



# AAMS

Annals of the Academy of Medicine, Singapore

VOLUME 42 (SUPPLEMENT)

NUMBER 9

SHBC 2013

SEPTEMBER 2013

Proceedings of the

# SHBC 2013

## Singapore Health & Biomedical Congress

**Advancing A Shared Vision Towards Healthcare 2020: Synergising Paradigms for  
A Patient-Centred Healthcare System, Affordable and Accessible for All**

**27 & 28 September 2013 | Max Atria @ Singapore Expo**

Organised by



## Annals Editorial Board

### Editor

Eng King [Tan](#)

### Deputy Editors

Erle CH [Lim](#)

Hui Kim [Yap](#)

### Associate Editors

Beng Yeong [Ng](#)

Pierce KH [Chow](#)

### Emeritus Editor

Vernon MS [Oh](#)

### Board Members

Richard [Sim](#)

Wee Joo [Chng](#)

Min Han [Tan](#)

Chiea Chuen [Khor](#)

Stacey KH [Tay](#)

Charles [Chuah](#)

### Immediate Past Editor

Vernon MS [Oh](#)

### Ex-Officio

Shih Hui [Lim](#)

Bien Soo [Tan](#)

## Specialist Advisory Panel

Balram [Chowbay](#)

Fun Gee [Chen](#)

Tou Choong [Chang](#)

Kok Yong [Fong](#)

Kei Siong [Khoo](#)

London Lucien [Ooi](#)

Bien Soo [Tan](#)

Hugo van [Bever](#)

### Editorial Executives

Hui Chee [Chan](#)

Deborah [Tan](#)

Harcharan [Kaur](#)

## International Advisory Panel

Juliana C N [Chan](#), *Hong Kong, SAR China*

Richard N [Fine](#), *USA*

Yik Hong [Ho](#), *Australia*

Edward [Holmes](#), *Singapore*

Richard H [Hunt](#), *Canada*

Ranga [Krishnan](#), *Singapore*

Edison [Liu](#), *Singapore*

Harvey [Marcovitch](#), *UK*

Albert [Singer](#), *UK*

We welcome submissions of cover images from Fellows and Friends of the Academy of Medicine for consideration for publication. Do submit interesting or unusual photographs or digitised images of original artwork, accompanied by a short write-up of about 30 words.

Format: 8 by 12 cm, resolution of at least 300 dpi, in JPEG or TIFF. Please email your submission to [annals@ams.edu.sg](mailto:annals@ams.edu.sg)

Printed by Straits Printers (Pte) Ltd

ISSN 0304-4602

MICA (P) 056/11/2012

# **Singapore Health & Biomedical Congress (SHBC) 2013**

## **CONTENTS**

### **List of Committee Members**

#### **Finalists**

Singapore Clinician-Investigator Award  
Singapore Allied Health Award  
Singapore Nursing Award  
Singapore Young Investigator Award – Basic Science/Translational Research  
Singapore Young Investigator Award – Clinical Research  
Singapore Young Investigator Award – Quality, Health Services Research  
Health Professions Education Research Investigator Award  
Singapore Primary Care Research Award (Oral Category)  
SHBC Best Poster – Allied Health  
SHBC Best Poster – Basic Science/Translational Research  
SHBC Best Poster – Clinical Research  
SHBC Best Poster – Health Professions Education  
SHBC Best Poster – Nursing  
SHBC Best Poster – Quality, Health Services Research  
Singapore Primary Care Research Award (Poster Category)

#### **Oral Presentation Abstracts**

Allied Health  
Basic Science/Translational Research  
Clinical Research  
Health Professions Education  
Nursing  
Primary Care Research  
Quality, Health Services Research

#### **Poster Presentation Abstracts**

Allied Health  
Basic Science/Translational Research  
Clinical Research  
Health Professions Education  
Nursing  
Primary Care Research  
Quality, Health Services Research

## Singapore Health & Biomedical Congress 2013

### Organising Committee

Chairperson A/Prof Steven Thng Tien Guan  
Co-Chair Dr Keith Tsou

National Skin Centre  
National Healthcare Group Polyclinics

### Scientific Committee

Chairperson Adj Asst Prof Sathappan S S

Tan Tock Seng Hospital

### Scientific Review Committee

*(In alphabetical order of Institutions)*

#### Members

Mr	Cai Cong Cong	Alexandra Hospital
A/Prof	Cheah Wei Keat	Alexandra Hospital
Dr	Chua Ai Ping	Alexandra Hospital
Dr	Gamaliel Tan	Alexandra Hospital
Dr	Gerald Chua	Alexandra Hospital
A/Prof	Harvinder Raj Singh Sidhu	Alexandra Hospital
Dr	Leow Li Pyn	Alexandra Hospital
Dr	Lim Ling Choo	Alexandra Hospital
Prof	Tey Beng Hea	Alexandra Hospital
Dr	Colin Kwok	Changi General Hospital
Dr	Hsu Pon Poh	Changi General Hospital
Dr	Imran Mohamed Noor	Changi General Hospital
Dr	Regina Lim	Changi General Hospital
Dr	Tan Tiong Yong	Changi General Hospital
Prof	Tay Yong Kwang	Changi General Hospital
Ms	Wendy Ang	Changi General Hospital
Dr	Yuen Heng Wai	Changi General Hospital
Ms	Bhing Leet	Institute of Mental Health
A/Prof	Daniel Fung	Institute of Mental Health
Dr	Jimmy Lee	Institute of Mental Health
Dr	Lim Choon Guan	Institute of Mental Health
Ms	Poh Chee Lien	Institute of Mental Health
A/Prof	Sim Kang	Institute of Mental Health
A/Prof	Verma Swapna	Institute of Mental Health
Dr	Ajeet Madhav Wagle	Khoo Teck Puat Hospital
Ms	Chan Sue Mei	Khoo Teck Puat Hospital
Dr	Christopher Cheok	Khoo Teck Puat Hospital
Dr	Edwin Seet	Khoo Teck Puat Hospital
Ms	Gladys Wong	Khoo Teck Puat Hospital

A/Prof	Kenneth Mak	Khoo Teck Puat Hospital
Dr	Philip Yap	Khoo Teck Puat Hospital
Ms	Sharon Pek	Khoo Teck Puat Hospital
A/Prof	Tavintharan Subramaniam	Khoo Teck Puat Hospital
Dr	Yip Chee Chew	Khoo Teck Puat Hospital
Ms	Charmaine Krishnasamy	National Healthcare Group HQ
Dr	Heng Bee Hoon	National Healthcare Group HQ
Ms	Kanika Batra	National Healthcare Group HQ
Mr	Lim Yong Hao	National Healthcare Group HQ
Ms	Ong Yu Han	National Healthcare Group HQ
Dr	Chong Phui-Nah	National Healthcare Group Polyclinics
Dr	David Ng Wei Liang	National Healthcare Group Polyclinics
Dr	Lee Eng Sing	National Healthcare Group Polyclinics
Dr	Lew Yii Jen	National Healthcare Group Polyclinics
Dr	Meena Sundram	National Healthcare Group Polyclinics
Dr	Tang Wern Ee	National Healthcare Group Polyclinics
Ms	Yan Chau Chain	National Healthcare Group Polyclinics
Ms	Yeo Loo See	National Healthcare Group Polyclinics
Dr	Jai Rao	National Neuroscience Institute
Dr	Kevin Tan	National Neuroscience Institute
A/Prof	Nigel Tan Choon Kiat	National Neuroscience Institute
Prof	Goh Chee Leok	National Skin Centre
A/Prof	Lingam Gopal	National University Hospital
Dr	Falk Mueller-Riemenschneider	National University of Singapore
Dr	Gautam Sethi	National University of Singapore
Dr	Pan An	National University of Singapore
Prof	Sally Chan	National University of Singapore
Dr	Ng Yuk Hui	Singapore General Hospital
Dr	Antonio Bertoletti	Singapore Institute for Clinical Sciences, A*STAR
Dr	Adrian Tan	Tan Tock Seng Hospital
Adj Asst Prof	Angela Chow	Tan Tock Seng Hospital
Adj Asst Prof	Veerendra Chadachan	Tan Tock Seng Hospital
Dr	Chan Lai Gwen	Tan Tock Seng Hospital
Dr	Chan Mei Leng	Tan Tock Seng Hospital
Dr	Chan Peng Chew	Tan Tock Seng Hospital
Ms	Chen Wei Ting	Tan Tock Seng Hospital
Dr	Cheong Seng Kwing	Tan Tock Seng Hospital
Dr	Chia Chung King	Tan Tock Seng Hospital
Dr	Chia Li-Ann Faith	Tan Tock Seng Hospital
Adj Asst Prof	Chong Kian Tai	Tan Tock Seng Hospital
Dr	Colin Tan Siang Hui	Tan Tock Seng Hospital
Dr	Daniel Yeo Poh Shuan	Tan Tock Seng Hospital

Dr	David Lye Chien Boon	Tan Tock Seng Hospital
Mr	Eugene Teoh Yen Tjuin	Tan Tock Seng Hospital
Adj Asst Prof	Habeebul Rahman	Tan Tock Seng Hospital
Dr	Ho Eu Chin	Tan Tock Seng Hospital
Ms	Isabel Ng Hui Ling	Tan Tock Seng Hospital
Ms	Jamie Lim	Tan Tock Seng Hospital
A/Prof	John Abisheganaden	Tan Tock Seng Hospital
Dr	Kenneth Heng	Tan Tock Seng Hospital
A/Prof	Kuperan Ponnudurai	Tan Tock Seng Hospital
Dr	Lee Lay Tin	Tan Tock Seng Hospital
Ms	Lee Leng Noey	Tan Tock Seng Hospital
Mr	Lee Wing Kuen	Tan Tock Seng Hospital
Dr	Lieu Ping Kong	Tan Tock Seng Hospital
A/Prof	Melvin Leow	Tan Tock Seng Hospital
Adj Asst Prof	Lim Wee Shiong	Tan Tock Seng Hospital
Dr	Lim Yen Peng	Tan Tock Seng Hospital
Dr	Ong Kiat Hoe	Tan Tock Seng Hospital
Dr	Ooi Chee Kheong	Tan Tock Seng Hospital
Ms	Pauline Yong	Tan Tock Seng Hospital
Dr	Phua Dong Haur	Tan Tock Seng Hospital
Dr	Rinkoo Dalan	Tan Tock Seng Hospital
A/Prof	Siow Jin Keat	Tan Tock Seng Hospital
Adj Asst Prof	Stephen Lo Dick Chung	Tan Tock Seng Hospital
Dr	Stephen Teoh	Tan Tock Seng Hospital
Ms	Susan Niam	Tan Tock Seng Hospital
A/Prof	Tai Yeng Huoa Dessmon	Tan Tock Seng Hospital
Dr	Tan Cher Heng	Tan Tock Seng Hospital
Dr	Tan Jit Ern Jonathan	Tan Tock Seng Hospital
Dr	Tan Wei Leong Glenn	Tan Tock Seng Hospital
A/Prof	Tay Jam Chin	Tan Tock Seng Hospital
A/Prof	Tham Kum Ying	Tan Tock Seng Hospital
Dr	Wong Teck Yee	Tan Tock Seng Hospital
Adj Asst Prof	Wong Wei Chin	Tan Tock Seng Hospital
Dr	Wong Yu-Lin	Tan Tock Seng Hospital

## What is the Epidemiology of Methicillin-resistant Staphylococcus Aureus in Nursing Homes?

**A CHOW<sup>1</sup>, LL LIEW<sup>1</sup>, I LEONG<sup>1</sup>, B ANG<sup>1</sup>**

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

### Introduction:

Methicillin-resistant Staphylococcus aureus (MRSA) remains a serious threat to healthcare systems worldwide. MRSA epidemiology in Singapore's nursing homes is poorly understood. This study aimed to estimate the MRSA prevalence and determine factors associated with colonisation in residents of a nursing home.

### Methods:

We conducted an analytical cross-sectional study from 4 to 11 March 2013. All residents in the nursing home were screened for MRSA via nasal, axillary, and groin swabs, using chromogenic agar cultures. Medical records were reviewed. Wilcoxon-Mann-Whitney and Chi-square tests were used to compare differences in continuous and categorical variables respectively. To control for confounding, we used a multiple logistic regression model.

### Results:

Of 190 nursing home residents, 12.6% were MRSA-colonised. Age (median 82 years [range 58-104] vs 79.5[48-101],  $P = 0.295$ ) and length of nursing home stay (median 1040 days [range 15-10181] vs 1300.5[31-10841],  $P = 0.218$ ) were similar between MRSA-colonisers and non-colonisers. A total of 16.3% of males were MRSA-colonised compared to 8.7% of females ( $P = 0.114$ ). MRSA colonisation was similar between residents with and without comorbidities (11.9% vs 14.9%,  $P = 0.591$ ). After accounting for age, gender, comorbidity status, and length of stay in the nursing home, receipt of oral antibiotics within 3 months (OR 36.15, 95% CI, 6.61 to 197.61) and recent hospitalisation in an acute hospital within 3 months (OR 3.80, 95% CI, 1.31 to 11.06) were independent factors associated with MRSA colonisation among nursing home residents.

### Discussion & Conclusion:

MRSA prevalence in the nursing home is similar to that in acute hospitals (10% to 15%). Antibiotic use and recent hospitalisation are independent factors associated with MRSA colonisation. Active MRSA surveillance of such residents can prevent MRSA transmission in nursing homes.

## Reducing the Rate of Postoperative Endophthalmitis Over 11 Years—Results of a New Intervention Using Intracameral Antibiotics

**C TAN<sup>1</sup>, F YANG<sup>1</sup>, HK WONG<sup>2</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore*, <sup>2</sup>*National Healthcare Group Eye Institute, Singapore*

### **Introduction:**

Endophthalmitis is a devastating ocular infection which causes significant visual impairment and blindness. This study aims to describe the incidence of postoperative endophthalmitis following cataract surgery in a multi-ethnic Asian population over an 11-year period and evaluate the efficacy of a new antibiotic regime (intracameral injection of cefazolin) on the rates of postoperative endophthalmitis.

### **Methods:**

A review of 50,177 consecutive cases of cataract surgery performed at Tan Tock Seng Hospital over an 11-year period (1999 to 2010) was performed, assessing the risk factors, microbiological cultures, and outcomes of endophthalmitis. Up to June 2006, the standard antibiotics were administered by subconjunctival injection. From July 2006, intracameral injection of 0.1 mL cefazolin (1 mg/mL) was used. Risk factors for endophthalmitis were assessed using multiple logistic regression.

### **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 6-fold decrease in the rate of postoperative endophthalmitis to 9.7 per 100,000, with only 2 cases of endophthalmitis out of 29,520 surgeries performed. Intracameral antibiotics significantly reduced the rate of endophthalmitis (multivariate odds ratio [OR] 13.6,  $P < 0.001$ ). Other significant risk factors were male gender (OR 2.51,  $P = 0.025$ ) and age (OR 1.05,  $P = 0.025$ ). The left eye infection rate was twice that of the right (71.4% vs. 28.6%, OR 2.96,  $P = 0.055$ ).

### **Discussion & Conclusion:**

The use of intracameral antibiotics has reduced the rate of postoperative endophthalmitis 6-fold and demonstrated reliable results over 4 years. Intracameral antibiotic use, age and male gender were independent risk factors.



## **Corpus Callosum Morphology in First Episode and Chronic Schizophrenia: A Combined MRI and DTI Study**

**GC T TAN<sup>1</sup>, SL COLLINSON<sup>2</sup>, SC GAN<sup>3</sup>, C KUSWANTO<sup>4</sup>, MY SUM<sup>4</sup>, GL YANG<sup>5</sup>, WL NOWINSKI<sup>5</sup>**

<sup>1</sup>National Healthcare Group HQ, Singapore, <sup>2</sup>National Neuroscience Institute, Singapore,

<sup>3</sup>National University of Singapore, Singapore, <sup>4</sup>Institute of Mental Health, Singapore,

<sup>5</sup>Singapore Bioimaging Consortium, A\*STAR, Singapore

### **Introduction:**

The corpus callosum (CC) forms the highway for communication between the cerebral hemispheres and has been established to be reduced in schizophrenia. While deficits in connectivity are clearly central in schizophrenia, their relationship to pathology, whether developmental or reflective of disease progression, remains controversial. We hypothesised that if abnormal interhemispheric connectivity in schizophrenia is developmental, corpus callosal reduction would be apparent in first episode psychosis. On the other hand if they reflect progression, reduction would be primarily evident in chronic schizophrenics.

### **Methods:**

To examine this, we used magnetic resonance and diffusion tensor imaging to compare CC volume, mid-sagittal area and fractional anisotropy in 52 patients with chronic schizophrenia, 68 first episode psychosis and 75 healthy age-and-sex-matched controls. ANCOVAs were performed to compare each dependent variable across 5 regions and the whole CC by group correcting for age, sex, education and intracranial volume.

### **Results:**

In volume and mid-sagittal area, chronic schizophrenics had significantly smaller mid-anterior, central, mid-posterior and whole CC than healthy controls, while first episode psychotics CCs were not significantly smaller in any measured variable. There was a trend in correlation of duration of untreated illness with central CC volume. No associations were observed in fractional anisotropy, suggesting intact integrity and myelination of existing tracts.

### **Discussion & Conclusion:**

This study suggests that interhemispheric connectivity deficits from mid-anterior to mid-posterior CC reflect ongoing disease perhaps from recurrent episodes or latent processes. These regions are consonant with temporal lobe deficits seen in schizophrenia and may help explain the pattern of cortical atrophy and neurocognitive deficits in schizophrenics.

## Differences in Late Cardiovascular Mortality Following Acute Myocardial Infarction Among Three Major Asian Ethnicities

**L CARVALHO<sup>1</sup>, MR ARTHUR<sup>1</sup>, M CHAN<sup>1</sup>, T CHUA<sup>2</sup>, F GAO<sup>2</sup>, QF CHEN<sup>2</sup>, D FOO<sup>3</sup>, LL SIM<sup>2</sup>, G LEONG<sup>4</sup>, KY CHOW<sup>5</sup>**

<sup>1</sup>National University Hospital, Singapore, <sup>2</sup>National Heart Centre Singapore, Singapore, <sup>3</sup>Tan Tock Seng Hospital, Singapore, <sup>4</sup>Changi General Hospital, Singapore, <sup>5</sup>Health Promotion Board, Singapore

### Introduction:

Acute myocardial infarction (AMI) is recognised as a major cause of mortality in Asian countries. Few studies have reported on disparities in long-term AMI outcomes among Asian ethnic groups.

