the 8 specified chronic diseases. The median age of those with chronic diseases was 67 years, with 43% earning <S\$300/month. Consultations were most frequent in the polyclinics (59%) and government specialist outpatient clinics (SOC; 21%). Majority (72%) reported paying out-of-pocket for outpatient services, 7% and 9% paid by Medifund and Medisave, respectively, while 19% paid through other government schemes such as public assistance programs. Those older than 70 years were more likely to pay through other government schemes. Patients who consulted at government SOCs and those enrolled in social support programs were less likely to pay out-of-pocket.

**Discussion & Conclusion:** While a variety of schemes are available to pay for health services, a large proportion of patients with chronic diseases, many of whom are low income earners rely on out-of-pocket payment. Improving access to health financing schemes will ease the burden of chronic diseases on the ageing population.

## PP-QHSR-04

### Self-Reported Chronic Diseases, Health Status and Health Service Utilisation - Results from a Community Health Survey in Toa Payoh

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**Background/Hypothesis:** To determine the prevalence of self-reported chronic diseases, self-rated health status (SRH) and healthcare utilisation among residents in 1- to 2-room Housing Development Board (HDB) apartments in Toa Payoh.

**Methods:** The study included Singaporeans/Permanent Residents aged 18 years and above from 4 pre-selected HDB blocks in Toa Payoh. A questionnaire was developed, subjected to cognitive testing, and was translated into Mandarin and Malay. Trained research assistants collected information through face-to-face interviews on 8 self-reported chronic diseases of interest diagnosed by a western-trained doctor (diabetes, hypertension, hypercholesterolemia, heart disease, stroke, renal failure, asthma and chronic obstructive pulmonary disease), state of health and health service utilisation. SRH status was scored on a likert scale from 1 (poor health) to 10 (best possible health).

**Results:** Survey respondents were significantly older than the Singapore population (median age, 51 vs 37 years). Overall, 48% reported having 1 or more chronic diseases where 17% have diabetes, 32% have hypertension and 8% have asthma. Median SRH score was 7, with respondents aged 65+ years, those with no formal education, either unemployed, retired or were housewives, without income or belonging to Chinese ethnic group rating themselves below median SRH scores. Hospital inpatient utilisation rates were highest among Indian ethnic group, unemployed, no income, low self-rated health score, and respondents with COPD (67%), renal failure (33%) and heart disease (25%). Outpatient utilisation rate was significantly higher among older respondents, females, and those with lower SRH scores (1 to 6).

**Discussion & Conclusion:** The findings confirming that residents living in 1 to 2 room HDB apartments are significantly older, with higher rates of chronic diseases, health care utilisation than national average, will help adopt a focused approach to healthcare planning, to address their needs.

**PP-QHSR-05**

**A Queuing Network Model to Estimate Resources for a Visitor Facilitation System**

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**Background/Hypothesis:** Tan Tock Seng Hospital implemented a ‘Visitor Facilitation System’ to manage the flow of visitors to inpatient wards. It was designed to be relatively automated with self registration kiosks, manned counters and automatic gantries. This system manages visitors’ access to the wards so that clinicians can provide better care and treatment to the patients, for patients to have adequate rest, and to ensure continued vigilance against disease outbreaks. During the resource estimation analysis, several different configurations and resource levels were suggested. A stochastic quantitative model was needed to evaluate proposals.

**Methods:** An open Jackson network model with multiple customer classes was used. Visitor arrivals to the kiosks were random and assumed to be Poisson distributions and the service durations as negative exponential distributions. Two customer classes were needed as some of the visitors who had issues at gantries flowed back to the counter for resolution. This queueing model was used to evaluate different configurations and was complemented by a simulation model.

**Results:** We found that using a configuration of 12 kiosks, 8 counters and 4 gantries at level 1 at the front of the hospital gave acceptable visitor wait time and utilisation. Sensitivity analysis showed that reducing the resource level escalates wait time. Also, placing a solitary kiosk at the basement to spread the crowd with truncated queues increases queue and wait time variance.

**Discussion & Conclusion:** Queueing network model is appropriate to evaluate capacity and waiting time of people flow in a network configuration where the demand and service durations are variable. It has multiple possibilities for analysis in the hospital.