### Methods:

We studied 15,151 patients hospitalised for AMI with a median follow-up of 7.3 years (maximum 12 years) in 6 publicly-funded hospitals in Singapore from 2000 to 2005. Overall and cause-specific cardiovascular (CV) mortality until 2012 were compared among 3 major ethnic groups that represent large parts of Asia: Chinese, Malay and Indian. Relative survival of all 3 ethnic groups was compared with a contemporaneous background reference population using the relative survival ratio (RSR) method.

### Results:

The median global registry of acute coronary events score was highest among Chinese, followed by Malay and Indians: 144 (25th percentile 119, 75th percentile 173), 138 (115,167), and 131 (109, 160), respectively,  $P < 0.0001$ ; similarly, in-hospital mortality was highest among Chinese (9.8%) followed by Malay (7.6%) and Indian (6.4%) patients. In contrast, 12-year overall and cause-specific CV mortality was highest among Malay (46.2 and 32.0%) followed by Chinese (43.0 and 27.0%) and Indian (35.9 and 25.2%) patients,  $P < 0.0001$ . The 5-year RSR was lowest among Malay (RSR 0.69) followed by Chinese (RSR 0.73) and Indian (RSR 0.79), compared with a background reference population (RSR 1.00).

### Discussion & Conclusion:

Although Chinese had the highest baseline AMI risk and in-hospital mortality, Malay had the highest late CV among all ethnic groups in spite of non-measured confounders as long-term therapeutic differences or medical compliance. Despite having the highest prevalence of diabetes, Indian had a lower late cardiovascular mortality than Malay.

## **Toll-like Receptor 3 (TLR3) Stimulation of Cetuximab Activated NK Cells Induces Dendritic Cross Priming of Epidermal Growth Factor Receptor (EGFR)-Specific CD8+ T Cells**

**CM LIM<sup>1</sup>, S RYAN<sup>2</sup>, RL FERRIS<sup>2</sup>, AM SALAZAR<sup>3</sup>**

<sup>1</sup>*National University Hospital, Singapore,* <sup>2</sup>*University of Pittsburgh Medical Center, United States,* <sup>3</sup>*Oncovir Inc Washington, United States*

### **Introduction:**

The immunostimulatory effect of toll-like receptor 3 (TLR3) agonist in monoclonal antibody based therapy has not been evaluated. We aim to determine the effect on cetuximab-mediated antibody dependent cytotoxicity (ADCC) against head and neck cancer (HNC) cells using TLR3-stimulated human PBMC and on inducing dendritic cell (DC) maturation and cross priming of epidermal growth factor receptor (EGFR)-specific CD8+ T cells.

### **Methods:**

Cytotoxic activity of PBMC or isolated NK cells expressing polymorphic Fcγ RIIIa (codon 158) was determined using PBMC incubated with TLR3 agonist poly-ICLC. Enhancement of cetuximab-activated NK cell induced DC maturation was assessed in the presence of poly-ICLC using flow cytometry. DC cross priming of EGFR-specific CD8+ T cells was measured after in-vitro stimulation and tetramer based flow cytometry.

### **Results:**

TLR3 stimulation enhanced ADCC by NK cells expressing Fcγ RIIIa F/F-158 genotype ( $P = 0.008$ ), VF ( $P < 0.0001$ ) and VV ( $P = 0.08$ ), with significant difference between genotypes ( $P = 0.006$ ). TLR3 stimulated PBMC from HNC patients also mediated higher cetuximab-mediated ADCC ( $P = 0.0028$ ), and cytotoxicity was abrogated by NK cell depletion. Poly-ICLC plus cetuximab induced greater DC upregulation of CD80, CD83 and CD86 compared to poly-ICLC or cetuximab alone ( $P = 0.001$ ;  $P = 0.0017$ ;  $P = 0.002$ ). Furthermore, improved cross-priming by these matured DCs was evident using both poly-ICLC and cetuximab in combination resulting in enhanced EGFR-specific CD8+ T cells ( $P < 0.0001$ ).

### **Discussion & Conclusion:**

TLR3 signaling via poly-ICLC exerts a direct immune activation on NK cells, resulting in enhancement of cetuximab-mediated ADCC. Induction of adaptive immune anti-tumor responses were seen using poly-ICLC enhanced DC maturation and cross priming of EGFR-specific CD8+ T cells.

## Exploring Relationship of Retinal Thickness on Optical Coherence Tomography and Visual Acuity in Patients with Diabetic Macular Edema

**K X CHEONG<sup>1</sup>, FP YANG<sup>2</sup>, CS TAN<sup>2</sup>**

<sup>1</sup>*Tock Seng Hospital, Singapore,* <sup>2</sup>*National Healthcare Group Eye Institute, Singapore*

### Introduction:

This study aims to determine the relationship between optical coherence tomography (OCT) measurements of macular thickness and visual acuity (VA) in patients with diabetic macular edema.

### Methods:

This is a review of 46 consecutive eyes with newly diagnosed macular edema that underwent laser photocoagulation. The OCT readings of central macular thickness (CMT) and mean inner subfield thickness (MIST) at the point of diagnosis and after the first laser treatment were correlated with the VA on the same day. The absolute change and relative change in CMT were compared to the change in VA at diagnosis and after laser photocoagulation. Absolute change in CMT was defined as the difference in thickness between the 2 measurements. Relative change in CMT is the absolute change in thickness as a percentage of the baseline thickening.

### Results:

The mean age of the 42 patients was 61.5 years, (range, 47 to 88, SD 9.123). Visual acuity correlated with CMT (correlation coefficient 0.322,  $P = 0.004$ ), but its correlation with MIST was of borderline significance (correlation coefficient 0.221,  $P = 0.050$ ). Change in VA also correlated with the absolute change in macular thickness (correlation coefficient 0.416,  $P = 0.016$ ) and relative change in thickness (correlation coefficient 0.398,  $P = 0.022$ ).

### Discussion & Conclusion:

Visual acuity correlates significantly with magnitude of CMT change in patients with diabetic macular edema. The absolute and relative change in CMT between baseline and the first laser photocoagulation has a stronger correlation with VA compared to CMT taken at a single time point.

## Medication Reconciliation in Outpatient Hospital Clinics

**ST HENG<sup>1</sup>, JC LEE<sup>1</sup>**

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

### Introduction:

The primary objective was to examine the extent of discrepancies between doctor's orders and pharmacist's medication reconciliation (MR) list. A secondary objective was to analyse the type and number of interventions made by pharmacists.

### Methods:

A prospective study was done at endocrine outpatient clinics in Tan Tock Seng Hospital. Forty patients were recruited, assigned numbers and randomised into 2 study arms. One group of 20 patients had MR done before consultation, and the MR list was passed to the doctor. Another group of 20 patients had MR done before consultation, but the MR list was not passed to the doctor. Randomisation was done by using a computer-generated random number table to pre-assign numbers into the two arms. Both the doctors' casenotes and pharmacists' MR documents were analysed for the study.

### Results:

A total of 15 discrepancies were detected from all the MR lists, 12 of which were from the arm without MR passed to the doctors, and 3 from the arm with MR list passed. The most commonly reported discrepancy is incomplete doctor record (8), followed by dosing mismatch (2). A total of 4 interventions were detected as well; 3 interventions were from the arm without MR list passed, and 1 intervention from the arm with MR list passed to doctors.

### Discussion & Conclusion:

This study showed that medication list discrepancies are significant between pharmacists and doctors. Pharmacists also demonstrated the value of their services by reinforcing medication safety in both prescription and non-prescription drugs. Further research with a larger sample size is warranted.

## Utilising Discharge Planning Tools in an Inpatient Psychiatric Rehabilitation Services to Promote Positive Clinical Outcomes

**MD SAIFUDIN<sup>1</sup>, PW EU<sup>1</sup>, M HENDRICKS<sup>1</sup>**

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

### **Introduction:**

Persons with psychiatric conditions may experience difficulties in adjusting to community living upon their discharge because of the debilitating effects of the disease on their mental faculties. However utilising discharge planning tools on a rehabilitation unit, can promote patients reintegration into community living, thus reducing their chances of readmissions. This paper demonstrates the effects.

### **Methods:**

Data mining of patients on an inpatient rehabilitation program in a tertiary hospital was conducted from January 2011 to December 2011. The discharge planning tools administered by a multidisciplinary (MDT) team included a psychosocial rehabilitation core module training program, an evidenced based clinical pathway, a MDT care plan, family sessions and post discharge telephonic support by the case manager. Results of the data mining were analysed using the Microsoft Excel programme.

### **Results:**

A total of 109 patients completed the 8 week inpatient rehabilitation program. Ninety-five percent suffered from Schizophrenia and 58% were aged from 30 years old to 40 years old. Sixty percent were male. Eighty-one percent were monitored under level 2 and 19% were level 3. A total of 708 phone calls were made and 698 psycho-education and 415 counseling sessions were delivered. Sixty-six percent was discharged home. At 1 year follow-up post discharge, we observed a total of 1455 appointment visits scheduled, with 94% coming for their appointment and a 74% reduction in numbers of admission.

### **Discussion & Conclusion:**

Comprehensive rehabilitation and discharge planning is essential to promote patient's reintegration into community living. The results of the survey support the positive aspects of this strategy.

## **Seven-point Subjective Global Assessment is More Time Sensitive than Conventional Subjective Global Assessment in Detecting Nutritional Changes**

**SL LIM<sup>1</sup>, XH LIN<sup>1</sup>, L DANIELS<sup>2</sup>**

<sup>1</sup>*National University Hospital, Singapore,* <sup>2</sup>*Queensland University of Technology, Australia*

### **Introduction:**

It is important for nutritional intervention in malnourished patients to be guided by accurate detection of small changes in the patient's nutritional status over time. However, the current Subjective Global Assessment (SGA) is not able to detect changes in a short period of time. The aim of the study was to determine whether 7-point SGA is more time sensitive to nutritional changes than the conventional SGA.

### **Methods:**

Sixty-seven adult inpatients assessed as malnourished using 7-point SGA and conventional SGA were recruited. Each patient received nutrition intervention and was followed up by dietitians post-discharge. Patients were reassessed prospectively using both tools at 1, 3 and 5 months from the baseline assessments. Pearson's chi-square and Wilcoxon Signed Ranks tests were performed to determine the likelihood of detecting a change and the time taken to see a minimum one-point change, respectively.

### **Results:**

It took significantly shorter time to see a one-point change using 7-point SGA compared to conventional SGA (median: 1 month vs. 3 months,  $P = 0.002$ ). A change over a 5-month period was 6 times more likely to be seen using 7-point SGA compared to conventional SGA (Odds Ratio: 6.23, 95% CI, 2.73 to 14.2). A total of 72% of the patients who had no change in SGA rating had changes detected using the 7-point SGA. The level of agreement between 2 blinded assessors for 7-point SGA was 83% ( $k = 0.726$ ,  $P < 0.001$ ).

### **Discussion & Conclusion:**

The 7-point SGA is more time sensitive in its response to nutritional changes than the conventional SGA. It can be used to guide the nutritional intervention of patients.

## Optimising Peripheral Intravenous Cannula Use—Can Clinically-Indicated Replacement Be a Reality?

**ING<sup>1</sup>, YHG TAN<sup>1</sup>, SWL TAI<sup>1</sup>**

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

### Introduction:

Current guidelines recommend routine change of peripheral cannula every 72 to 96 hours to prevent phlebitis. Systematic reviews and equivalence study published in 2010 to 2013 recommended re-siting cannulas only when clinically indicated. Our study aims to describe cannula lifespan in practice to assess the feasibility of implementing clinically-indicated replacement.

### Methods:

The study involved a systematic sampling of 100 general adult patients requiring peripheral infusion therapy. For 2 weeks, the device duration and reasons for removal were collected on all cannulas consecutively inserted in April 2013. Research nurses inspected the insertion sites daily for infusion-related complications. Patient demography and infusates administered were extracted from electronic records. The primary outcome was the mean cannula duration in days where appropriate and reasons for removal. Factors contributing to infusion-related complications were modeled using random effects model in STATA v11.0.

### Results:

The study examined 282 cannulas in 71 medical and 29 surgical patients. The median age was 71 years. Nearly 70% of cannulas were inserted by nurses with 37 known cannulas (13.4%) kept in-situ beyond 3rd day. The median lifespan was 2.0 days with 70.6% of infusion-related complications occurred before the 3rd in-situ-day. A small number of cannulas (n = 44, 15.6%) were found not required after 1 to 2 days of insertion. No pre-identified factors, including infusate types, were found associated with infusion-related complications.

### Discussion & Conclusion:

The findings suggested cannula use was not optimal. The risk of developing infusion-related complications, however, did not increase with longer indwelling time. Implementing clinically-indicated replacement is feasible, requiring nurses to be competent and vigilant in cannula care.



## Singapore Hospice Nurses Perspectives About Spirituality and Spiritual Care

**LH TIEW<sup>1</sup>, MF CHAN<sup>2</sup>, JH KWEE<sup>3</sup>**

<sup>1</sup>*National University of Singapore, Singapore,* <sup>2</sup>*National University of Singapore, Singapore,*

<sup>3</sup>*Tan Tock Seng Hospital, Singapore*

### **Introduction:**

Spiritual care is integral to providing quality end-of-life (EOL) care. However, patients often report that this aspect of care is lacking. Previous studies suggest that nurses' neglect of spiritual care could be attributed to poor understanding of what spirituality is and what such care entails. This study aimed to explore Singapore's hospice nurses' perspectives about spirituality and spiritual care.

### **Methods:**

Nurses in 8 hospices were recruited via convenience sampling. The survey comprised 2 parts: the Participant Demographic Details and Spirituality Care Giving Scale (SCGS). This 35-item validated instrument measures participants' perspectives about spirituality and spiritual care.

### **Results:**

Sixty-six nurses participated (response rate of 65%). Overall, participants agreed with items in the Spiritual Care Giving Scale related to Attributes of Spiritual Care; Spiritual Perspectives; Spiritual Care Attitudes and Spiritual Care Values. Results from General Linear Model analysis showed statistically significant main effects between race, spiritual affiliation, and type of hospice setting, with the total SCGS score and 4 factor scores.

### **Discussion & Conclusion:**

Spirituality was perceived as universal, holistic and existential in nature. Spiritual care was viewed as relational, and centred on respecting patients' differing faiths and beliefs. Participants highly regarded the importance of spiritual care in caring of patients at EOL. Factors that significantly affected participants' perspectives of spirituality and spiritual care included race, spiritual affiliation and hospice type. Study can clarify misperceptions and emphasise values and importance of spirituality and care concepts in EOL care. Thus, spirituality and care issues can be incorporated in multi-disciplinary team discussions.

## **Patients with Dysphagia: Encounters in Taking Medication**

**S RAJARAM<sup>1</sup>, A CHUA<sup>1</sup>, E CHEAH<sup>1</sup>**

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

### **Introduction:**

This study is an account in discovering the encounters of older people with dysphagia taking their medication. Dysphagia is a common problem notably among the elderly and it affects the digestion of food, fluids and medication. With the number of older people increasing, dysphagia has become a major problem in terms of medication administration and therapy.

### **Methods:**

This is a descriptive qualitative study which examined the experiences that participants with dysphagia had when taking medication. In 2011, we carried out interviews with 11 patients in a restructured hospital in Singapore. These patients had different grades of dysphagia. The interview records were analysed using the Colaizzi technique.

### **Results:**

Six inter-related themes were distinguished from the data. They are (i) the wide variety and spectrum of dysphagia, (ii) medication formulation, (iii) information discussion between patients and health care professionals, (iv) circumstances affecting medication observance, (v) approaches used to enhance swallowing (vi) the fundamental purpose of swallowing as eating and drinking. The 6 themes indicated that patients do not inform health care providers that they have problems taking their medication.

### **Discussion & Conclusion:**

It is essential to ensure that each patient has an individualised medication program and for patients with dysphagia formulation of the medicine is as significant as the active ingredients. Further research is needed to identify how health care professionals can ensure that patients with dysphagia receive their medicines in a form that they can take safely.

## Enhanced Infarct Stabilisation and Cardiac Repair with an Injectable PEGylated-Fibrinogen Hydrogel Carrying Vascular Endothelial Growth Factor (VEGF)

**R ABDUL JALIL<sup>1</sup>, M PLOTKIN<sup>1</sup>, SR VAIBAVI<sup>1</sup>, T KOFIDIS<sup>1</sup>, J WANG<sup>1</sup>, J SHEN<sup>1</sup>, D SELIKTAR<sup>2</sup>**

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>Israel Institute of Technology, Israel

### Introduction:

Angiogenic therapy is a promising approach for repair and regeneration of ischemic tissues. Vascular endothelial growth factor (VEGF) has been widely used to improve vascularisation. However, direct bolus VEGF delivery has limited therapeutic potential due to lack of sustainable release. In this study, we utilised a biosynthetic scaffold comprising of fibrinogen backbone cross-linked with polyethylene glycol (PEG) as a delivery matrix for VEGF and explored its potential in cardiac repair.

### Methods:

PEG-fibrinogen (PF) hydrogels were synthesised and VEGF was incorporated. Kinetics of VEGF release was studied. Acute myocardial infarction was generated in rodent models and they were randomly assigned to; sham, saline, PF and PF-VEGF groups (n=10 each group). 150µl of either saline or hydrogel was injected in infarct and peri-infarct areas. The animals were monitored for 4 weeks and myocardial function was assessed using echocardiography. Histological and  $\alpha$ -smooth muscle actin staining were performed to assess degree of fibrotic scar and arteriogenesis.

### Results:

PF-VEGF hydrogels showed sustained slow release over 30 days. Highest degree of cardiac muscle preservation was observed in PF-VEGF-treated animals. They showed the best improvement in ejection fraction (PF-VEGF =  $74.68\% \pm 4.23$ , PF =  $64.15\% \pm 2.64$ , saline =  $41.86\% \pm 7.32$ ), left ventricular internal dimensions, end-systolic and end-diastolic volumes. Higher degree of arteriogenesis in infarct and peri-infarct areas were seen in animals treated with PF-VEGF hydrogels.

### Discussion & Conclusion:

This study demonstrated that PF hydrogel is an efficient matrix for VEGF delivery in restoring the ischemic myocardium. In addition to providing mechanical support, PF-VEGF provided sustained and controlled release of VEGF in the ischaemic tissue resulting in improved neovascularisation and cardiac function.

## Identification of Tumour Suppressive MicroRNAs in Multiple Myeloma by Pharmacologic Unmasking

CL BI<sup>1</sup>, WJ CHNG<sup>2</sup>, JL YAN<sup>2</sup>, GF HUANG<sup>2</sup>, TH CHUNG<sup>2</sup>, JB ZHOU<sup>2</sup>

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>Cancer Science Institute of Singapore, Singapore

### Introduction:

Deregulation of microRNAs (miRNAs) has been associated with pathogenesis and prognosis of multiple myeloma (MM). Although several causes may lead to miRNA deregulation, epigenetic alterations such as aberrant DNA methylation and/or histone modifications, have emerged as the main culprit. A few tumour suppressor miRNAs silenced by methylation have been reported, but to date there is no systematic investigation on epigenetically silenced miRNAs in MM.

### Methods:

We conducted genome-wide screening for miRNAs induced by demethylating agent 5-azacytidine (5'aza), global histone methylation inhibitor DZNep and histone deacetylase inhibitor SAHA respectively in MM cells, followed by functional screening on consistently upregulated miRNAs for tumour suppressors.

### Results:

Among the 1205 human miRNAs profiled, 32 were consistently upregulated by 5'aza. These miRNAs were closely associated with CpG islands and include 6 miRNAs under-expressed in MM patients, 4 miRNAs upregulated by all 3 compounds, as well as 3 miRNAs with known anti-tumour functions in other cancers. Among the predicted mRNA targets of these 13 miRNAs, 305 were upregulated in MM patients (UAMS dataset, GSE2658) and contained a 46-gene signature that was associated with patient survival. Ectopic restoration of these miRNAs significantly repressed MM cell proliferation, colony formation and migration.

### Discussion & Conclusion:

In summary, we have revealed important, epigenetically silenced tumour suppressor miRNAs by pharmacologic reversal of epigenetic silencing. These miRNAs are of functional relevance and affect genes that are associated with survival in myeloma.

## Use of a Novel Stereographic Projection Software to Calculate Precise Area of Peripheral Non-Perfusion and its Correlation with Manual Grading

**C TAN<sup>1</sup>, S SADD<sup>2</sup>, M CHEW<sup>3</sup>, JV HEMERT<sup>4</sup>, D BELL<sup>5</sup>, M SINGER<sup>5</sup>**

<sup>1</sup>Tan Tock Seng Hospital, Singapore, <sup>2</sup>Doheny Eye Institute, United States, <sup>3</sup>National Healthcare Group Eye Institute, Singapore, <sup>4</sup>Optos, United Kingdom, <sup>5</sup>Medical Center Ophthalmology Associates, United States

### Introduction:

Identification of peripheral retinal non-perfusion using ultra-widefield (UWF) imaging systems is important in the management of eyes with retinal vascular disorders. Non-linear distortion at the periphery UWF images prevents accurate quantification of lesion areas. Recent advances in software now permit anatomically correct areas of non-perfusion to be calculated. This study aimed to compare the calculated, anatomically correct, areas of non-perfusion seen on ultra-widefield (UWF) fluorescein angiography (FA) with manual grading in retinal vein occlusion.

### Methods:

Sixty-four patients with retinal vein occlusion underwent standardised UWF fluorescein angiography (FA). Uncorrected raw images were sent to an image reading center and graded manually by masked investigators for capillary non-perfusion. Using validated planimetric grading software, non-perfusion was outlined and calculated as a percentage of the total visible retina (ischemic index). The annotated images were converted using a novel “stereographic projection” method to calculate precise areas of non-perfusion, which was compared with the ischemic index.

### Results:

The precise areas of peripheral non-perfusion ranged from 0 mm<sup>2</sup> to 365.4 mm<sup>2</sup> (mean 95.1 mm<sup>2</sup>). The corrected non-perfusion percentage ranged from 0% to 52.9% (mean 13.5%) while the uncorrected ischemic index ranged from 0% to 67.7%, with a mean of 14.8%. Both the corrected area of non-perfusion and the corrected percent non-perfusion correlated with the uncorrected ischemic index ( $R = 0.978$ ,  $P < 0.001$ ), but the difference in non-perfusion percentage between corrected and uncorrected metrics was as high as 14.8%.

### Discussion & Conclusion:

Software advances now allow for correction and calculation of lesion areas in correct physical units which correlate well with manual grading by image reading centers.

## **A Protocol to Reduce Inter-Reviewer Variability in Computed Tomography Measurement of Orbital Floor Fractures**

**CH ANG<sup>1</sup>, E CAI<sup>2</sup>, JR LOW<sup>2</sup>, JY SHEN<sup>2</sup>, E HING<sup>2</sup>, G SUNDAR<sup>2</sup>, YH CHAN<sup>3</sup>**

<sup>1</sup>*National University Hospital, Singapore,* <sup>2</sup>*National University Health System, Singapore,*

<sup>3</sup>*National University of Singapore, Singapore*

### **Introduction:**

Orbital defect detection and size determination from computed tomography (CT) scans affect the decision to operate, the type of surgical implant used, and postoperative outcomes. However, the lack of standardisation of radiological signs often leads to false positive detection of orbital fractures, while non-standardised landmarks lead to inaccurate defect measurements. Hence, there is a need to design a protocol to overcome these problems.

### **Methods:**

A novel standardised protocol for CT measurement of orbital floor fractures was designed to reduce inter-reviewer variability. We evaluated its efficacy by testing the accuracy of orbital fracture measurements obtained through CT images. Five independent reviewers without clinical experience in orbital fracture measurements measured the orbital floor fractures of 3 consecutive patients following the protocol. The mean fracture widths and depths of the 3 patients, together with the 95% confidence intervals, were computed based on the 5 reviewers' measurements.

### **Results:**

The means of orbital floor fracture width measured by the 5 reviewers on coronal views of CT scans were 27.67( $\pm 0.38$ ) mm, 27.02( $\pm 0.35$ ) mm and 25.02( $\pm 1.08$ ) mm for patients A, B, and C respectively. The means of orbital floor fracture depth measured on sagittal views were 27.12( $\pm 1.31$ ) mm, 37.24( $\pm 1.13$ ) mm and 36.32( $\pm 0.94$ ) mm for patients A, B, and C respectively. For measurements performed with this novel protocol; inter-observer variability was minimal (similar to margin of error in mesh trimming  $\sim 1$ mm).

### **Discussion & Conclusion:**

Our novel protocol in CT measurements of orbital fractures has resulted in an improvement in the accuracy of orbital fracture measurements, as well as the overall sensitivity of orbital fracture detection by the novice readers.

## Impact of Genome Wide Supported Psychosis Susceptibility NRGN Gene on Thalamocortical Morphology in Schizophrenia

**MY SUM<sup>1</sup>, CN KUSWANTO<sup>1</sup>, K SIM<sup>1</sup>, YJ THONG<sup>2</sup>, TA TUAN<sup>2</sup>, A QIU<sup>2</sup>**

*<sup>1</sup>Institute of Mental Health, Singapore, <sup>2</sup>National University of Singapore, Singapore*

### Introduction:

Recent meta-analytic data have highlighted that genetic risk for schizophrenia is better indexed by brain structure and function. Although genome wide supported psychosis susceptibility neurogranin (NRGN) gene is expressed in human brains, it is unclear how it impacts on neural substrates such as cortical thickness and subcortical brain structures in schizophrenia. This study investigated the influence of NRGN rs12807809 on cortical thickness, volumes, and shapes of subcortical brain structures in patients with schizophrenia. We hypothesised that patients with risk TT genotype were associated with cortical thinning involving frontal, temporal regions as well as subcortical structural abnormalities, implicating the thalamus and hippocampus.

### Methods:

One hundred and fifty-six subjects (91 patients with schizophrenia and 65 healthy controls) underwent structural MRI and were genotyped using their blood samples. Cortical thickness, subcortical volume, shape and their genetic associations with NRGN in schizophrenia were measured.

### Results:

Patients with risk TT genotype were associated with widespread cortical thinning involving frontal, parietal and temporal cortices compared with healthy controls (all  $P < 0.001$ ). No volumetric difference in subcortical structures (hippocampus, thalamus, amygdala, basal ganglia) was observed between risk TT genotype in patients with schizophrenia and controls. Schizophrenia patients with risk TT genotype were associated with thalamic shape abnormalities involving regions involving pulvinar and medial dorsal nuclei ( $P < 0.001$ ).

### Discussion & Conclusion:

Our results reveal the influence of the genome wide supported psychosis vulnerability NRGN gene on thalamocortical morphology in schizophrenia involving widespread cortical thinning and thalamic shape abnormalities. These findings help to clarify underlying NRGN mediated pathophysiological mechanisms involving cortical-subcortical brain networks in schizophrenia

## Improved Outcome of Myeloma Patients in a Tertiary Hospital: An Analysis of Outcomes

**JY GOH<sup>1</sup>, A LIN<sup>2</sup>, WJ CHNG<sup>2</sup>, PL LUI<sup>2</sup>, G LOO<sup>2</sup>**

<sup>1</sup>*National University Hospital, Singapore,* <sup>2</sup>*National University of Singapore, Singapore*

### Introduction:

Multiple myeloma (MM) is the second most common haematologic malignancy in the world. There have been significant therapeutic advancements in MM in recent years. This study sought to assess the impact of treatment and other factors on overall survival in a cohort of Singaporean MM patients.

### Methods:

We conducted a retrospective review of patients with newly diagnosed myeloma from year 2000 to 2012. A number of clinical parameters including genetics and staging were assessed. Continuous and categorical variables were compared using the student's t-test and chi-square test respectively. Survival is assessed using the Kaplan-Meier method and compared using the log-rank test. *P* value of <0.05 is considered significant.

### Results:

The median overall survival of the cohort (*n* = 187) is 64 months. The clinical features and genetic profile of our patients are similar to those reported in other countries. A non-hyperdiploid karyotype, response that is less than very good partial response (VGPR), elevated lactate dehydrogenase (LDH) or not undergoing stem cell transplantation are factors significantly associated with poorer outcome. Furthermore, the use of novel agents such as thalidomide and velcade mainly benefit patients with stage 2 and 3 disease but not those with stage 1. Achieving a VGPR is important for better survival in patients who do not undergo a transplant. Patients with higher stage disease will need deeper response for better outcome.

### Discussion & Conclusion:

Our study identified factors that will help rationalise the use of expensive novel agents in myeloma and the depth of response that is needed for the best outcome in different groups of patients.



## **Femoral Neck Fractures—Factors Affecting Ambulatory Status in Elderly Patients More Than 65 years old Who Underwent Hip Hemiarthroplasty**

**J ZHANG<sup>1</sup>, E KWEK<sup>1</sup>, M ANG<sup>1</sup>**

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

### **Introduction:**

The aim of femoral neck fracture treatment is to restore pre-fall ambulatory status. There exists inconclusive evidence for rehabilitation protocol. Our study aims to elucidate the factors that affect ambulation and evaluate if a prolonged rehabilitation facility stay is detrimental to outcomes.

### **Methods:**

Consecutive patients, >65 years old, within Tan Tock Seng Hospital, Orthopedic Department, from January to December 2010, who have undergone hip bipolar hemiarthroplasty were enrolled. Exclusion criteria include mortality, pathological fracture, non-ambulant pre-morbid, cognitive impairment and concurrent fractures. Variables including fulltime caregiver, length of stay in rehabilitation facility and discharge destinations were evaluated against Modified Harris Hip Score (MHHS), Parker Mobility Score (PMS), and return to near pre-morbid ambulatory status at 1 year.

### **Results:**

One hundred and thirty-four patients were recruited, 110 females and 24 males and follow-up for all participants was 1 year. A longer length of stay in rehabilitative facility was associated with poorer ambulatory scores at all time intervals measured. Categorical evaluation between those who stayed <3 weeks and those who stayed longer showed the odds of returning to near pre-morbid PMS is increased in the <3weeks group. Longer use of strong analgesia increased odds and discharge to inpatient rehabilitation instead of own home decreased odds of returning to near pre-morbid ambulatory status.

### **Discussion & Conclusion:**

Patients similar to our study population would benefit most from a discharge home after intensive in-patient physiotherapy or a short duration of rehabilitation at sub-acute facility of 3 weeks. Preemptive treatment of pain postoperatively will support early mobilisation to give better ambulatory outcomes.

## Exploratory Factor Analysis of the Zarit Burden Interview in a Multi-Ethnic Asian Community Sample

**R SAMBASIVAM<sup>1</sup>, EB ABDIN<sup>1</sup>, M SUBRAMANIAM<sup>1</sup>, JA VAINGANKAR<sup>1</sup>, SA CHONG<sup>1</sup>**

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

### Introduction:

The measurement of caregiver burden has become increasingly important in the current ageing population. The Zarit Burden Interview (ZBI) is quick and easy to administer, and has been the most widely used instrument to measure burden in disease-specific samples. This study aims to explore the structure of the ZBI for informal caregivers of community-dwelling elderly in a multiethnic population.

### Methods:

The 22-item ZBI was used to measure caregiver burden among 302 informal caregivers of elderly persons aged 60 and above and whom the caregivers have stated could not be left on their own for more than 3 days. Socio-demographic data was collected to determine the caregivers' characteristics. The data was analysed by principal component analysis (PCA) with varimax rotation.

### Results:

The mean age of the caregivers was 53.5 (SD = 13.7) years. The caregivers were mainly males (68.2%), married (65.2%) and had children (67.4%). Five factors were identified to be associated with taking care of these elderly that most affect the carers. These are social and psychological impact on self, antipathy (emotional reactions), demands of care (caregivers' incapacity to fulfill demands), stigma and social embarrassment, and feelings of guilt (worry about inadequate care). These factors accounted for 60% of total variance.

### Discussion & Conclusion:

Findings from this study are important as it enables the identification of specific aspects of burden and, with the aging population it is vital to cater to caregivers of elderly in the general population. Further studies should be done with disease-specific samples to establish if the 5 factor structure can be replicated.

## How Well Do Consumers Understand Healthcare Financing?—A Community-Based Survey of Residents in a Public Housing Estate in Singapore

S LAU<sup>1</sup>, YZ LEE<sup>1</sup>, KJ TAY<sup>1</sup>, CS TAN<sup>1</sup>, NP FONG<sup>1</sup>

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

### Introduction:

MediSave and MediShield are co-payment and co-insurance schemes in Singapore which necessitate sufficient consumer knowledge to utilise efficiently. However, no local studies have been done to assess the level of healthcare financing knowledge. Studies based in the United States have shown that consumers had varying levels of knowledge of insurance schemes—from “knowing coverage but not benefits” to having “low levels of knowledge about benefits, coverage, enrolment and plan choice”. Therefore, this study represents the first rigorous door-to-door survey which comprehensively investigates the level of healthcare financing knowledge, as well as its associated factors in a public housing estate.

### Methods:

Interviewer-assisted questionnaires were conducted among Singaporeans and Permanent Residents aged 21 and above living in Geylang Serai public flats. The questionnaire was crafted based on literature review and refined through 2 pilot studies. Households were randomly selected after stratification by flat type. One participant per household was randomly selected. MediSave and MediShield knowledge scores were computed and associated factors were identified.

### Results:

Seven hundred and thirty-nine questionnaires were completed, yielding a response rate of 62.6%. Knowledge was poor—36.8% and 81.3% lacked basic MediSave and MediShield knowledge respectively. Six variables were significantly associated ( $P < 0.05$ ) with the combined MediSave and MediShield knowledge score: knowledge of where to find information, education level, housing type, computer literacy, financial role, and previous usage of a personal MediSave account.

### Discussion & Conclusion:

Healthcare financing knowledge was poor, and factors aiding targeted education were identified. We hope this study provides useful local data for policy makers to improve Singapore's healthcare financing framework.

## Prevalence, Awareness, Treatment and Control of Hypertension Among Singapore Elderly Residential Population

**LSE SEOW<sup>1</sup>, M SUBRAMANIAM<sup>1</sup>, E ABDIN<sup>1</sup>, JA VAINGANKAR<sup>1</sup>, SA CHONG<sup>1</sup>**

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

### Introduction:

Local studies have shown hypertension to be a common health problem among the elderly. The prevalence, awareness, treatment and control of hypertension were investigated in a national cross-sectional epidemiological study of the elderly in Singapore.

### Methods:

Data was collected from 1041 randomly selected elderly ( $\geq 60$  years) as part of the Well-being Study of Elderly (WiSE) that involves household face-to-face survey and physical examination. Sitting blood pressure (BP) was measured twice at a 1-minute interval and averaged. Category of BP levels (normal, high-normal, grade 1 & grade 2 hypertension) were then graded according to the Ministry of Health Clinical Practice Guidelines. Prevalence was defined as having either grade 1 or grade 2 hypertension levels, and/or been diagnosed by a doctor to have hypertension.

### Results:

Of the 1041 participants, our study revealed 81.7% had hypertension. In total, 29.2% were grade 1, 24.4% were grade 2 and 62.2% of all were previously diagnosed by a doctor to have hypertension. Among those previously diagnosed ( $n = 647$ ), 97.2% were started on treatment and 45.3% were well-controlled. 29.5% still had grade 1 and 25.2% grade 2 hypertension. Among those undiagnosed ( $n = 394$ ), 28.7% and 23.1% were found to have grade 1 and 2 hypertension respectively.

### Discussion & Conclusion:

The proportion of local elderly with hypertension is high and of concern is the substantial proportion of undetected cases. This highlights the need for effective health screening among the elderly. Optimal control of BP in those diagnosed with hypertension is also a cause for concern as identified in our study.

## Predictive Factors of Unscheduled 15-Day Hospital Readmissions

**YB LOH<sup>1</sup>, M NG<sup>1</sup>, SP GOLLAMUDI<sup>2</sup>, RA MERCHANT<sup>2</sup>**

<sup>1</sup>*National University of Singapore, Singapore,* <sup>2</sup>*National University Hospital, Singapore*

### Introduction:

A costly burden on healthcare resources and unscheduled readmissions are emotionally draining to patients which may represent suboptimal quality of care. Determining risk factors would allow us to identify patients at high risk for readmission. Our study aims to identify the risk factors for unscheduled hospital readmissions and formulate a readmission predictive model.

### Methods:

We conducted a retrospective single-centre study in National University Hospital comparing 2 groups of patients aged  $\geq 18$  years, matched for age, race and gender who were admitted once over a 2-month period (1 June to 31 July 2012) and patients who were readmitted within 15 days of the first admission during the same period ( $n = 382$  in each group). Medical variables (reason for readmission, length of stay, admission in past 6 months, recovery status on discharge, number of discharge medications), and relevant comorbidity variables such as Charlson's comorbidity index were obtained from medical records and analysed.