## PP-QHSR-06

### Reducing Clinical Coding Backlog

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**Background/Hypothesis:** Clinical coding translates medical terminology of a patient's diagnosis, treatment and procedure into international recognised codes, that is the International Classification of Disease, 9th revision Clinical Modification, commonly known as ICD 9-CM. Developed by World Health Organisation, this system assigns every health condition a unique category and code. Timely and accurate coding is critical for hospital to receive revenue through payment. Project on parallel coding (full casenotes and simplified coding with reference to electronic discharge summary done simultaneously for 3 months), and an inefficient work process has led to an increasing trend of coding backlog from April 2009.

**Methods:** Through the methodology of PDSA "cause and effect" diagram, key areas for improvement were identified to review the current processes.

**Results:** Completion of coding ICD 9-CM within 10 days post-discharge has improved from 73% in April 2010 to 95.7% in June. This new initiative has resulted in producing a faster, better, cheaper and safer work output.

**Discussion & Conclusion:** Understanding of common department objectives have motivated staff and engaged team efforts. Voting system used during discussion aids in common consensus. Implementation of standardised guidelines inculcate best practice and eliminates variations.

In conclusion the new system has significantly increased coding productivity with a possible direct impact on the financial resources accrued for the organisation as well as the clients.

## PP-QHSR-07

### Psychiatric Comorbidity and Substance Use among Patients with Sleep Difficulties

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**Background/Hypothesis:** Insomnia has an increasingly evident relationship with substance use. Alcohol disrupts sleep architecture and insomnia can precipitate substance abuse. This study assessed psychiatric comorbidity and substance use among patients with sleep difficulties.

**Methods:** Demographic data, completion of the Short Form Health Survey and screening tools: Michigan Alcohol Screening Test (MAST) and Drug Abuse Screening Test (DAST) were undertaken in an ethics board approved study involving Sleep Clinic patients and a control group (well persons). The validity and reliability of these tools are proven.

**Results:** Twenty-two patients (age  $36.68 \pm 11.91$ ) and 19 controls ( $37.68 \pm 10.27$ ) participated. There were slightly more male patients (14, 63.6%, controls 9, 47.4%). Race and marital status were closely matched. Patients' Axis I diagnosis was determined on clinical assessment: 11(50%) Primary Insomnia, 7(31.8%) Chronic Insomnia, 2(9.1%) Generalized Anxiety Disorder, 1 (4.55%) each Obsessive Compulsive Disorder and Dysthymia. 6(27.3%) had a comorbid psychiatric disorder, 7(31.8%) had an Axis II personality disorder/traits. All patients were found to be in the 'no alcohol problems' category but one control (5.3%) was in the 'problem drinker' category of the MAST. In the DAST, only 1 patient (4.5%) reported using drugs but this did not amount to a positive screen.; there were none amongst the controls. Patients were significantly likely to rate their health as poor ( $P = 0.022$ ).

**Discussion & Conclusion:** Substance abuse was not significant amongst this small group of patients. Patients however perceived they were in poor health. While this study has several limitations, the MAST and DAST proved quick and useful self-rater screening tools.

**PP-QHSR-08**

**Comparison of Customised Versus Standardised Peripheral Parenteral Nutrition in an Asian Academic Medical Centre**

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**Background/Hypothesis:** Malnutrition among hospitalised patients has been associated with increased morbidity, prolonged hospital stay and increased costs. Peripheral parenteral nutrition (pPN) is a supportive therapy for patients who cannot be sufficiently fed enterally for a short duration of time. Either customised or standardised pPN is used depending on the preference of the treating doctor.

To compare safety and efficacy of customised versus standardised peripheral parenteral nutrition (pPN). To introduce standardised pPN and educate on use of pPN in an Asian academic medical centre.

**Methods:** From 5 October 2008 to 11 March 2009, patients admitted under the general surgery department who were nil by mouth and required pPN were recruited. Data was collected prospectively including patient characteristics, total caloric count, types of calories, length of stay, days and complications of pPN. Education sessions describing differences between standard and customised pPN were held for doctors and nursing staff.