### Results:

Previous admission in the last 6 months (OR (95% CI): 4.68 (3.41-6.44)), Charlson's comorbidity index  $>3$  (OR: 3.34 (2.23-5.01)) and  $>10$  discharge medications (OR 2.26 (1.66-3.09)) predicted readmission. Comorbidities associated with readmission are moderate-to-severe liver disease (OR: 7.77 (1.76-34.2)), congestive cardiac failure (CCF) (OR: 4.12 (2.14-7.92)) and peripheral vascular disease (PVD) (OR: 3.51 (1.89-6.51)).

### Discussion & Conclusion:

Patients with Charlson's score  $>3$ ,  $>10$  discharge medications, previous admission in last 6 months and patients with comorbidities such as liver disease, CCF and PVD are at high risk of readmission. High risk patients should be referred to care coordinators for seamless transition into community and close follow-up.

## **Lost in Transition—Newly Qualified Registered Nurses and Their Transition to Practice Journey: A Qualitative Descriptive Study**

**E TEOH<sup>1</sup>, LH PUA<sup>1</sup>, YJ LIM<sup>1</sup>, MF CHAN<sup>2</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore,* <sup>2</sup>*National University of Singapore, Singapore*

### **Introduction:**

Transition to practice was reported to be most stressful during the first year of employment. Poor transition could result in compromised patient care and high turnover. With an ageing population and increasing healthcare demands, it is imperative to retain newly qualified Registered Nurses to sustain the nursing workforce. Our aim is to explore newly qualified Registered Nurses' perceptions on their transition to practice journey during their first year of employment.

### **Methods:**

A qualitative descriptive design was carried out. One-to-one semi-structured interviews were conducted with eleven newly qualified Registered Nurses with 6 months of working experience from a public hospital in Singapore. Data were analysed using thematic analysis.

### **Results:**

Three themes emerged from the data analysis: personal adaptations, professional adaptations and organisational adaptations. The transition to practice journey was stressful for the newly qualified Registered Nurses and changes were made to personal lifestyle to meet work demands. Adjustment stress level using a positive attitude, self-care and efficient time management were identified. They were challenged with new responsibilities, forging new relationships and acquiring new nursing knowledge required of their professional role. Lastly, organisation factors such as staff support, working environment and transition to practice programme were found to influence the transition to practice journey.

### **Discussion & Conclusion:**

This study contributed to the understanding of newly qualified Registered Nurses perceptions of their transition to practice journey. The study also emphasised the importance of bridging the gap between transition to practice programme and preceptorship, and the need for greater institutional social support required to seek work advice.

## National Healthcare Group Clinical Educators Reflection on Web2.0's Application in Enhancing Teaching and Lifelong Learning in Medical Education

**CK CHIA<sup>1</sup>, S CHEONG<sup>1</sup>, WS LIM<sup>1</sup>, B CHIA<sup>1</sup>**

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

### Introduction:

Web 2.0 offers unprecedented opportunities to engage the younger generation of clinicians, yet the utilisation amongst clinician educators remain low. We aim to study the factors affecting the attitudes and motivation of National Healthcare Group (NHG) clinical educators in their adoption of web 2.0 tools.

### Methods:

We surveyed participants attending the IT-centric module of 'Essentials for Clinician Teachers' course. We compared pre-post scores on frequency of usage of Web 2.0 tools, as well as responses to 7-point Likert scales and open-ended questions regarding barriers and motivators towards adoption of Web 2.0 tools. We conducted thematic analysis of open-ended qualitative data.

### Results:

There are no significant pre-post differences in the participants' reported usage of Web 2.0 tools. In contrast, there was an improved attitude towards perceived barriers such as "Content can be independently managed" [Pre-post, mean (SD): 5.32 (1.07) vs 4.80 (0.64);  $t(64)=2.23$ ,  $P=0.03$ ]. Thematic analyses revealed that major themes affecting uptake of Web 2.0 tools are support, time and usability; these factors (14% to 71%, 57% to 45% and 46% to 61% respectively) show a significant post-course change.

### Discussion & Conclusion:

Our preliminary findings show that a week-long IT course can affect attitudes towards incorporating educational technology in their teaching and learning activities despite no immediate impact on behavior. Follow-up interviews with selected participants will give further insights as to how the working environment, community of practice and availability of technical support influence their overall experience.

## Determinants of Clarification Studies in Medical Education Research: A Systematic Review

**WS LIM<sup>1</sup>, HY NEO<sup>1</sup>, WC WONG<sup>1</sup>, KM THAM<sup>2</sup>, C RINGSTED<sup>3</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore,* <sup>2</sup>*National University of Singapore, Singapore,* <sup>3</sup>*University of Toronto, Canada*

### Introduction:

Medical education research should aspire to illuminate the field by moving beyond descriptive (“What was done?”) and justification (“Did it work?”) research purposes to clarification studies that address “Why or how did it work?” questions. We aim to ascertain the predictors of clarification studies in medical education research.

### Methods:

We conducted a systematic review of all eligible original research abstracts presented at the 2012 Asia Pacific Medical Education Conference. Abstracts were classified as descriptive, justification or clarification using Cook’s 2008 framework. We collected data on the research approach, Kirkpatrick’s learner outcomes, statement of study intent, presentation category, topic of study, professional group, and number of institutions involved. All abstracts were reviewed by 2 researchers, with disagreement resolved by consensus. Significant variables from bivariate analysis were included in logistic regression analyses.

### Results:

Our final sample comprised 186 abstracts. Descriptive studies were the most common (65.6%), followed by justification (21.5%) and clarification (12.9%). Significant associations from bivariate analysis include Kirkpatrick’s learner outcomes of level 2 and above, clear statement of study objectives, and a non-descriptive research approach (all  $P < 0.01$ ). In multivariate analyses, the presence of a clear study aim (OR: 5.33, 95% CI, 1.17 to 24.38) and non-descriptive research approach (OR: 4.70, 95% CI, 1.50 to 14.71) but not higher Kirkpatrick’s outcome levels predicted a clarification research purpose.

### Discussion & Conclusion:

Only about one-tenth of studies have a clarification research purpose. A clear study aim and non-descriptive study research approach each confers a 5-fold greater likelihood of a clarification purpose, and represent 2 potentially remediable areas to advance medical education research.



## Hypoglycemia Management of Patients with Type 2 Diabetes in Primary Care Setting: A Best Practice Implementation Project

**CY CHAN<sup>1</sup>, YL LEE<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

### Introduction:

Diabetes mellitus (DM) is a global health problem affecting 347 million people worldwide. The prevalence of DM in Singapore is a major health concern as 1 in 9 residents aged 18 to 69 has DM. Hypoglycemia is a preventable complication that can affect patients' quality of life. This study aims to improve current clinical management of patients with hypoglycemia using Joanna Briggs Institute evidence based guideline and is hypothesised that the utilisation of evidence will bring about standardisation of best practice.

### Methods:

This study was conducted in 2 polyclinics from July to December 2012. A pre and post documentation audit on 18 registered nurses was carried out using a hypoglycemia management audit tool based on best available evidences. Measures to enhance recommended practices consist of an educational program for nurses highlighting the current evidence in hypoglycemia management. To facilitate rapid hypoglycemia treatment, a "hypo box" was placed at the nursing station. Cue cards were attached to dextrose powder sachets to provide quick reference towards a systematic hypoglycemia risk assessment.

### Results:

Post implementation nursing documentation audit findings indicated a significant improvement in rechecking blood glucose level 10 minutes after initial glucose treatment (0% to 94%), instead of 15 minutes ( $\chi^2 = 40.656$ ,  $P = 0.000$ ), and in completing a comprehensive hypoglycemia risk assessment (6% to 100%), ( $\chi^2 = 40.768$ ,  $P = 0.000$ ).

### Discussion & Conclusion:

The utilisation of best evidences has resulted in improved nursing assessment and management of patient with hypoglycemia, which may contribute towards minimising potential serious complications. The implication for practice calls for increased vigilance in hypoglycemia risk assessment and prevention to effect overall good disease outcome.

## **Does Seeing the Same Doctor Improve Low Density Lipoprotein Cholesterol Control in Patients with Type 2 Diabetes Mellitus?—A Retrospective Cohort Study**

**KH LEE<sup>1</sup>, WL NG<sup>1</sup>, YF SIM<sup>1</sup>**

<sup>1</sup>*National Health Group Polyclinics, Singapore*

### **Introduction:**

The role of interpersonal continuity of care in the management of diabetes mellitus is currently inconclusive. Good control of low density lipoprotein cholesterol (LDL-c) prevents cardiovascular events in patients with diabetes. This study aims to determine if seeing the same doctor improves the control of LDL-c in patients with diabetes.

### **Methods:**

Data was extracted from the institution's health information system. One hundred and seventy-six patients with poor diabetes control at the end of 2009 and who have seen the same doctor for more than 65% of their visits from 2010 to 2011 were selected. They were matched with 176 controls who saw different doctors for their consults in the same period. The mean LDL-c levels were compared between the 2 arms at baseline (end 2009) and the end of the 2 years (start of 2012).

### **Results:**

There was no significant difference in the mean resultant LDL-c levels in both groups. ( $2.52 \pm 0.06$  in control vs  $2.60 \pm 0.06$  in study group) There was also no significant difference in the decrease of the mean LDL-c levels ( $-0.41 \pm 0.09$  in control vs  $-0.19 \pm 0.09$  in study group). Notably, the proportion of patients who achieved the institutional target LDL-c level of  $<2.6\text{mmol/l}$  in both arms were also not significantly different at baseline and at the end of the study.

### **Discussion & Conclusion:**

Seeing the same doctor does not improve the control of LDL-c in patients with type 2 diabetes mellitus.

## Photograph-Assisted Dietary Review Amongst Type 2 Diabetics in Primary Care

**D SEAH<sup>1</sup>, YF SIM<sup>1</sup>, V ONG<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

### Introduction:

Evidence suggests that dietician-led diabetes management and dietary advice improves metabolic outcomes in type 2 diabetes mellitus (T2DM) patients. However, barriers such as confusion over the proper diet components exist for patients to adhere to dietary recommendations. This study hypothesises that using photographic record of patients' dietary intake will result in more effective dietary counseling by dieticians leading to improved metabolic parameter outcomes.

### Methods:

A prospective within-subject study was conducted. T2DM patients were given dietician reviews at 2 visits, 14 weeks apart. Patients received routine care at the first dietician visit and kept a 3-day food photo diary for the second dietician visit. These photos were used at the second dietician visit. Metabolic parameters such as Body Mass Index (BMI), HbA1C and blood pressure were recorded. Wilcoxon Signed Rank test was applied to test the equality of means of clinical outcomes between 2 visits. Evaluation of patient self management through the use of the Patient Activation Measure (PAM) was also performed.

### Results:

Comparing baseline and final visit results, patients experienced a significant decrease in BMI of 26.78g/m<sup>2</sup> to 26.21g/m<sup>2</sup> ( $P < 0.001$ ), a significant drop of mean HbA1C from 8.44% to 8.2% ( $P = 0.03$ ) and a significant decrease in mean systolic blood pressure from 128.5mmHg to 118.8mmHg ( $P = 0.026$ ). Mean PAM scores significantly increased from 42.06 to 44.87 ( $P = 0.003$ ).

### Discussion & Conclusion:

Use of photograph assisted dietary reviews can effectively improve metabolic parameters amongst type 2 diabetes patients seen in primary care. Through this activity, patients also demonstrated higher self management scores.

## Exploring the Feasibility of Advanced Care Planning in Persons with Early Cognitive Impairment

**K CHEONG<sup>1</sup>, P FISHER<sup>1</sup>, J GOH<sup>2</sup>, L NG<sup>2</sup>, HM KOH<sup>2</sup>, P YAP<sup>2</sup>**

<sup>1</sup>*James Cook University Singapore, Singapore,* <sup>2</sup>*Khoo Teck Puat Hospital, Singapore*

### Introduction:

Persons with early cognitive impairment (ECI), comprising mild cognitive impairment and early dementia, face the risk of diminished mental capacity with progressive dementia. Advance Care Planning (ACP) is advocated as a means to respect the autonomy of individuals and enable them to express their wishes for the future while they still possess mental capacity. This study aims to explore the feasibility of ACP in persons with ECI in Singapore

### Methods:

Consecutive patients undergoing a counseling service for persons with ECI who fulfilled inclusion criteria (Mini Mental State Examination score  $\geq 18$ , Clinical Dementia Rating = 0.5 or 1) were recruited. Demographic and clinical data were collected and the proceedings of the counseling sessions were subjected to a thematic analysis. Differences between patients who were willing to engage in ACP and those who declined were analysed.

### Results:

Ninety-three patients (mean age 76.0, 60.2% female) were recruited of which 38.7% chose to engage further in ACP discussions. GCDR (Global Clinical Dementia Ratings) was the only factor that emerged significant on bivariate analysis for willingness to engage in ACP ( $t(79) = 2.191$ ,  $P < 0.05$ , two-tailed). Among those who declined ACP, abdicate future decision making to family members ( $n = 39$ ), avoidance of the issue ( $n = 18$ ), leaving it to destiny ( $n = 14$ ) and denial of the issue ( $n = 11$ ) were the major reasons for refusal.

### Discussion & Conclusion:

The findings suggest that the reasons for declining ACP are much influenced by personal values and socio-cultural norms, and this has important implications for practice.

## **Non-invasive Genetic-Based Prenatal Test of Fetal Gender Using Maternal Plasma to Avoid Invasive Procedural-Related Fetal Miscarriages for Sex-Linked Disorders**

**SSY HO<sup>1</sup>, JJM KOH<sup>2</sup>, KJJ LEE<sup>2</sup>, KMH KONG<sup>2</sup>, SSH TAN<sup>2</sup>, A BARRETT<sup>3</sup>, M CHOOLANI<sup>3</sup>, ESC KOAY<sup>3</sup>**

<sup>1</sup>*National University Hospital, Singapore,* <sup>2</sup>*Ngee Ann Polytechnic, Singapore,*

<sup>3</sup>*National University of Singapore, Singapore*

### **Introduction:**

Prenatal diagnosis of sex-linked disorders requires invasive procedures such as amniocentesis or chorionic villus sampling to obtain fetal DNA for genetic analysis. These procedures can cause miscarriages and are unacceptable to some couples. This study aims to develop a noninvasive genetic-based test for fetal gender using fetal DNA from maternal plasma to avoid procedure-related miscarriages.

### **Methods:**

Real-time PCR of Y-chromosome-specific sequence, SRY, was performed on cell-free DNA extracted from 38 maternal plasma samples at 6 to 39 gestational weeks. Detection of SRY confirmed male fetal gender. In samples without detectable SRY, real-time PCR of 12 polymorphic insertion-deletion sequences (INDELs) were performed on DNA extracted from maternal buffy coat and plasma samples to differentiate between maternal and paternal alleles. Detection of paternal-inherited fetal alleles in maternal plasma without SRY amplification indicate female fetal gender.

### **Results:**

SRY was detected in 18 maternal plasma DNA samples indicating male fetuses. Paternal-inherited fetal alleles were detected in the remaining 20 maternal plasma DNA samples indicating female fetuses. All results correspond to fetal gender confirmed by fluorescence in situ hybridisation (FISH) of trophoblast cells from placental tissue, ultrasound and at birth with 100% sensitivity (lower 95% CI, 78.1%) and 100% specificity (lower 95% CI, 80.0%).

### **Discussion & Conclusion:**

We have developed a noninvasive prenatal genetic-based test to determine fetal gender as early as 6 gestational weeks using cell-free fetal DNA from maternal plasma. Noninvasive prenatal testing of fetal gender will allow pregnant women carrying female fetuses to avoid unnecessary invasive procedures that can cause fetal miscarriages.

## **Roles of miR-186 in Circulating Tumour Cells (CTCs)-mediated Metastasis in Breast Cancer**

**SM LEONG<sup>1</sup>, M SUFYAN<sup>2</sup>, HW CHUA<sup>2</sup>, MH LI<sup>3</sup>, S TUCKER<sup>4</sup>, CF CHANG<sup>2</sup>, ESC KOAY<sup>5</sup>**

<sup>1</sup>National University Hospital, Singapore, <sup>2</sup>National University of Singapore, Singapore, <sup>3</sup>CellSieve Private Limited, Singapore, <sup>4</sup>Tucker Medical Private Limited, Singapore, <sup>5</sup>National University Health System, Singapore

### **Introduction:**

Recent findings have correlated high numbers of circulating tumour cells (CTCs) in the blood of breast cancer patients with poor prognosis and cancer progression, pointing to involvement of CTCs in metastasis. To further understand their role in metastasis development, a study was undertaken to identify and characterise highly-expressed microRNAs in CTCs.

### **Methods:**

CTCs from breast cancer patients were harvested using a microsieve device (CellSieve). We next used TaqMan microRNA OpenArray Card (Life Technologies) to identify highly expressed microRNAs in these CTCs. We further investigated how these highly expressed microRNAs affect cancer-related phenomena, such as epithelial-to-mesenchymal transition (EMT), migration, invasiveness, and chemokines expression, using breast cancer cell lines MCF-7 and MB-MDA-231.

### **Results:**

We found miR-186 highly expressed in at least 6/23 (26.1%) of breast cancer patients with detectable CTCs. Lentiviral-mediated overexpression of miR-186 drove epithelial-to-mesenchymal phenotype transition ( $P \leq 0.001$ , Student's t-Test) and reduced expression of the epithelial cell surface marker, EpCAM, in epithelial MCF-7 breast cancer cells. Overexpression of miR-186 appeared to up-regulate the expression of a wide range of chemokines, showing higher expression of 7 out of 8 chemokines / receptors surveyed over control cells. Like the oncogenic miR-21, miR-186 enhanced the migratory capability and invasiveness ( $P \leq 0.05$ , Student's t-Test); in contrast, the tumour suppressor miR-200C markedly impeded these processes.

### **Discussion & Conclusion:**

We propose a model in which miR-186 induces EMT and enhances invasiveness in the CTCs, which in turn fuels aggressive metastatic development. The prognostic significance of miR-186 expression in CTCs, in relation to blood chemokine levels in breast cancer progression, warrants further investigation.

## Characterisation of the Biological and Clinical Relevance of RUNX Genes in Natural Killer T-Cell Lymphoma

**V SELVARAJAN<sup>1</sup>, J YAN<sup>1</sup>, SB NG<sup>1</sup>, WJ CHNG<sup>1</sup>**

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

### Introduction:

RUNX3 is known to play a tumour suppressive role in gastric, colon and other cancers. It has also been reported to play an oncogenic role in a certain subset of cancers including our preliminary study which identified the over-expression of RUNX3 in NK/T-cell lymphoma nasal-type using IHC. NKTCL is a rare and severe disease more frequent in Asia and South America. Although several recent studies have explored the treatment of NKTCL, the optimal therapy has still not been found.

### Methods:

The study was conducted on a panel of NK-tumour cell lines and normal NK cells derived from human PBMCs. RUNX3 knockdown was achieved utilising the NEON Transfection System. Apoptotic cell death analyses were carried out using Annexin-V-APC and PI detection systems and BrdU incorporation assays using anti-BrdU combined with 7-AAD. Cell viability was analysed using MTS assays.

### Results:

Observations revealed higher RUNX3 mRNA and protein expression in NK-tumour lines compared to normal NK cells. This correlates well with the preliminary IHC data obtained from clinical samples. Silenced cells showed a significant RUNX3 reduction of (KHYG-1 = 50%) and (NK-YS = 90%), apoptosis induction (KHYG-1 = 15%) and (NK-YS = 22%) and reduction in cell proliferation. A significant RUNX3 down-regulation was also observed in a dose-dependent manner upon treatment with a small-molecule inhibitor (JQ1) which leads to apoptosis in NK-tumour cell lines.

### Discussion & Conclusion:

This study identified that RUNX3 is over-expressed in NKTCL and is functionally relevant and oncogenic in NKTCL. This will provide opportunities for further understanding of the role of RUNX3 in the pathogenesis of NKTCL as a potential therapeutic target.

**A Novel and Highly Selective Dual PI3KmTOR Kinase Inhibitor VS-5534 (SB2343), Shows Promising Therapeutic Potential for the Treatment of Multiple Myeloma**

**N MUSTAFA<sup>1</sup>, WJ CHNG<sup>2</sup>, S HART<sup>3</sup>**

<sup>1</sup>*National University of Singapore, Singapore,* <sup>2</sup>*Cancer Science Institute, Singapore,* <sup>3</sup>*S\*Bio Ptd Ltd, Singapore*

**Introduction:**

The PI3K/mTOR/AKT pathway represents a critical target in MM because it stimulates proliferation, survival, and drug resistance of MM cells. PI3-kinase or mTOR-kinase single inhibitors have not been very effective in clinical trials. We hypothesise that targeting this complex pathway at multiple levels with a dual mTOR/PI3-kinase inhibitor will evidence a more potent inhibitory effect in MM.

**Methods:**

The efficacy of the dual mTOR/PI3-kinase inhibitor in MM was evaluated in: (i) A panel of MM cell lines and patient samples with MTS assay. (ii) Assays evaluating the induction of apoptosis (Annexin V-FITC/PI, PARP cleavage, caspase 3 activation, cell cycle profiling). (iii) Molecular targets of VS-5534 were confirmed by Western blotting. (iv) In vivo tumour xenograft mouse models. (v) Combination with clinical drugs.

**Results:**

We report that VS-5534 is highly efficacious against a wide panel of MM cells including Velcade- and Doxorubicin-resistant cell lines, including in the presence of MM growth factors, IL-6 and IGF-1. Importantly, VS-5534 shows similar efficacy in patient samples and preferential tumour cell targeting compared to healthy PBMCs. Further testing in a myeloma xenograft mouse model further confirmed the potency of this compound in vivo. We have also observed synergistic activity in combination with anti-MM therapeutics, Dexamethasone and Panabinostat.

**Discussion & Conclusion:**

Our data provide strong evidence for the ability of VS-5534 to overcome MM cytokine/stromal protection and inducing potent anti-MM activity in vivo. In addition, preferential targeting for MM patient samples, alone or in combination with clinical therapeutics, suggests that targeting the PI3K/mTOR/Akt pathway at multiple levels provides a promising framework for clinical trials of VS-5534.



**Validation of a Novel Mutation (H126D) In Hepatocyte Nuclear Factor-1A (HNF-1A) Gene Associated With Maturity Onset Diabetes of the Young Type 3 (MODY3) Using the Next Generation Sequencer (NGS)**

**SHC TAN<sup>1</sup>, XW NG<sup>1</sup>, DSM WONG<sup>1</sup>, ECK. YEOH<sup>1</sup>, YA OU<sup>1</sup>, S TAVINTHARAN<sup>1</sup>, CF SUM<sup>1</sup>, SC LIM<sup>1</sup>, YM BEE<sup>2</sup>**

<sup>1</sup>*Khoo Teck Puat Hospital, Singapore, <sup>2</sup>Singapore General Hospital, Singapore*

**Introduction:**

Our group identified a pair of siblings with non-ketotic prone adolescent-onset diabetes mellitus (DM) and strong family history of young-onset diabetes. Autosomal dominant inheritance led us to hypothesise a probable diagnosis of monogenic diabetes. MODY is a heterogenous disorder due to mutations in several candidate genes involved in glucose metabolism. Mutation (especially in exon-2) in the HNF-1 $\alpha$  gene is most commonly associated with MODY type 3 in most populations.

**Methods:**

We performed high-throughput sequencing using the PGM, Ion Torrent (Life Technologies) and AmpliSeq assay to target the exonic and promoter regions of HNF-1 $\alpha$  (100% coverage). Validation of mutation was performed using bi-directional Sanger's Capillary Electrophoresis (CE) (ABI 3130xl) on exon 2 of the HNF-1 $\alpha$  gene. High sensitivity C-reactive protein (hsCRP), which was reported as a biomarker for MODY3, was measured in the serum.

**Results:**

Next-generation sequencing, with significant confidence score (minor allele frequency 0.49), and Sanger's sequencing revealed a novel non-synonymous mutation in exon 2 of the HNF-1 $\alpha$  gene (H126D) in both siblings. Computational tools (PolyPhen2 and SIFT) predicted the mutation to be functionally detrimental. Interestingly, hsCRP in both siblings were extremely low (0 and 0.1mg/L respectively).

**Discussion & Conclusion:**

We validated the novel H126D mutation using 2 independent sequencing platforms: Sanger's CE and bench-top PGM (Ion Torrent, Life Technologies) in a pair of Chinese siblings with MODY. Clinical significance of MODY3 diagnosis includes the possibility of converting current treatment of long-standing daily insulin injections to oral insulin secretagogue (sulphonylurea) due to preserved pancreatic  $\beta$ -cell response to the glucose lowering effect of sulphonylurea.

## **Pain Relief After Total Knee Arthroplasty: A Randomised Controlled Trial Comparing Single-Injection and Continuous Femoral Nerve Blocks with Patient-Controlled Analgesia**

**EY CHAN<sup>1</sup>, S SATHAPPAN<sup>1</sup>, NHL CHUA<sup>1</sup>, N CHUA<sup>1</sup>, M FRANSEN<sup>2</sup>, YH CHAN<sup>3</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore,* <sup>2</sup>*University of Sydney, Australia,* <sup>3</sup>*National University Health System, Singapore*

### **Introduction:**

Optimal pain relief after total knee arthroplasty (TKA) promotes recovery and prevents adverse outcomes. This study hypothesised that single-injection or continuous femoral nerve blocks (FNB) provide better analgesic effects compare to intravenous patient controlled analgesia (PCA) opioids, after TKA.

### **Methods:**

We randomised 200 patients undergoing unilateral TKA to either single injection FNB, continuous FNB, or intravenous PCA opioids. Primary outcome was patients with significant pain on movement at postoperative 24 hours. Secondary outcomes were pain intensity at rest and on movement, opioid consumption, episodes of nausea and vomiting, and time to 90 degrees active knee flexion. Follow-up was until month 3 after surgery. Logistic regression and ANCOVA were used to determine the differences in categorical data and continuous data, respectively. Analyses were adjusted for baseline values.

### **Results:**

The proportion of patients with significant knee pain on movement at 24 hours after TKA was reduced with single-injection FNB (OR 0.30; 95% CI, 0.12 to 0.74;  $P = 0.009$ ) and continuous FNB (OR 0.21; 95% CI, 0.08 to 0.51;  $P = 0.001$ ), compared with PCA opioids. The FNB groups also had lower pain intensity in the initial postoperative period, consumed less opioids, had fewer episodes of nausea and vomiting, and reached 90 degrees knee flexion earlier, than the PCA opioids group.

### **Discussion & Conclusion:**

Single-injection and continuous FNB provided better analgesic effects as compared to PCA opioids, after TKA. Nevertheless, the use of FNB, in particular continuous FNB, should be considered in the terms of the additional resources required to place the block.

## Magnetic Resonance Imaging (MRI) Changes in Lower Limbs in Transition to Frailty: A Prospective Study

**SKH TAY<sup>1</sup>, B PEREIRA<sup>2</sup>, S BANERJI<sup>2</sup>, R MERCHANT<sup>2</sup>, E CHEW<sup>2</sup>, G SINGH<sup>2</sup>,  
M SHARMA<sup>2</sup>, R KAMBADUR<sup>3</sup>, K SHEAH<sup>4</sup>**

<sup>1</sup>National University Hospital, Singapore, <sup>2</sup>National University Health System, Singapore, <sup>3</sup>Nanyang Technological University, Singapore, <sup>4</sup>Radlink Diagnostic Imaging, Singapore

### Introduction:

The reasons behind the onset of frailty are as yet poorly understood. Sarcopenia, or lowered relative muscle mass due to ageing is associated with frailty. The aim of this study was to prospectively identify early indicators of sarcopenia and transition to frailty from a lower limb magnetic resonance imaging (MRI) study.

### Methods:

Fifty community dwelling healthy-weight Singapore Chinese males underwent fine-slice MRI imaging of the lower limbs. Quantification of muscle and fat volume using a novel algorithm was performed. Three muscle groups were examined, namely, quadriceps, hamstrings and gastrocnemius. These were then correlated to a clinically validated frailty scale (CSHA).

### Results:

MRI imaging revealed early posterior compartment wasting and increase in fat infiltration for those subjects diagnosed as clinically frail (CSHA=4). While markers of frailty included reduction of hamstring and gastrocnemius volumes, an increased fat infiltration into gastrocnemius muscle was observed in early frailty (CSHA=3), possibly indicating a marker for transition to frailty.

### Discussion & Conclusion:

Study of posterior muscles may help us detect early signs of frailty. Posterior muscle wasting could arise due to changes in gait, sedentary lifestyle, or certain catabolic mechanisms occurring later in life. An early intervention targeted at these muscles may be used to slow down age related frailty and to retard the progress of sarcopenia. Future studies of exercise intervention could focus on targeted training for posterior compartment muscles of the lower limbs to improve long term ambulation and stability in the elderly.

## Prevalence of Dilutional Hyponatraemia in Inpatients and Outpatients in Singapore

**R HAWKINS**<sup>1</sup>

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

### **Introduction:**

Hyponatraemia is the most common electrolyte disorder encountered in clinical practice. Failure to recognise hyperglycaemic hyponatraemia (HH) can lead to inappropriate investigation and treatment. This study assessed the prevalence of HH in both inpatients and outpatients at a general hospital in Singapore.

### **Methods:**

Anonymised records of all serum Na and glucose measurements performed during 2011 were extracted from the laboratory database for analysis in Microsoft Access and Excel. Na concentration adjusted for glucose concentration (cNa) was calculated as: Glucose <5.5 mmol/L, cNa = Na; Glucose 5.5 to 22 mmol/L, cNa = Na + (Gluc/3.44); Gluc >22 mmol/L, cNa = Na + (Gluc/2.3) (Am J Med 1999; 106: 399 to 403). Na and cNa values were compared against the locally derived Na reference interval of 134 to 144 mmol/L.

### **Results:**

During 2011, there were 38,578 simultaneous serum Na and glucose requests (comprising 13.6% of all Na requests). The prevalence of hyponatraemia based on unadjusted Na was 9% and on cNa was 4.2%, giving an overall HH rate of 4.8%, which makes up 53% of all unadjusted Na hyponatraemic cases. Based on patient location, the % of unadjusted hyponatraemic cases, % of cNa hyponatraemic cases and % of HH of all unadjusted hyponatraemia cases were: ED 19.9 / 7.0 / 64.8%, ICU 24.5 / 12.5 / 48.8%; inpatient 25.0 / 12.9 / 48.8%; outpatient 5.5 / 2.7 / 51.7%.

### **Discussion & Conclusion:**

Over half of all hyponatraemic results when glucose is simultaneously requested are due to hyperglycaemic hyponatraemia. Automatic calculation and reporting of sodium concentration adjusted for glycaemia should be implemented wherever possible.

## **A Prospective Randomised Study on the Patency Period of the Plastic Anti-Reflux Biliary Stent**

**WL QUAN**<sup>1</sup>

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

### **Introduction:**

Palliative biliary stent placement is the treatment of choice for patients with inoperable malignant strictures in the biliary system. The problem is a relatively short stent patency period requiring frequent stent change. Reflux of duodenal content into the bile duct through the plastic stent has been a known factor in stent occlusion. We postulate that the new Fusion Marathon anti-reflux biliary plastic stent will provide a longer stent patency period than the conventional plastic stent in patients with malignant distal biliary strictures.

### **Methods:**

We conducted a prospective, randomised, double-blind comparative trial at 2 tertiary centers (Price of Wales Hospital, Hong Kong, China and Tan Tock Seng Hospital, Singapore) to compare the patency period between 2 similar plastic biliary stents. The difference lies in the additional anti-duodenobiliary reflux valve in the new Fusion Marathon stent which prevents the backflow of duodenal content into the bile duct.

### **Results:**

Sixteen subjects were recruited with 7 allocated to receive the ordinary Tannenbaum stent (group A) and 9 patients received the new Fusion Marathon stent (group B). All stents in group B were occluded within 30 days while none occurred in group A. Our data showed a significantly shorter stent patency period in group B ( $P < 0.003$ ). The anti-reflux valve of the ARB stent was observed to be collapsed and folded backwards during stent change suggesting a stent design issue.

### **Discussion & Conclusion:**

Routine use of anti-reflux plastic biliary stent in the palliative management of malignant biliary obstructions cannot be recommended at the moment.

## Navigating the Milestones: One Map, Same Destination

**E TAN<sup>1</sup>, NY KOH<sup>1</sup>, WS LIM<sup>1</sup>**

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

### **Introduction:**

Residency training heralded a shift towards competency-based training and the achievement of milestones. We began defining milestones to explicate and translate the general language of competencies into concrete assessments. Well-defined milestones facilitate progress tracking, communication of expectations, and informing of decisions regarding suitability of residents to practice at various levels. Different frameworks have been developed and there is a need to develop a shared mental model.

### **Methods:**

The NHG Residency programme started with the broad Seeker-Reader-Leader (SRL) framework; we subsequently adopted the RIME (Reporter, Interpreter, Manager, Educator) model for reliability. The introduction of the Dreyfus model presents an additional vocabulary. The Internal Medicine Education Committee met in an iterative process to create a common milestone framework that links the different models. We reviewed the theoretical and practical bases of each model, assessed their relevance to the local practice context, and then made one-to-one correspondences between the different levels.

### **Results:**

Each of the steps in the RIME and Dreyfus models has associated descriptors. We were able to map both models under the unifying SLR framework, and have implemented the map in our resident evaluation processes. Preliminary verbal feedback from faculty and residents has been positive with regard to its utility and clarity.

### **Discussion & Conclusion:**

The development of a common milestone map facilitates a shared mental model that harnesses the unique strengths of each model. The clearer link between the cognitive and practical aspects aids in the development of Entrustable Professional Activities to operationalise training and education goals which can be applied across disciplines and professions.

## Enhance Transitioning: An Academic-Practice Collaboration through Simulation Learning

**SY LIAW<sup>1</sup>, S PALHAM<sup>1</sup>, ST LAU<sup>1</sup>, R DAWOOD<sup>1</sup>, WC CHAN<sup>1</sup>,  
Y KOWITLAWAKUL<sup>1</sup>, WT ZHOU<sup>1</sup>, LF WONG<sup>1</sup>, FP LIM<sup>1</sup>, YW KOH<sup>2</sup>**

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>Duke-NUS Graduate Medical School, Singapore

### Introduction:

With the collaboration between academic educator and practicing nurses, an innovative 15-hour simulation program known as SIMulated Professional Learning Environment (SIMPLE) was developed. The program incorporated multiple simulation scenario based on actual ward clinical practices. This study aimed to evaluate the outcomes of the SIMPLE programme in preparing the nursing students for their transition to graduate nurse clinical practice.

### Methods:

A mixed methods study was conducted. A quasi-experimental pretest and post-test design was performed with 94 final year nursing students to evaluate the students' perceived preparedness for the clinical practicum in transition to graduate nurse practice. Following the clinical practicum, a qualitative study using focus group was conducted with 22 final year nursing students.

### Results:

The nursing students reported a significant improvement ( $P < 0.001$ ) on post-test score from pre-test score for their perceived preparedness towards their clinical practicum in transition to graduate nurse practice. Three themes emerged from the qualitative data on the impact of the program on their transition-to-practice clinical practicum: (i) experiencing the role of staff nurse; (ii) knowing how to; and (iii) learning from the "senior".

### Discussion & Conclusion:

The studies provided support for implementing the SIMPLE program to enhance the nursing students' transition-to-practice experiences. A key success of the program was the involvement of practicing nurses, who are the university alumni, in a simulated learning environment that closely linked the students with the realities of nursing practice. A stronger collaborative relationship between academic educators and practicing nurses could be fostered to further align the educational process with the realities of nursing practice.

## A Multicentre Study of Physiotherapists' Knowledge and Perceptions in Palliative Care

**J LIM<sup>1</sup>**

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

### Introduction:

A local pilot survey suggested that physiotherapists found it challenging to manage patients under palliative care. This study aimed to explore physiotherapists' knowledge and perceptions, including their perceived adequacy of training in palliative care. It hoped to identify gaps in the current level of knowledge and practice, and guide the development of physiotherapy training in this area. Hypothesis: Physiotherapists in Singapore perceived a lack of knowledge and training in palliative care.

### Methods:

A questionnaire was developed based on literature and World Health Organization's palliative care principles. An expert panel reviewed the content validity and design. Ten physiotherapists then piloted the revised questionnaire. Physiotherapists from 4 local hospitals were recruited for the final questionnaire.

### Results:

Response was received from 125 subjects (96% response rate). From 15 statements based on World Health Organization's palliative care principles, the subjects showed a lack of knowledge by agreeing with only a mean of 8.4( $\pm 2.9$ ) statements. On a scale of 1 to 5 (1='Novice', 5='Expert'), the mean score for 'perceived general knowledge of palliative care' and 'perceived knowledge of physiotherapy in palliative care' was 2.43 and 2.41 respectively. Only 58% of the subjects were comfortable treating palliative patients and 62% were comfortable communicating with them. Only 13% of them felt adequately prepared by their undergraduate curriculum, while 32% felt adequately prepared by their work exposure and training.