**Results:** Seventy-three patients on pPN were recruited, 74.0% were put on customised pPN and 26.0% on standardised pPN. Average age was 63.7 years (19 to 100), and the majority was male. Patients on standardised pPN received significantly more calories (57.5% of required calories,  $P < 0.01$ ) compared to customised pPN (19.0%). Standardised pPN patients had a more appropriately balanced caloric intake compared to customised pPN. Majority of the customised pPN patients received dextrose solution alone ( $n = 39$ ). Complication rate was lower for patients on standardised pPN (15.8%) versus customised pPN (27.8%). The most common complication for customised pPN was thrombophlebitis (18.0%) and raised triglycerides for standardised pPN (10.5%). After the education session, there was a significant increase in the prescription of standardised pPN from 0% to 70% ( $P < 0.01$ ).

**Discussion & Conclusion:** We found that the use of standardised pPN resulted in more adequate calories to patients and fewer complications.

**PP-QHSR-09**

**Predictors of Length of Stay and Mortality in Hospital Total Parenteral Nutrition Patients**

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**Background/Hypothesis:** To assess which factor/s increase mortality, length of stay and complications in hospital patients commenced on total parenteral nutrition (TPN).

**Methods:** Data was prospectively collected from patients commenced on TPN and managed by the Nutrition Support Team in an Asian Tertiary Hospital during the period of January 2007 to September 2009. The primary outcome measure was mortality; secondary outcome measures included length of stay and TPN related complications. Data was analysed using Strata.

**Results:** Two hundred and fifty-one patients were commenced on TPN during this period with a total of 260 episodes. The average age of patients was 66.4 years (range, 23 to 95 years old) and 82.2% were Chinese. Indication for commencement of TPN were non-functioning GI tract 18.46%, disrupted GI tract 51.92% postoperative 20.38 and others 6.15% (Fig 1). 19% of patients died during their hospital admission. TPN complication rate was 14.7%. The average length of stay was 29 days (range 5 to 339 days). Patients who were started on TPN postoperatively for anticipated prolonged fast had a significantly shorter length of stay -2.35 days ( $P = 0.02$ ) and reduction in mortality with an odds ratio 0.24 ( $P = 0.043$ ) (Table 1). Those with a Subjective Global Assessment (SGA) score C had significantly increased mortality with odds ratio of 14.3 ( $P < 0.005$ ) (Table 3). SGA C patients had a longer length of stay 1.85 days ( $P = 0.65$ )

**Discussion & Conclusion:** We found that both indication for commencement of TPN and SGA score of C influenced both hospital mortality and length of stay in hospital of patients started on TPN.

## PP-QHSR-10

### How Anti-Fluoridationists Portray Water Fluoridation

#### **GTF CHONG**

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**Background/Hypothesis:** Despite the immutable evidence supporting water fluoridation, anti-fluoridationists have vehemently opposed its universal implementation. It is perhaps the only public health intervention where its implementation is decided by the popular vote and the outcome is usually unfavourable. How water fluoridation is portrayed in the media is important as it shapes lay understanding of the subject and is also viewed by politicians as a gauge of public opinion on the issue. This study analyses and describes the negative portrayal of water fluoridation in the Australian media during 2006 to 2007.

**Methods:** A comprehensive search, using FactivaTM, was made for articles pertaining to water fluoridation that appeared in the Australian media, during October 2006 to October 2007. Search key words included: "water fluoridation, fluoride debate, fluoridation controversy". Retrieved articles were subjected to content analysis (type of media and stance on water fluoridation — pro, neutral or anti) and articles with an anti-fluoridation stance were further analysed for their subtextual themes (the manner in which water fluoridation was framed).

**Results:** A total of 104 articles were retrieved and approximately one-third (n = 33) were anti-fluoridationist. Two-thirds of 'letters to the editor' were anti-fluoridationist (n = 28) and these comprised the most common anti-fluoridation medium (84.8%). The anti-fluoridation articles contained 1 or frequently more subtextual themes, of which there were 10 in total. The most common anti-fluoridation subtextual themes were that of 'poisoned water' (34.2%) and 'doctoring our water' (12.5%).

**Discussion & Conclusion:** The 10 subtextual themes describe the manner in which water fluoridation is portrayed by anti-fluoridationists in the Australian media. These mistruths and allegations have been hypothesised to cause public anxiety and confusion, which in turn, partly accounts for the dismal outcome at fluoridation plebiscites/referendums.