### Discussion & Conclusion:

Physiotherapists appeared to lack knowledge and training in palliative care. There is a need to incorporate training in physiotherapy for palliative care. Further research is required to enhance our understanding of this topic.



## Post Discharge Pain Experiences Following Total Knee Arthroplasty

**EY CHAN<sup>1</sup>, SL CHEOW<sup>1</sup>, M FRANSEN<sup>2</sup>, FM BLYTH<sup>2</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore,* <sup>2</sup>*University of Sydney, Australia*

### Introduction:

Total knee arthroplasty (TKA) can be an extremely painful surgery. Increasingly, hospital length of stay is becoming shorter, shifting pain management to patients themselves. This study aimed to determine patients' pain experience, effectiveness of their postoperative pain management and potential barriers to optimal pain relief, after hospital discharge.

### Methods:

We administered a questionnaire 2 weeks after discharge to TKA patients who were discharged home within a week following surgery. The questionnaire consisted of items on pain severity, analgesia consumption, analgesia-associated side-effects, non-pharmacological methods for pain relief, adequacy of discharge information on pain management. Data were analysed using descriptive statistics with SPSS v 19.

### Results:

The response rate was 94% (105 participants). During the first 2 weeks after discharge, 58% of patients had moderate to severe pain, while almost 40% experienced severe to extreme pain more than half the time. Twenty percent reported their pain to be more severe after discharge than during the admission. Of the patients with moderate to severe pain, only 36% consumed an opioid and 5% did not consume any analgesia. About 40% experienced analgesia-associated side-effects. Approximately 91% used non-pharmacological methods for pain relief. While 70% reported that discharge information on analgesia was adequate, only 22% found information on non-pharmacological methods for pain relief to be adequate.

### Discussion & Conclusion:

After hospital discharge following TKA, there was a high prevalence of moderate to severe pain and analgesia-associated side effects, and suboptimal use of analgesia. The findings highlighted that pain management after discharge could be improved.

## **Back to Basics: Developing an Instrument to Explore Nurses' Attitudes Towards Vital Signs Monitoring to Detect Deteriorating Patients**

**WQ MOK<sup>1</sup>, SY LIAW<sup>1</sup>, WR WANG<sup>1</sup>, E ANG<sup>2</sup>**

*<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>National University Health System, Singapore*

### **Introduction:**

There is a lack of instrument in the existing literature to measure nurses' attitude towards vital signs monitoring in detecting and reporting deterioration. The study aims to describe the development and psychometric testing of an instrument (VITALS) to measure general ward nurses' attitude towards vital signs monitoring in detecting and reporting deterioration.

### **Methods:**

A review of literature identified constructs and items for the VITALS scale. These constructs were built based on the structural component of the Nursing Role Effectiveness Model framework. Content validity of the 49-item instrument was established using content validity index (CVI) by 11 experts. The VITALS scale was tested on 234 general ward nurses from an acute hospital during October 2012. The internal consistency was evaluated using Cronbach's Alpha and item-to-total correlation. Test-retest reliability was assessed using Intraclass Correlation Coefficient (ICC). Exploratory factor analysis using principal component analysis and varimax rotation was employed to evaluate the instrument's factor structure.

### **Results:**

A CVI of 0.969 was achieved. The final instrument consists of 16 items with a Cronbach's Alpha of 0.702 and ICC of 0.849. Principal component analysis revealed 5 core factors (key indicators, knowledge, communication, workload, and technology) that explained 56.27% of the variance.

### **Discussion & Conclusion:**

A systematic and comprehensive methodology involving the use of conceptual framework, peer-reviewed literature, expert consensus and psychometric testing was implemented to develop and validate the VITALS tool. The 16-item VITALS instrument has demonstrated acceptable psychometric properties that can be used for exploring general ward nurses' attitude towards vital signs monitoring in detecting and reporting patient deterioration.

## **p53 Protein Expression, Oestrogen and Progesterone Receptors Status in Breast Cancer: Malaysian Preliminary Data**

**S RASHIDAH<sup>1</sup>, HRA RAZAK<sup>1</sup>, WMM SAAD<sup>1</sup>**

<sup>1</sup>*Universiti Teknologi MARA, Malaysia*

### **Introduction:**

Overexpression of p53 protein involves in variety of human malignancies including breast cancer. Epidemiologic studies have suggested that hormonal receptors may influence breast cancer risk including estrogen receptor (ER) and progesterone (PR) expression. The purpose of this study is to determine the association between hormonal receptors and p53 status in malignant breast cancer tissues.

### **Methods:**

A total of 127 breast cancer tissues were examined for p53 protein expression by immunohistochemistry (IHC).

### **Results:**

47/127 breast cancer tissues had p53 positive protein and 20/47 showed positive ER (p53+, ER+). Significant association between p53 and ER ( $\chi^2 = 18.23$ , d. f. = 3,  $P = 0.000$ ) were observed. In all the p53 positive protein breast cancer tissues, 23 (48.9%) of the breast cancer tissues had positive PR; (p53+, PR+) and significant association were observed between p53 and PR ( $\chi^2 = 11.16$ , d. f. = 3,  $P = 0.002$ ).

### **Discussion & Conclusion:**

The association of p53+ and ER+ breast cancer may be due to p53 role in directly regulating with ER receptor in breast cancer cells. The present data also showed positive association between p53 protein and PR. This may be due to ER role in inducing PR+. ER and PR receptors are included in breast cancer reports due to these hormones efficacy in assisting physician for treatment management and prognosis of breast cancer patients. By including p53 protein as a biomarker in breast cancer report along with the hormonal receptors may lead to a significance prognostic and better treatment with higher survival rate among the breast cancer patients.

## Characteristics of Subjective QOL of Elderly People with Dementia in China and Japan

**C SUISHU<sup>1</sup>, T ISHITANI<sup>2</sup>, S HATTORI<sup>2</sup>**

<sup>1</sup>*National University Hospital, Japan,* <sup>2</sup>*Wakayama Medical University, Japan*

### Introduction:

A meta-analysis of 23 studies worldwide shows that the annual development-of-symptoms rate of Alzheimer-type dementia increases exponentially. Health professionals need to maintain the comfort and quality of life (QOL) of cognitively impaired elderly persons, whose numbers are increasing rapidly, and their families. Therefore, we examined the subjective QOL of such persons in Japan and China, and extracted its characteristics.

### Methods:

Subjects were adults (205 Japanese, 187 Chinese) with dementia aged  $\geq 65$  years, scoring 23 – 15 on the Mini Mental State Examination. Survey items included age, sex, personality, educational background, economic conditions, past illness, and instrumental activities of daily living (IADL), and the Dementia Quality of Life Instrument (D-QOL). We conducted a one-way analysis of variance, multiple comparisons, and a chi-square test.

### Results:

The mean age of the Japanese men ( $n = 37$ ) was  $84.3 \pm 8.6$  years, Japanese women ( $n = 168$ ) was  $85.7 \pm 6.5$  years, Chinese men ( $n = 81$ ) was  $77.0 \pm 6.7$  years, and Chinese women ( $n = 106$ ) was  $79.9 \pm 6.8$  years. Mean D-QOL scores of the Japanese and Chinese were  $118.3 \pm 14.6$  and  $90.1 \pm 15.2$ , respectively. Japanese D-QOL scores differed significantly by IADL functioning, educational background, and personality; Chinese scores, by past illness and economic condition.

### Discussion & Conclusion:

In Japan, lifelong learning, functional training, and enhancement of personal dignity are necessary to maintain QOL of elderly dementia patients. In China, preventive strategies and sufficient medical care with no additional cost are necessary for the same.

## Audit of Readmissions to a Palliative Care Unit in a Tertiary Hospital

**SY YANG<sup>1</sup>, YMA HUM<sup>1</sup>, HY WU<sup>1</sup>**

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

### Introduction:

The Palliative Medicine Department in Tan Tock Seng Hospital provides support for patients with advanced non curative illnesses, either directly within the palliative medicine department, or via inter-departmental referrals. Most patients continue to have the support of community teams on discharge. Readmissions to the hospital are an indicator of quality of care. Our aim was to determine reasons for patients' readmission within 2 weeks of discharge from a tertiary care hospital.

### Methods:

A retrospective review of clinical charts was conducted for patients readmitted within 2 weeks. The study period was for 3 months from September to December 2010.

### Results:

Forty-eight readmission episodes within 2 weeks were analysed. Constituting 10% of all readmissions in the year, most readmissions were unplanned for during the initial admission, with average time to readmission in 6.8 days. Most patients were admitted for physical symptoms, the most commonly encountered being dyspnoea, pain and drowsiness. Only 1 readmission episode was primarily due to unhappiness with care arrangements. Caregiver and community hospice support were present in 85% and 65% respectively of readmission episodes prior to readmission. However, following readmission, there was a significant increase in placement in inpatient hospice or death (>40%).

### Discussion & Conclusion:

Though the number of readmissions within 2 weeks is small, there were similarities to readmission symptoms. The presence of caregivers and home hospice support did not prevent readmissions in the many patients. Difficult physical symptoms contribute to hospital readmissions, and inpatient hospice can be an alternative to readmission.

## Factors Affecting Psychological Distress in Informal Caregivers of Singapore Elderly

**S SHAFIE<sup>1</sup>, E ABDIN<sup>1</sup>, M SUBRAMANIAM<sup>1</sup>, JA VAINGANKAR<sup>1</sup>, SA CHONG<sup>1</sup>**

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

### Introduction:

Studies have shown that distress of caregivers of elderly people is associated with their relatives' behavioural and psychological symptoms (BPSD). This paper aims to examine informal caregivers' distress and its relationship with BPSD in the elderly and factors affecting this relationship. We hypothesised that increase in BPSD in the elderly will be associated with increase in caregivers' distress.

### Methods:

A population-based study of 1045 caregivers of elderly (i.e. those aged 60 and above) in Singapore was conducted using the Self-Reporting Questionnaire (SRQ-20) and Neuropsychiatric Inventory Questionnaire (NPI-Q) to measure caregivers' distress and BPSD, respectively. Higher scores indicate more distress and more BPSD observed. Caregivers provided socio-demographic details including social support from family and friends, and paid/unpaid helpers.

### Results:

The caregivers sample comprised 62.6% females and 37.4% males with mean age of 56 years. SRQ-20 was significantly associated with NPI-Q (crude  $\beta = 0.372$ ,  $P = 0.02$ ,  $R^2 = 0.06$ ). After adjusting for caregivers' socio-demographic factors and social support in multiple linear regression, SRQ-20 remained significantly associated with NPI-Q (adjusted  $\beta = 0.526$ ,  $P = 0.005$ ,  $R^2 = 0.35$ ). In the adjusted model, part-time workers (versus full-time) and widows (versus never married) were negatively associated with SRQ-20 (adjusted  $\beta = -1.92$ ,  $P = 0.007$ ; adjusted  $\beta = -1.84$ ,  $P = 0.01$  respectively). No education (versus completed tertiary) was positively associated with SRQ-20 (adjusted  $\beta = 2.84$ ,  $P = 0.0009$ ).

### Discussion & Conclusion:

Informal caregivers' distress was significantly associated with their relatives' BPSD, after adjusting for caregivers' socio-demographic factors and social support. Caregivers need help in managing BPSD through education on the illness and behavioural interventions for the elderly. Flexible work arrangements should be an option for caregivers, particularly full-time workers.

## Is Face-to-Face Handover Better Than Handphone Handover?—A Multi-Centre Simulation Study

**K SIAH<sup>1</sup>, YKL FONG<sup>1</sup>, X YANG<sup>2</sup>, T PARK<sup>2</sup>, C WICKENS<sup>3</sup>, TW LIM<sup>4</sup>, SQ YIN<sup>4</sup>**

<sup>1</sup>*National University Hospital, Singapore,* <sup>2</sup>*Nanyang Technological University, Singapore,*  
<sup>3</sup>*Alion Science & Technology, United States,* <sup>4</sup>*Changi General Hospital, Singapore*

### Introduction:

Face-to-face handover is often regarded as the gold-standard of handover. It required the meeting of 2 individuals in the same locality. It becomes complicated when multiple parties are involved. However, there were limited studies comparing face-to-face with handover methods using handphone. We aimed to compare the effectiveness of face-to-face and 5 other handphone handover methods.

### Methods:

We designed a simulated experiment. Sender studied each case record for 3 minutes and performed handover by one of the randomised method. Receiver then answered questionnaire developed by 2 Subject Matter Experts. A blinded (to handover method) assessor scored the questionnaire. Handover effectiveness was evaluated by memory recall and case comprehension. Subjective receiver evaluation and time taken for handover were recorded.

### Results:

Twenty-eight residents from NUH, AH and CGH participated in the study. Using Handphone (stationary) as the control, a one-way ANOVA revealed handphone (moving) and voice message performed poorly compared to handphone (stationary) in both memory recall and case comprehension ( $P < 0.05$ ). Handphone (stationary) in turn was worse than handphone plus online record review with regards to case comprehension but no difference in memory recall. There was no difference in handover effectiveness between face-to-face and handphone (stationary). Face-to-face handover also took significantly longer time (2.42min vs 2.16min,  $P < 0.05$ ).

### Discussion & Conclusion:

Face-to-face was not better than handphone handover and it also took longer to execute. Handphone handover complimented by online record review was better than handphone alone for case comprehension.

## Prevalence of Anaemia in Patients on Aspirin Medication in a Primary Care Setting

**R MK LEE<sup>1</sup>, E S LEE<sup>1</sup>**

<sup>1</sup>*National Health Group Polyclinics, Singapore*

### **Introduction:**

The prevalence of anaemia in patients in the primary care setting in Singapore is unknown. Anaemia often goes unnoticed as patients present with non-specific symptoms. The main aim of this study is to investigate the prevalence of anaemia in the general population and patients who are prescribed aspirin.

### **Methods:**

A cross sectional study was done for all patients who had a full blood count done in the clinics from 1st January to 31st December 2012. Data was analysed with SATA SE\_version12.

### **Results:**

The prevalence of anaemic patients in a total population of 74,511 was noted to be 34.8%. There were more female than male patients with anaemia (RR:1.38) but more elderly males than female patients were anaemic (RR:1.15). Majority of the anaemic patients falls into the normochromic and normocytic type (59.5%). A total of 41,045 patients were prescribed aspirin. Female patients who were on aspirin have a higher prevalence of anaemia of 19.1% as compared to male patients of 12.1% ( $P < 0.01$ ). The uptake of FOBT (faecal occult blood test) is less than 2%.

### **Discussion & Conclusion:**

The prevalence of anaemia noted is consistent with that found in other countries. An annual screen of full blood count is able to pick up one anaemic patient in every 5 female patients as compared to one in every 8 male patients on aspirin medication. Further study needs to be conducted to explore this difference and shed light on the reasons for low FOBT uptake among iron-deficient patients.



## **Does a Blended Interprofessional Learning Workshop Improve Infection Control Knowledge Among Primary Care Healthcare Teams?**

**K NG<sup>1</sup>, CC YAN<sup>1</sup>, YF SIM<sup>1</sup>, P KANNAN<sup>1</sup>, ACS TOH<sup>1</sup>, F NG<sup>2</sup>**

<sup>1</sup>National Healthcare Group Polyclinics, Singapore, <sup>2</sup>Assisi Hospice, Singapore

### **Introduction:**

Each NHG Polyclinic has an appointed multi-disciplinary Infection Control Team (ICT). This study aims to evaluate the impact of an infection control workshop incorporating inter-professional team-learning on the acquisition of infection control knowledge among the participants.

### **Methods:**

The multi-disciplinary ICT from each of the polyclinics received updates on many key concepts on infection control conducted in an interactive and interprofessional manner. A pre and post-workshop questionnaire measured the impact of the workshop on the infection control knowledge of the participants. Wilcoxon signed-rank test was employed to compare the knowledge level before and after workshop.

### **Results:**

A total of 40 participants attended the workshop. The average baseline knowledge score was 71.64 (95% CI, 67.14 to 76.12). Upon completion of 'intervention' (blended interprofessional team-learning workshop), there was significant improvement in the infection control knowledge among the participants (mean=85.45, 95%CI, 81.63 to 89.28,  $P < 0.001$ ). The doctors and nurses were found to have significantly higher baseline knowledge score (mean=81.81, 95%CI, 76.62 to 87.01) compared to other categories of healthcare staff ( $P < 0.001$ ). Nevertheless, the overall infection control knowledge score after the 'interventional' workshop (mean=93.88, 95% CI, 89.60 to 98.16) remained significantly higher than the baseline ( $P = 0.004$ ). The improvement in infection control knowledge remained statistically significant after adjusting for different healthcare professional groups ( $P = 0.019$ ).

### **Discussion & Conclusion:**

The blended inter-professional team-learning approach resulted in improved overall infection control knowledge among all categories of primary healthcare professionals. The workshop bridged the variation and equalised the level of knowledge and understanding of infection control among the various healthcare professionals within the same team.

## **Patient Satisfaction with Pharmacist-managed Hypertension-Diabetes-Lipids Clinic and its Relation to Medication Adherence and Beliefs About Medication**

**GJS CHEAH<sup>1</sup>, CXY LIEW<sup>1</sup>, ESJ BEK<sup>1</sup>, JYC LEE<sup>2</sup>**

<sup>1</sup>*National Healthcare Group Pharmacy, Singapore,* <sup>2</sup>*National University of Singapore, Singapore*

### **Introduction:**

The pharmacist-managed Hypertension-Diabetes-Lipids Clinic (HDL-C) at 6 National Healthcare Group (NHG) Polyclinics provides drug optimisation for patients with diabetes, hypertension and dyslipidemia. We hypothesised that patient satisfaction with clinic sessions leads to better medication adherence and beliefs.

### **Methods:**

This was a prospective, cross-sectional study conducted on patients following up at NHG Polyclinics pharmacist-managed HDL-C service. From August 2012 to January 2013, patients were subjected to an interviewer administered paper survey either before or after HDL-C sessions. The survey consisted of the Updated Patient Satisfaction Instrument, Morisky-8 Medication Adherence Questionnaire and Beliefs about Medicines Questionnaire (BMQ) to assess patient's satisfaction with HDL-C services, adherence to medication and medication beliefs respectively. Pearson correlation was used to assess correlation between patient satisfaction to both adherence and beliefs. All analysis was performed on PASW Statistics 18.

### **Results:**

One hundred and forty completed surveys were obtained. 87.9% of respondents were satisfied with HDL-C services. 47.9% of patients surveyed reported high and medium adherence. There was no observable correlation between patient satisfaction and medication adherence ( $r = -0.001$ ,  $P = 0.993$ ). A statistically significant correlation was observed between patient satisfaction with the specific necessity ( $r = 0.306$ ,  $P < 0.001$ ) and general overuse ( $r = -0.183$ ,  $P = 0.03$ ) domains of the BMQ. Correlation between patient satisfaction and the specific concern ( $r = -0.111$ ,  $P = 0.19$ ) and general harm ( $r = -0.131$ ,  $P = 0.124$ ) domains of the BMQ did not reach statistical significance.

### **Discussion & Conclusion:**

Patient satisfaction with pharmacist managed HDL-C services led to better beliefs about medication but not adherence.

## Anthropometric Measures and Cognition in the Singapore Elderly

**GK ENG<sup>1</sup>, M SUBRAMANIAM<sup>1</sup>, E ABDIN<sup>1</sup>, JA VAINGANKAR<sup>1</sup>, SA CHONG<sup>1</sup>**

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

### Introduction:

Anthropometric measures are reported to be associated with cognition. However, most studies were conducted on Western and adult populations. This study aims to establish the correlation between anthropometric indices and cognition in the Singapore elderly.

### Methods:

The analytic sample consisted of 928 respondents aged 60 years and above, as part of an ongoing population-based epidemiology study. Trained interviewers administered cognitive tests [Modified-Community-Screening-Instrument-for-Dementia (CSI-D), CERAT-word-list], and collected demographic information and physical measurements. Anthropometric indices included were body mass index (BMI); waist circumference (WC); waist-to-hip ratio (WHR); waist-to-height ratio (WHtR), adjusted for age, sex, ethnicity, blood pressure and smoking status. Principal component analysis (PCA) with Varimax-Rotation and multiple-linear-regression analysis were performed.

### Results:

Mean age of the sample was 70.7 years [SD=8.7], comprising 48.5% Males, an ethnic composition of Chinese/Malays/Indians of 28.0%/40.3%/30.1%; with 60.4% completing at least Primary-education. Three factors were derived from PCA [Factor 1 — Object-Naming & Description; Factor 2 — Memory; Factor 3 — Orientation & Executive-Functioning], explaining 58.9% cumulative-variance. A Composite-Score was also derived. All cognitive factors were adjusted for age, sex, ethnicity and education. Multiple-regression analyses revealed associations of increased WHR with poorer Composite [ $\beta = -0.15$ ,  $t(927) = -2.8$ ,  $P < 0.01$ ] and Factor 1 scores [ $\beta = -0.18$ ,  $t(927) = -3.1$ ,  $P < 0.01$ ], while increased BMI was related to higher Factor 2 scores [ $\beta = 0.21$ ,  $t(927) = 2.8$ ,  $P < 0.01$ ].

### Discussion & Conclusion:

This is the first study that investigates anthropometric indices on a community cognitive screener in a multi-ethnic elderly sample. Our study shows that central-obesity (WHR) is more appropriate in informing about cognition, and we postulate BMI to be a proxy of nutritional status. Our study findings are important and will drive research to investigate the biology behind these relationships.

## Clinical Decision Support for High-priority Drug-drug Interactions: Evaluation of a Commercial Medication Knowledge Base

**A SOH<sup>1</sup>, R OW<sup>1</sup>, GK LIM<sup>1</sup>, A LEE<sup>1</sup>, P XIE<sup>1</sup>, BP LIM<sup>1</sup>**

<sup>1</sup>*National Healthcare Group HQ, Singapore*

### Introduction:

Clinical decision support (CDS) in electronic medication records (EMR) has the potential to reduce adverse events caused by drug-drug interactions (DDIs). Minimally, CDS for DDIs should be able to identify drug combinations which are contraindicated due to the potential for high-severity DDIs. Our objective was to evaluate the adequacy of CDS provided by a commercial medication knowledge base (KB) for high-priority DDIs.

### Methods:

A published list of 15 high-priority drug-drug, drug-class or class-class interactions recommended for inclusion into CDS KBs by an expert panel was identified. All possible interacting pairs for each recommended interaction were permuted. Interacting pairs available for prescribing were evaluated in a test environment of an EMR. The presence or absence of an alert was documented for each interacting pair. These results were aggregated and matched against the recommendations made by the expert panel.

### Results:

Of the 15 high-priority interactions, 4 were excluded because either the object or precipitant drug or class was not available for prescribing. Of the remaining 11 drug-class or class-class interactions, 2 had alerts for all interacting pairs evaluated. The other 9 had alerts only for some of the permuted interacting pairs.

### Discussion & Conclusion:

The commercial CDS KB evaluated does not adequately fulfill the requirements for alerting prescribers to high priority DDIs. Further work is required to evaluate the best approach to implementing a computerised CDS that adequately identifies clinically significant DDIs, taking into consideration other factors such as patient conditions and dosing regimen.

## A Normative Study on the National University Health System Aphasia Screening Test

**SK JAMIL<sup>1</sup>, EY GUO<sup>1</sup>, SKR LIOW<sup>2</sup>, NAA NASSER<sup>3</sup>**

<sup>1</sup>*National University Hospital, Singapore,* <sup>2</sup>*National University of Singapore, Singapore,*

<sup>3</sup>*Early Years Centre, AWWA Integration Services, Singapore*

### **Introduction:**

No formalised aphasia screener has been designed for the Malay-speaking population in Singapore. Clinicians often have to rely on informal language assessments or translations, which may not be culturally or linguistically appropriate due to the differences in languages.

### **Methods:**

Based on the cognitive neuropsychological model of the Malay language, a screener was developed to assess all modalities of language processing (understanding, speaking, reading and writing) across 10 subtests. Performance of neurologically-intact adults aged 40 to 60 years old Malay-English bilinguals (n = 30) were recorded and tabulated.

### **Results:**

Neurologically-intact adults performed near ceiling on the test. Minimum and maximum scores, as well as means and standard deviations, were identified to establish performance of normal healthy participants.

### **Discussion & Conclusion:**

The NUHS AST Malay version illustrates how the use of cognitive neuropsychological approach can be applied as a framework for a culturally and linguistically appropriate screener. The screener can assist clinicians in identifying the breakdown of any language processing pathways to facilitate differential intervention for Malay-speaking persons with aphasia.

## **A Pilot Study on the Integration of a Cognitive-Behavioral Therapy-Based Computer Game in the Clinical Treatment of Childhood Anxiety**

**LP ONG<sup>1</sup>, SH ONG<sup>1</sup>, K YEO<sup>1</sup>**

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

### **Introduction:**

This pilot study examined 2 models of adjunctive use of a role-playing computer game CASTLE-AC (Computer-Assisted Strategies to Lessen Excessive Anxiety in Children) developed by the Child Guidance Clinic (CGC) based on cognitive behavioral therapy (CBT) principles to treat clinically anxious children.

### **Methods:**

Twenty-one participants, aged between 9 and 12 years and diagnosed with an anxiety disorder at CGC were randomly assigned to the 8-session aomputer-assisted therapist (CAT) programme, 3-session therapist-assisted computer (TAC) programme or treatment-as-usual 8-session CBT workbook control group.

### **Results:**

Significant improvement in parent-report of child anxiety (Spence Children Anxiety Scale) was found for children in the CAT program (n = 7) at 3-months follow up ( $P < 0.05$ ) while significant improvements in the self-report Asian Children Anxiety Scale ( $P < 0.05$ ) and doctors' ratings on the Clinical Global Impressions scale ( $P < 0.01$ ) were found for children in the TAC program (n = 6). As for children in the CBT workbook control group (n = 8), significant improvement was only reported by the attending doctors at post-treatment ( $P < 0.05$ ). One-way ANOVA indicated no significant differences in improvement between the 3 treatment groups. The participants generally indicated more favorable ratings to learning anxiety management skills through the CASTLE-AC computer program rather than through a workbook. Although the participants had fewer sessions with the psychologists in the TAC program, this did not significantly affect the child-reported level of therapeutic alliance with the psychologist.

### **Discussion & Conclusion:**

Hence, this pilot study demonstrated the utility and efficacy of integrating a CBT-based computer game to treat childhood anxiety without compromising therapeutic alliance.

## Barriers of Whole-grain Intake Among Healthcare Workers in National Healthcare Group Polyclinics

**L GOH<sup>1</sup>, BC KWOK<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

### Introduction:

Diets rich in whole-grains improve health and reduce risk of chronic diseases. A total of 59.6% of National Healthcare Group Polyclinics (NHGP) staff are consuming at least one serving of whole-grains everyday above the national comparison (27%, National Nutrition Survey 2010). As a first step, this study investigated NHGP staff's knowledge and perception to identify barriers of whole-grain intake.

### Methods:

A self-administered questionnaire was carried out at NHGP headquarters and all 9 NHG Polyclinics over a 1-week period in March 2013. The questionnaire collected information on staff's knowledge and perception towards whole-grains, their health belief about the associations between whole-grains and chronic diseases, and barriers to whole-grain consumption (taste, hassle to cook, cost, availability, time constraints, isolation and knowledge). One thousand and seventy-seven survey forms were collected and 1048 included in analysis. Logistics regression analysis was performed to identify potential factors associated with daily whole-grain intake.

### Results:

Most staff agreed that eating whole-grains would reduce their risk of cancer (74.2%), heart disease (83.7%), diabetes (85.7%), aid weight reduction (61.3%), and promote healthy digestive system (90.3%). There was no association between knowledge of whole-grains and daily whole-grain intake. Taste was the main barrier (42.1%), followed by cost (25.6%). Staff aged 40 years and above are more likely to eat whole-grains everyday (OR=2.02, 95% CI, 1.27 to 3.23,  $P = 0.003$ ). Staff who like the taste of whole-grains are more likely to consume whole-grains everyday (OR=3.24, 95% CI, 2.01 to 5.25,  $P < 0.001$ ), while staff who feel that whole-grains are more expensive are less likely to eat whole-grains everyday (OR=0.61, 95% CI, 0.39 to 0.95,  $P = 0.029$ ).

### Discussion & Conclusion:

Most staff recognised the positive benefits of whole-grains but intake was inadequate. Main barriers to intake were taste and cost. Interventions should focus on improving taste and perception of whole-grains. Community education on tasty, cost effective strategies to increase consumption, and increasing availability of affordable whole-grain foods could help promote whole-grain intake.

## A Novel Approach to Lead Screening

**M TONG<sup>1</sup>**

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

### **Introduction:**

Lead aprons are worn in for the specific role of providing radiation shielding against secondary radiation. Major utilisation areas include the radiology, OTs and cardiology during diagnostic imaging examinations. Lead aprons are screened minimally annually to ensure no compromise to the lead shielding integrity. The routine approach is to employ the use of fluoroscopy. The study explores the alternate concept of screening by performing a CT topogram on the lead aprons.

### **Methods:**

Thirty lead aprons in good condition and 2 defective lead aprons were randomly selected and screened fluoroscopically for comparison with corresponding images obtained from the same lead aprons screened by CT topograms. Images obtained from the respective imaging equipments were collected for records.

### **Results:**

No discrepancy or compromise was found in both screening methodologies for both the good lead aprons and those with cracks and tears as shielding defects.

### **Discussion & Conclusion:**

Screening lead aprons with CT topogram hinges on the fundamental concept of radiographic inspection of lead. Technically, plain x-ray of lead aprons offers the same information albeit with different image interpretation. This study prequels a second study on radiation safety. Of major significance would be the amount of radiation dose reduction where the obvious difference lies in the operator being out of the scanning room during a CT topogram as compared to being in the room during a fluoroscopy. In a setting where the number of lead protective garments and accessories is massive, the amount of radiation dose reduction may be worth investigating.



## Effects of Computed Tomography Contrast on Bone Scans

**M TONG<sup>1</sup>, J WHEAT<sup>2</sup>, GCURIE<sup>2</sup>**

<sup>1</sup>*National University Hospital, Singapore,* <sup>2</sup>*Charles Stuart University, Australia*

### **Introduction:**

Diagnostic imaging modalities such as nuclear medicine and computed tomography (CT) work in tandem in diagnosing patients' clinical pathology. The study seeks to build upon and extend the findings of existing literature regarding the effect of CT scans with contrast specifically on nuclear medicine bone scans. Turning up for 2 studies on separate days is less convenient for the patient. The relevant findings would influence reporting confidence and may also affect referring physicians' decisions in arranging for both types of imaging on the same day.

### **Methods:**

Thirty bone scan images of patients administered with CT contrast on the same day were collected retrospectively and evaluated in terms of quality by comparison with a 'normal' bone scan's diagnostic value and scale graded.

### **Results:**

The clarity of the images were graded as 90% and above with the other images graded as having only insignificant changes.

### **Discussion & Conclusion:**

This study confirms the null hypothesis of no significant difference in image resolutions. However, this study sample may not have accurately reflected the full spectrum of characteristics, resulting in the possibility of random sampling error and reflects variability or chance variation that may occur from sample to sample due to the limited sample size. Future more concise study should include variables such as standardising the amount of contrast administered to allow for replication due to chemistry effects, classifying the types of contrast used as variations in the chemical makeup may have various impacts on bone scans and consistent injection timings as the body metabolises different chemicals at different rates.

## **Serum Brain-Derived Neurotrophic Factor (BDNF) Mediates the Effect of Smoking on Increased Framingham 10-year CVD Risk in Patients with Schizophrenia**

**M NURJONO<sup>1</sup>, J LEE<sup>1</sup>**

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

### **Introduction:**

Brain Derived Neurotrophic Factor (BDNF) is implicated in schizophrenia, smoking, and play a role in the cardiovascular system. Smoking is highly prevalent among patients with schizophrenia and is a well-known risk factor for cardiovascular diseases (CVD). We hypothesised that BDNF mediates the effect of smoking on CVD risk. Therefore, this study aims to examine the relationship between smoking, BDNF and CVD risk.

### **Methods:**

Sixty-four Chinese patients with schizophrenia were recruited into the study. All study participants provided venous blood for fasting lipid, glucose and BDNF measurements. Demographic and smoking history was obtained. Subsequently, CVD risk for each participant was computed using the Framingham 10-year CVD Risk (FRS).

### **Results:**

The prevalence of smoking in our sample is 25%. The mean FRS was 4.9% (SD 5.1). Serum BDNF was significantly higher in smokers ( $P = 0.020$ ). A dose-dependent increase in BDNF was observed with smoking intensity ( $P = 0.047$ ). After adjusting for age and gender, smoking ( $P < 0.001$ ) and serum BDNF ( $P = 0.010$ ) were found to be independently associated with the FRS.

### **Discussion & Conclusion:**

This study revealed that smoking increased serum BDNF level in a dose dependent manner. Both smoking and serum BDNF were independently associated with increased 10-year CVD risk among patients with schizophrenia. This suggests that BDNF could be a mediator between smoking and CVD risk. Further studies are needed to confirm the relationship between BDNF and CVD risk.

## Prevalence and Predictors of Employment Among the Singaporean Elderly

**V SAGAYADEVAN<sup>1</sup>, E ABDIN<sup>1</sup>, M SUBRAMANIAM<sup>1</sup>, JA VAINGANKAR<sup>1</sup>,  
SA CHONG<sup>1</sup>**

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

### Introduction:

Several studies have emphasised retention of the elderly in the workforce given its role in increasing financial independence and its association with general physical and psychological well-being. The current study aims to explore the prevalence of employment and its socio-demographic correlates among Singaporean elderly, and its association with self-reported well-being.

### Methods:

The current study utilised data from a larger, ongoing cross-sectional study examining the well-being of Singaporean elderly. Socio-demographic information, self-reported life-satisfaction and happiness data from 1091 participants (Age range: 60 years and above) was analysed using a multinomial logit model.

### Results:

Of the elderly population, 30.8% were employed (part-/full-time), 1.5% were unemployed, and 67.7% were economically inactive (home makers, retirees, and pensioners). Elderly aged 60 to 74 years were significantly more likely to be employed (versus economically inactive) than those who were 75 years and above. Indians, Malays (versus Chinese), males (versus females), elderly with tertiary/further education (versus no formal education), and individuals who were head of their households were also more likely to be employed. Marital status, and having children were not significant correlates of employment status. Unemployed individuals were significantly more likely to be unhappy compared to those who were economically inactive. The relationship between employment status and life satisfaction however, was not significant.

### Discussion & Conclusion:

Lower age and higher educational qualifications were associated with a higher likelihood of being employed. Although, employment was not significantly associated with self-reported well-being, the shrinking tradition of extended families and aging population necessitates measures to engage the elderly in the workforce past their retirement age.

## **Evaluating the Impact of Inpatient Accelerated Palliative Radiation Therapy Programme in Reducing Inpatient Hospitalisation**

**CY KOH<sup>1</sup>, CN LEONG<sup>2</sup>**

<sup>1</sup>*National University Hospital, Singapore,* <sup>2</sup>*National Cancer Institute, Singapore*

### **Introduction:**

This is a retrospective study to investigate the impact of an “Inpatient accelerated palliative radiation treatment programme” to reduce inpatient stays for palliative radiation treatment. The programme involves all inpatients identified by the Radiation Oncologists for palliative radiation treatment in the host institution. Inpatients in the programme are expected complete treatment between 5 to 9 working days.

### **Methods:**

A retrospective data collection will study 370 inpatients over a period of 36 months who underwent palliative radiation treatment in Radiotherapy Centre. Patients will be selected over an 18 month period pre-programme (August 2009 to January 2011) and post-programme (February 2011 to July 2012). Retrospective review of the data will be obtained from Radiation Therapy Management System (MOSAIQ), Patient management system (SAP) and clinical data from the Medical Records Office (MRO). Data collection will include ward admission data, treatment waiting time and re-admission data pre and post programme.

### **Results:**

Inpatients who were selected for the inpatient accelerated palliative radiation therapy programme experienced shorter waiting time for consultation, CT-Simulation and radiation treatment.

### **Discussion & Conclusion:**

Inpatients selected for the inpatient accelerated palliative radiation therapy programme experienced shorter waiting time for consultation, CT-Simulation and radiation treatment. Promotion/knowledge of programme to oncology inpatient wards could further shorten inpatient waiting time from admission, treatment to discharge.