**PP-QHSR-11**

**Geriatric Syndromes and Depression among People with Diabetes Mellitus in the Lower Income Group and Implications on Diabetes Management and Health Promotion**

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**Background/Hypothesis:** People with diabetes have been found to have higher prevalence of geriatric syndromes and depression. It is important to formulate interventions on diabetes management for the lower income group as the impact of diabetes burden will be the greatest on them. This study aims to determine the association of geriatric syndromes and depression among those with diabetes in a lower income community; and their association with self-management, lifestyle, and healthcare utilisation.

**Methods:** A cross-sectional survey was conducted in 4 blocks of 1- and 2-room flats in Toa Payoh from July to November 2009. Using a standard questionnaire, face-to-face interviews were conducted with household members on chronic diseases, geriatric syndromes and health-related behaviour. Data were analysed using SPSSv15.

**Results:** A total of 778 respondents were surveyed (response rate: 61.8%). Of these, 16.8% had diabetes, of whom 32.8% reported depression. Respondents who had diabetes with depression had a higher prevalence of geriatric syndromes compared to those without; i.e. functional decline (25.6% vs 5.7%,  $P = 0.001$ ); falls (30.2% vs 11.4%,  $P = 0.008$ ); stumbling (30.2% vs 10.2%,  $P = 0.004$ ); urinary incontinence (34.9% vs 5.7%,  $P < 0.001$ ); progressive forgetfulness (25.6% vs 5.7%,  $P = 0.001$ ) and poor eyesight (20.9% vs 5.7%,  $P = 0.008$ ). They were less likely to comply with medications (88.4% vs 95.1%), perform exercise (20.9% vs 50.0%,  $P = 0.001$ ); more likely to have hospital admissions (20.9% vs 11.4%); and had more specialist outpatient visits per person (2.3 visits vs 0.9 visits).

**Discussion & Conclusion:** Geriatric syndromes were associated with depression among persons with diabetes in the lower income group. Those with depression utilised more healthcare services and were less likely to have favourable self-management and lifestyle. Diabetes management must take these findings into consideration, and psychological interventions should be part of the diabetes care.

## PP-QHSR-12

### Vancomycin Resistant Enterococci Outbreak Investigation in a Tertiary Hospital

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**Background/Hypothesis:** From 2005 to 2009, the incidence of Vancomycin Resistant Enterococci (VRE) in Tan Tock Seng Hospital (TTSH) was between 0.02 and 0.24 per 1000 patient-days. The majorities were of the VAN B subtype with a few cases of VAN A found in patients with a history of hospitalisation overseas. In April and May 2010 respectively, VAN A was isolated in the clinical cultures of 2 TTSH patients who had not travelled out of Singapore.

**Methods:** Outbreak investigations and active case finding were carried out. A total of 56 and 61 inpatient contacts of the 2 VAN A-positive patients were screened. Samples from healthcare workers' hands and patients' environment were also collected after one inpatient contact of the first VAN A-positive patient was screened positive for VAN A. Isolates were subsequently sent for genotype identification, using Pulsed-Field Gel Electrophoresis (PFGE) method.

**Results:** Three contacts (5.4%) of the first VAN A patient and 2 (3.3%) of the 2nd were screened positive for VAN A. The average lengths of stay for these contacts (was this LOS before screening or culture) were 13.5 days and 9 days respectively. Five (62.5%) of the cases had an admission to a healthcare institution during the previous year. Five (62.5%) of the cases had chronic illnesses, either diabetes, hypertension or hyperlipidaemia. Three were also found to have carcinoma. Two distinctly different clones were identified in the 2 periods. Contacts of the cases had identical strains. None of the samples from healthcare workers and the environment yielded positive results.

**Discussion & Conclusion:** Two new strains of VAN A have emerged in Singapore. They are highly transmissible and have resulted in colonisation among contacts. Enhanced environmental surfaces cleaning and infection control practices were necessary to prevent its transmission.

## PP-QHSR-13

### "Real-World" Clinical Effectiveness of a Statin

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**Background/Hypothesis:** Drug efficacy in clinical trials and 'real-world' clinical practice may differ. Atorvastatin has been found to lower low-density lipoprotein cholesterol (LDL-c) by 36% in clinical trials. We studied the lipid-lowering effects of atorvastatin in a local clinical practice.

**Methods:** We conducted a retrospective cohort study on patients followed-up for dyslipidemia at a polyclinic who were started on atorvastatin 10 or 20 mg/day in 2009. Patients' medical records were used to obtain their pre and post initiation (up to 6 months) LDL-c, comorbidities and demographic profile.

**Results:** Of the 113 patients prescribed atorvastatin, 64.6% were female, mean age was 56.2±9.3 years, 55.8% had known coronary artery disease (CAD), stroke or diabetes (DM) and 44.2% had hypertension and/or dyslipidaemia. The mean duration of statin therapy was 79±30 days. After atorvastatin initiation, patients' LDL-c were lowered by 16.6%±21.8%; mean decrease of 0.78mmol/L (±1.0,  $P < 0.01$ ) with 41.6% of patients achieving the recommended LDL-c targets. Compared to patients with diabetes, CAD and/or stroke, patients with hypertension and/or dyslipidaemia alone had significantly greater reduction in their LDL-c (difference 9.9%±4.1,  $P = 0.02$ ) and were more likely to achieve their LDL-c targets (OR = 17.5, 95% CI: 5.7 to 53.2). Chinese patients had significantly greater reduction in LDL-c compared to non-Chinese patients (difference 10.6%±4.6%,  $P = 0.02$ ) and were more likely to achieve their LDL-c targets post initiation (OR = 4.8, 95% CI: 1.3 to 17.9). There was no significant difference in the percentage improvement in LDL-c between patients on atorvastatin 10 mg or 20 mg dosages.

**Discussion & Conclusion:** Patient non-adherence and pharmacogenomics are possible reasons for the lower effectiveness in LDL-c reduction with atorvastatin found in this study compared to that reported in the literature. Further studies comparing the "real-life" effectiveness of different statins would be useful to guide optimal statin therapy.

**PP-QHSR-14**

**Predicting the Critical Success Factors in the Coverage of Low Vision Services Using the Classification Analysis and Regression Tree Methodology**

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**Background/Hypothesis:** To identify the critical success factors (CSF) associated with coverage of low vision services.

**Methods:** Data were collected from a survey distributed to Vision 2020 contacts, government, and non-government organizations (NGOs) in 195 countries. The Classification and Regression Tree Analysis (CART) was used to identify the critical success factors of low vision service coverage. Independent variables were sourced from the survey: policies, epidemiology, provision of services, equipment and infrastructure, barriers to services, human resources, and monitoring and evaluation. Socioeconomic and demographic independent variables: health expenditure, population statistics, development status, and human resources in general, were sourced from the World Health Organization (WHO), World Bank and the United Nations (UN).

**Results:** The findings identified that having >50% of children obtaining devices when prescribed ( $\chi^2 = 44$ ;  $P < 0.000$ ), multidisciplinary care ( $\chi^2 = 14.54$ ;  $P = 0.002$ ), >3 rehabilitation workers per 10 million of population ( $\chi^2 = 4.50$ ;  $P = 0.034$ ), higher percentage of population urbanized ( $\chi^2 = 14.54$ ;  $P = 0.002$ ), a level of private investment ( $\chi^2 = 14.55$ ;  $P = 0.015$ ), and being fully funded by government ( $\chi^2 = 6.02$ ;  $P = 0.014$ ), are critical success factors associated with coverage of low vision services.

**Discussion & Conclusion:** This study identified the most important predictors for countries with better low vision coverage. The CART is a useful and suitable methodology in survey research and is a novel way to simplify a complex global public health issue in eye care.

## PP-QHSR-15

### **Outpatient Management of Primary Spontaneous Pneumothorax Using Small Bore Chest Tube Connected to a Heimlich Valve: One Year's Experience in a Singapore Emergency Department**

**SM LAI**

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**Background/Hypothesis:** Management of primary spontaneous pneumothorax (PSP) has traditionally been with either needle aspiration or chest tube insertion. Insertion of small bore (8Fr) chest tubes connected to a Heimlich valve is an acceptable alternative form of treatment for PSP's. This is less painful and invasive than traditional chest tube insertion, and would enable outpatient management of the patient. However it is currently still not widely used in Singapore. In Changi General Hospital, emergency physicians started doing this procedure in August 2009, after appropriate training. A retrospective audit was done to assess the success rate and complications.

**Methods:** Inclusion criteria was 1st episode of PSP, unilateral,  $\geq 2$ cm rim of air, and none or minimal effusion. After insertion of the 8 Fr chest tube, the patient was observed for 4 hours, and chest x-ray repeated. If there was partial or complete re-expansion, the patient was discharged with respiratory clinic review in 48 to 72 hours. Otherwise, the patient was admitted.

**Results:** From 1 August 2009 to 31 July 2010, 33 patients had 8 Fr chest tube with Heimlich valve inserted in our department. Of these, 30 patients fulfilled the inclusion criteria and were true PSP's. The 3 that did not fulfil criteria included 1 secondary pneumothorax and 2 spontaneous hemopneumothoraces. Median age was 21. All 30 patients with PSP were successfully discharged from the emergency department at first visit. At subsequent clinic review, 6 of them were admitted for surgical pleurodesis, and 1 patient was admitted for suction to be applied to the 8 Fr chest tube, after which the pneumothorax resolved. Overall, 76.7% were completely treated as outpatients, and 80% were successfully treated without need for surgery. No major complications occurred. Minor complications included serous fluid or small amount of blood in the tubing (16.7%).

**Discussion & Conclusion:** Use of 8 Fr chest tube with Heimlich valve is safe and efficacious for outpatient treatment of PSP's.

## PP-QHSR-16

### **Factors Associated with Non-Willingness to Participate in Health Promotion Programmes among Adults of Lower Socioeconomic Status**

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**Background/Hypothesis:** Lower socioeconomic groups have been found to have poorer health outcomes and engage in less health promoting behaviours. Understanding the factors associated with non-willingness to participate in lower socioeconomic groups will enable administrators to modify the programmes and increase participation in this population. This study aimed to determine reasons for and characteristics associated with non-participation in health promotion programmes.

**Methods:** A cross-sectional survey on self-empowerment and health-service utilisation for chronic diseases was conducted on a purposive sample of residents living in 4 housing developments of 1- and 2-room households in Singapore from June to October 2009. The patterns on exercise and smoking, receptiveness towards health promotion programmes and reasons for non-participation were elicited. Chi-square tests and logistic regression analysis were performed to identify differences between groups.

**Results:** Seven hundred and seventy-eight responses were analysed. Only 36.1% respondents were willing to participate in at least 1 health promotion programme (health screening, talk, or workshop). Older respondents aged 45 to 64 years (OR = 0.52, 95% CI: 0.35 to 0.76) and 65+ years (OR = 0.44, 95% CI: 0.29 to 0.66) were less likely to participate than their younger counterparts (range, 18 to 44 years). Malays (OR = 1.84, 95% CI: 1.27 to 2.68) were more likely than Chinese to participate, and respondents who do not exercise (OR = 0.57, 96% CI: 0.42 to 0.78) were less likely to participate than respondents who exercise (regularly/occasionally). Reasons for non-participation were "Not interested" and "No time".

**Discussion & Conclusion:** Existing health promotion strategies may not be effective for individuals from lower socioeconomic backgrounds. Health promotion messages should adapt to the needs and situation of the disadvantaged, so that participation would increase.

**PP-QHSR-17**

**Characteristics and Treatment Outcomes of Tuberculosis Treatment Defaulters Treated under the Infectious Disease Act**

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**Background/Hypothesis:** A key objective of any Tuberculosis (TB) control programme is successful treatment completion and cure of all active TB cases. This will minimise transmission and prevent future relapses and drug resistance. Since 2004, Singapore has had a policy to legally compel recalcitrant TB treatment defaulters to undergo treatment. We describe the treatment outcomes and compare their characteristics with a cohort of TB patients.

**Methods:** Data pertaining to the treatment outcomes and sociodemographic characteristics (age, gender, ethnic group, and housing type) of TB patients treated under the Infectious Disease (ID) Act from 2004 to 2009 were obtained from the National TB Registry. Socio-demographic data for the cohort of TB patients notified in 2009 were used for comparison.

**Results:** Among the 169 patients served with the legal notice, 81% completed treatment, 8% died before treatment completion, 4% defaulted again midway through treatment and became uncontactable, 2% never turned up, and the remaining were still on treatment. Compared to the cohort of TB patients in 2009, the recalcitrant defaulters had a greater proportion of males (87% vs 76%) and non-Chinese (57% vs 28%). A greater proportion of the recalcitrant defaulters were also staying in 1 to 2 room HDB flats (30% vs 8%).

**Discussion & Conclusion:** Even though these patients took much longer than their counterparts, treatment completion was eventually achieved in 81% with the utilisation of the ID Act. Certain sociodemographic characteristics also emerged as risk factors, and may guide intervention efforts to prevent non-compliance.

## PP-QHSR-18

### **A Model for Integration between Ren Ci Hospital and Medicare Centre and Tan Tock Seng Hospital**

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**Background/Hypothesis:** With different and separate institutional models of healthcare and financing policies, implementing a continuum of care for patients to transit smoothly from a restructured hospital to a community hospital presents a set of challenges and inefficiencies that need to be addressed. Ren Ci Hospital and Medicare Centre and Tan Tock Seng Hospital have collaborated on care integration through the appointment of a Joint Clinical Governance Working Committee to oversee the clinical governance and manpower capacity matters.

**Methods:** The initiatives that have been implemented include manpower secondment of clinical and operations staff, skills-based training to provide for higher care needs, provision of onsite specialist services from various medical, nursing and allied health disciplines, access to clinical support services (e.g. laboratory), facilitated direct admissions to TTSH, and access to clinical data systems, etc.

**Results:** There was a 3-fold increase in admissions to Ren Ci over 15 months; a 61% reduction on unplanned admission rates from Ren Ci to restructured hospitals over 1 year; and savings in acute bed days arising from Ren Ci's continued care for patients who required intravenous antibiotics which resulted in a combined savings of 115 bed-days for TTSH over 4 months.

**Discussion & Conclusion:** The Ren Ci-TTSH care integration model has provided benefits to both institutions as well as the patients along the continuum of care. For the rapidly ageing population of Singapore, such collaborations are crucial to ensure that older patients with complex medical conditions and who require slow stream rehabilitation receive the most appropriate level of care and clinical services.



**PP-QHSR-19**

**Refinements for Better Selecting Suitable Candidates for Focal Hemiablative Therapy with Curative Intent for Presumed Unilateral Organ-Confined Prostate Cancer**

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**Background/Hypothesis:** Focal hemi-ablative therapy has received significant interest as a treatment alternative to conventional surgery and radiation for localised unilateral prostate cancer, with reportedly fewer side-effects. We identify clinicopathologic characteristics to better predict for contralateral cancer involvement and extraprostatic extension (EPE) in patients with presumed unilateral disease on biopsy, for whom such therapy regimes would be oncologically inadequate.

**Methods:** Between January 2005 and August 2009, 1,861 patients underwent robotic-assisted radical prostatectomy by a single surgeon. Univariate and multivariate analyses was performed to identify significant clinicopathologic predictors for contralateral cancer and EPE on final histopathology.

**Results:** Of 1,114 patients with biopsy-proven unilateral prostate cancer, 867 (77.9%) had contralateral or bilateral disease on final histopathology. EPE was found in 132 patients (11.9%). Twenty patients (1.8%) had contralateral EPE involvement. High-grade prostatic intraepithelial neoplasm (HGPIN) significantly predicted for contralateral lobe involvement on both univariate ( $P = 0.02$ ; OR = 1.791) and multivariate analysis ( $P = 0.004$ ; OR = 2.677). Clinical stage T2 significantly predicted for contralateral EPE on both univariate ( $P = 0.012$ ; OR = 5.250) and multivariate analysis ( $P = 0.007$ ; OR = 8.656).

**Discussion & Conclusion:** Biopsy-proven HGPIN and clinically palpable prostate cancer on digital rectal examination are novel significant predictors for contralateral disease and EPE, and should be considered exclusion criteria for hemi-ablative focal therapy with curative intent for organ-confined prostate cancer.

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