## **Sustaining Positive Results in the Reduction of Appointment Default Rates of Patients Discharged from an Acute Psychiatric Ward**

**S ENG<sup>1</sup>, SSL ENG<sup>1</sup>, A SU<sup>1</sup>, M HENDRIKS<sup>1</sup>**

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

### **Introduction:**

Institute of Mental Health (IMH) faces a high default rate for TCU or follow-up appointments. According to data from March 2010 to March 2011, the hospital's average monthly TCU default rate stood at 18.67%. In ward 33B, the default rate was 12%. A Clinical Practice Improvement Project was initiated to reduce the rate of TCU in April 2011. The initial results of the implementation (telephone calls on discharge, meeting patients at the clinic, sending them decorated reminder letters) revealed a 6.8% default rate. The members strive to sustain the project and continued to refine the implementation strategies. This paper describes the results.

### **Methods:**

The team used the PDSA methodology to refine its strategies which included increase in psychoeducation sessions, more phone calls and meeting of patients in Outpatient Clinic. Data mining was done to illicit the results of patients were discharged and who had defaulted on TCU.

### **Results:**

After the implementation of the project (July to December 2011) the default rate was 8.69%. However the project revealed improved suitability results: (i) January to June 2012 had default rate of 2.99%, (ii) July to December 2012 had default rate of 6.96%, and (iii) January to April 2013 had default rate of 7.97%. Therefore the sustainability results of the CPIP revealed a mean average of 5.72% default rate.

### **Discussion & Conclusion:**

It is evident that our strategies have proven to be effective. We will continue to monitor further outcomes, to provide quality care for our patients and we intend to spread this project to the other wards.

## Socio-demographic Correlates of Positive Mental Health

**L PICCO<sup>1</sup>, J VAINGANKAR<sup>1</sup>, M SUBRAMANIAM<sup>1</sup>, E ABDIN<sup>1</sup>, SA CHONG<sup>1</sup>**

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

### Introduction:

Positive Mental Health (PMH) instrument is a validated, multi-dimensional measure comprising General Coping (GC), Emotional Support (ES), Spirituality, Interpersonal Skills (IS), Personal Growth and Autonomy (PGA) and Global Affect (GA) domains. This paper describes the socio-demographic differences for total PMH and domain-specific scores among residents in Singapore.

### Methods:

Using a quota sample, residents of Chinese, Malay or Indian ethnicity, aged 21 to 65 years, residing in households across Singapore were recruited to complete the self-administered shortened PMH instrument. The anonymous survey also collected socio-demographic information and incorporated other measures. Independent t-tests and one-way ANOVA tests were conducted to examine the mean differences in domain-specific and total PMH scores by socio-demographic characteristics.

### Results:

Among the 201 participants, the mean age (SD) was 40.6 (12.3) years, with almost equal proportions of Chinese (34.3%), Malays (31.3%) and Indians (34.4%). The majority of participants were married (64.7%) and employed (81.1%). Significant differences in ES and PGA scores were observed by gender, while significant differences were observed for spirituality, IS and total PMH scores by ethnicity. GC, PGA, GA and total PMH scores were significantly higher among younger (21 to 39 years) versus older (40 to 65 years) participants. ES was the only domain where significant differences were observed by education. Significant differences were not found for total PMH or any of the domains for marital or employment status.

### Discussion & Conclusion:

Our findings indicate that PMH is associated with age, gender and ethnicity. Further research is needed to better understand these findings, which in turn would have implications for building resilience in the local population.

## Unravelling the Relationship Between Obesity, Schizophrenia and Cognition

**J LIM<sup>1</sup>, NAA RASHID<sup>1</sup>, M LAM<sup>1</sup>, RSE KEEFE<sup>2</sup>, J LEE<sup>1</sup>**

*<sup>1</sup>Institute of Mental Health, Singapore, <sup>2</sup>Duke University, United States*

### **Introduction:**

Previous studies investigating the relationship between obesity and cognition as well as gender differences in these relationships reported equivocal results. Here, this study examines age, years of education, schizophrenia, and gender differences which might affect the relationship between obesity and cognition.

### **Methods:**

One thousand and twelve healthy controls and 707 participants with schizophrenia were recruited. Information on Body Mass Index (BMI) was obtained and a neurocognitive battery was administered. Structural equation modelling (SEM) was performed to examine the relationships between BMI, schizophrenia, cognition and its covariates.

### **Results:**

No significant direct effect of BMI on cognition was found when cognition was regressed on age, years of education, diagnosis of schizophrenia and BMI. Instead, 2 SEM models indicated that indirect effects between BMI and cognition exist. The indirect effect of BMI on cognition through schizophrenia was the strongest in both genders, while the indirect effect of cognition on BMI through schizophrenia was only found in females. We also noted that females had a larger total indirect effect of BMI on cognition compared to males. BMI affecting cognition through age, years of education and schizophrenia appears to be the most plausible model that explains the data.

### **Discussion & Conclusion:**

With increased rates of obesity in schizophrenia, it is important to highlight potentially deleterious effect of obesity at the cognitive level. BMI could be used as a candidate risk marker to identify people at higher risk for cognitive deficits, and as an intervention target for modifications of cognitive outcomes.

## Relationship Between Measures of Mental Health and Functional Impairment in Primary Care

**KC LOKE<sup>1</sup>, WT ZENG<sup>1</sup> MY WONG<sup>1</sup>, JX LAI<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

### Introduction:

Research supports significant relationship between mental health symptoms and functional levels. This study explores whether these findings are replicated for patients in primary care in Singapore, for measures of depression, anxiety and insomnia.

### Methods:

Measures for depression, anxiety and insomnia were administered to 64 patients by psychologists at a National Healthcare Group Polyclinic seen in May 2013: Patient Health Questionnaire (PHQ9), Generalised Anxiety Disorder (GAD-7) and Insomnia Severity Index (ISI), respectively. Measures of functional impairment: Sheehan Disability Scale (SDS) and Global Assessment of Functioning (GAF).

### Results:

PHQ9 ( $\bar{x}$ =6.69), GAD7 ( $\bar{x}$ =6.73), ISI ( $\bar{x}$ =8.13), SDS ( $\bar{x}$ =6.06), GAF ( $\bar{x}$ =66.06). SDS and GAF ( $r$ =-0.77,  $P$  <0.01), PHQ9 and SDS ( $r$ =0.62,  $P$  <0.01), GAD7 and SDS ( $r$ =0.44,  $P$  <0.01), ISI and SDS ( $r$ =0.49,  $P$  <0.01), PHQ9 and GAF ( $r$ =-0.74,  $P$  <0.01), GAD7 and GAF ( $r$ =-0.66,  $P$  <0.01), ISI and GAF ( $r$ =-0.52,  $P$  <0.01).

### Discussion & Conclusion:

Significant relationships were found between SDS and GAF, and for mental health measures with SDS and GAF. Previous findings are replicated for this sample of primary care patients. The relationship between SDS that showed no significant functional impairment in this sample, and the mental health measures, do not enhance the meaning of patients' mental health status. Thus, it appears not to add value in informing about the nature of psychological interventions for targeted management of mental health symptoms. GAF, instead, appears to offer more meaningful details about patients' functional status with changes in mental health measures. Given the nature of primary care patients and their functional levels, the findings have implications for choice of measure for functional impairment for patients in primary care settings.



## Prevalence and Correlates of Heart Disease: Findings from the Singapore Mental Health Study

**L PICCO<sup>1</sup>, M SUBRAMANIAM<sup>1</sup>, E ABDIN<sup>1</sup>, JA VAINGANKAR<sup>1</sup>, SA CHONG<sup>1</sup>**

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

### Introduction:

Heart Disease (HD) is one of the leading causes of morbidity and mortality worldwide. This paper describes the prevalence and association of HD with mental disorders and other chronic physical conditions among the adult resident population in Singapore.

### Methods:

The Singapore Mental Health Study was a representative, cross sectional epidemiological survey of adult residents in Singapore. The Composite International Diagnostic Interview Version 3.0 was used to establish the diagnosis of mental disorders. A chronic medical conditions checklist was also used and respondents were asked to report if a doctor had diagnosed them with any of the 15 physical conditions listed, including various types of HD.

### Results:

The lifetime prevalence of HD in the Singapore general population was 2.8% (n = 192). Socio-demographic correlates of HD included older age, Indian ethnicity, secondary education (vs. tertiary) and being economically inactive. The odds of major depressive disorder (MDD) (OR = 4.0) and bipolar disorder (OR = 11.0) were significantly higher among those with HD, after adjusting for socio-demographic variables and other comorbid physical conditions and mental disorders. HD was also significantly associated with other physical conditions including diabetes (OR = 3.1), arthritis (OR = 2.0), kidney failure (OR = 6.1) and lung disease (OR = 3.6), after adjusting for socio-demographic variables and other comorbid physical and mental disorders.

### Discussion & Conclusion:

These findings highlight important associations between HD and various socio-demographic correlates, mental disorders and physical conditions. Significant comorbidities between HD and MDD and bipolar disorder were found, and given the high prevalence of MDD among HD patients, timely and appropriate screening and treatment of mental disorders is essential.

## Body Mass Index of Elderly Persons in Singapore

**A JEYAGURUNATHAN<sup>1</sup>, E ABDIN<sup>1</sup>, M SUBRAMANIAM<sup>1</sup>, GK ENG<sup>1</sup>,  
JA VAINGANKAR<sup>1</sup>, SA CHONG<sup>1</sup>**

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

### Introduction:

Population ageing is a worldwide phenomenon. Weight and body mass index (BMI) have important implications on the health and functioning of the elderly. This study hypothesised different relationships between BMI class, age, gender and ethnicity among the elderly. The current study aims to assess the BMI of the elderly in Singapore and explore BMI relationships with age, gender and ethnicity.

### Methods:

Data for this study was derived from an ongoing cross-sectional population-based epidemiological study. A total of 1091 respondents, aged 60 and above were recruited through disproportionate random sampling method. Descriptive analyses were performed to generate BMI distributions. The relationship between BMI class, age, gender and ethnicity was tested using multinomial regression analyses.

### Results:

The study sample consisted of 52.9% females and 47.1% males. 8.2% of the population was obese (BMI  $\geq 30.0$ ) and 3.9% underweight (BMI  $\leq 18.5$ ). Being underweight was more common among Chinese (4.3%) than Indians (3.0%) and Malays (2.0%). Obesity was more common among Malays (22.8%) than Indians (20.6%) and Chinese (5.4%). Multinomial regression analyses revealed that elderly above age 85 years were 4.6 times more likely to be underweight than those between 60 to 74 years. Obesity was more likely in females (2.4 times of males) and in the Indians (5.5 times of Chinese).

### Discussion & Conclusion:

Clinical practice and epidemiology research in the elderly reported BMI to be an important indicator of general nutritional and health status, and functional efficiency. Our study reported population-level differences in the BMI among the elderly. Females and Indians had highest risk of obesity while aged above 85 years and Chinese had highest risk of being underweight. There is a need to target future nutritional interventions towards these groups.

## Improving the Influenza and Pneumococcal Vaccination Rate of Eligible Patients with Chronic Heart Failure

**A KOH<sup>1</sup>, J WONG<sup>1</sup>, CY GOH<sup>1</sup>, W KWA<sup>1</sup>, HH LEE<sup>1</sup>, J GAO<sup>1</sup>, CY HO<sup>1</sup>, KX ONG<sup>1</sup>, I LYE<sup>1</sup>, PSD YEO<sup>1</sup>**

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

### Introduction:

In Singapore, pneumonia is the 3rd principal cause of death and 5th leading cause for hospitalisation. In 2011, 19% of Heart Failure (HF) admissions and 10% of HF readmissions in TTSH were precipitated by pneumonia. In 2010, only 1.5% (34 out of 2281) of HF patients attending the HF clinic in TTSH received influenza vaccination, and 1% (23 out of 2281) received pneumococcal vaccination.

### Methods:

We aimed to improve the influenza and pneumococcal vaccination rate of all eligible HF patients attending the HF clinic using the Model for Improvement approach. We identified 4 areas for improvement—poorly-informed patients, lack of planned care, absence of a vaccination database and lack of standardisation of vaccination work-flows in the HF clinic. Standardisation of clinic work-flows created a smooth vaccination process. Waiting time from prescription to vaccination was reduced. Increased par level of vaccines in the clinic ensured that vaccines were always available when required. The database assisted in identifying patients and avoided unnecessary repeat vaccination. All patients vaccinated were followed-up to date to assess outcomes. We reviewed all patients from September 2011 to February 2013.

### Results:

Influenza and Pneumococcal vaccination rates rose to 36.13% (559 of 1547) and 25.14% (361 of 1436) respectively. There were no major adverse events or deaths related to vaccination. The rate of HF admission was less in those vaccinated from Influenza (8.23% vs 9.51%), and Pneumococcus (9.14% vs 11.72%).

### Discussion & Conclusion:

Workflow improvements resulted in a significant increase in the rate of appropriate vaccination, with reduction in HF admissions.

## Correlative Factors of Elective Initiation of Chronic Haemodialysis in a Multi-Ethnic End Stage Renal Disease Population

**Y MA<sup>1</sup>, EJC LEE<sup>2</sup>, A VATHSALA<sup>2</sup>**

<sup>1</sup>*National University Hospital, Singapore*, <sup>2</sup>*National University Health System, Singapore*

### **Introduction:**

Unplanned, emergent Haemodialysis (HD) initiation, through a temporary catheter, is associated with worse outcomes than elective initiation using a chronic vascular access. Pre-ESRD dialysis education and care-coordination by a Renal Coordinator (RC) are crucial to improve elective initiation of dialysis. This retrospective study is to evaluate the correlation factors between the RC follow-up and elective HD initiation at our centre.

### **Methods:**

Of 165 ESRD incidents in 2012, 128 initiated and remaining on HD at 90 days post-initiation were retrospectively studied. Impact of demographics, etiology of ESRD, follow-up by nephrologist and RC in relation to HD initiation and chronic vascular access creation (VAC) prior to ESRD on elective vs. emergent HD initiation was evaluated.

### **Results:**

Overall, 23% of the study population (Mean age  $59.9 \pm 12.9$  years, 59.4% male, 63.3% Chinese, 68.7% Diabetic) had elective HD initiation. There were no differences in demographics or etiology of ESRD for elective vs. emergent HD initiation; however, duration of follow-up by nephrologist and by RC, prior to ESRD, was significantly longer for ESRD with elective initiation. Proportion with chronic VAC prior to ESRD, (44% vs 7.7%, Elective vs Emergent  $P < 0.0001$ ) and elective HD initiation (38% vs 7.7%, Early vs Late Referral  $P < 0.005$ ) was significantly higher with early referral to RC (defined as RC referral  $> 90$  days prior to HD) but not in relation to duration of nephrologist's follow-up, even after excluding those with follow-up  $< 90$  days.

### **Discussion & Conclusion:**

These results demonstrate that referral to RC earlier than 90 days of HD initiation facilitates earlier chronic access creation and elective HD initiation.

## Reducing Near Misses from Packing Errors in Inpatient Pharmacy

**M NITHIYA<sup>1</sup>, BL PHOA<sup>1</sup>, SY CHIN<sup>1</sup>, SF OH<sup>1</sup>, YT TAN<sup>1</sup>, LY ZHAO<sup>1</sup>**

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

### Introduction:

Packing errors in inpatient pharmacy may potentially end up as medication errors in wards if undetected. From January 2012 to February 2013, the average number of packing errors exceeded 40 per month. These packing errors are defined as near misses by the Joint Commission International (JCI). Hence, a reduction in packing errors will improve patient safety in the aspect of medication distribution.

### Methods:

A detailed process flow of the actual packing process was developed. Brainstorming on possible causes of error with reference to the process flow was done. Subsequently, root cause analysis was done and interventions were proposed to solve the root causes. The identified root causes were the lack of a standardised packing process, a high prevalence of risk taking behavior and insufficient training of new staff. A standardised packing workflow was introduced in phases to address different packing lines. The second intervention was to re-arrange drug bins stored in the 'fast moving' item shelf to be re-arranged in alphabetical order according to their names. All interventions were implemented by mid-April.

### Results:

The number of packing errors has dropped from an average of 10 per week at baseline to about 4 per week by mid June.

### Discussion & Conclusion:

Medication errors due to packing errors are not uncommon in hospitals. The consequence of such errors is potentially irreparable harm caused to patients. Hence, it is important that near misses are monitored and addressed with sustainable changes. Changes proposed should also address specific problems with current processes.

## Prevalence of Vitamin D, Parathyroid Hormone (PTH) and Calcium in Young Singaporeans (21 to 35 years)

**SK ONG<sup>1</sup>, HH KONG<sup>1</sup>, L LAM<sup>1</sup>, A SALLEH<sup>2</sup>, VYY NG<sup>2</sup>**

<sup>1</sup>*Alexandra Hospital, Singapore,* <sup>2</sup>*National University Hospital, Singapore*

### Introduction:

Vitamin D is an essential metabolite involved in the regulation of calcium levels in the body, alongside PTH. This study measures Vitamin D, PTH and calcium levels in normal healthy young Singaporeans with BMI (18 to 23kg/m<sup>2</sup> not on any supplement/medication and non-smokers).

### Methods:

We collected blood samples from 23 (12 females : 11 males) healthy subjects from May to June 2013. Subject was informed and signed a written consent to take part in the project. A serum gold-topped gel-plain (vitamin D and Calcium) and plasma EDTA (PTH) tubes were collected. Vitamin D and intact PTH was measured by Cobas-eElecys electrochemiluminescence immunoassay and calcium by colorimetry in Cobas-c702 311/501 system. BMI was calculated. (DSRB 2011/02032)

### Results:

This cohort has normal calcium mean 2.00 mmol/L (range, 2 to 2.65 mmol/L) and PTH 3.0pmol/L (range, 1.6 to 5.8 pmol/L: 1 participant <1.9 pmol/L out-of-reference range). The mean Vitamin D was 23.0ug/L (6.8 to 46.5 ug/L). Using the Vitamin D reference of 30 to 100 ug/L, only 17% (4/23) participants have sufficient Vitamin D levels (37.6 to 46.5 ug/L). Mean age was 25 years old and BMI was 20 kg/m<sup>2</sup>.

### Discussion & Conclusion:

Recruitment for participants has been slow using strict selection criteria. This preliminary study indicates for the first time, the apparent Vitamin D deficiency in normal healthy Singaporeans (83%) whose calcium and PTH levels are within the reference range. Previous studies on normal range for Vitamin D have been done on Western population. If surrogate markers such as calcium and PTH are normal, further investigations are needed to ascertain the Vitamin D range for Asian population.

## Pharmacy-led Smoking Cessation Clinic in Dermatology: Current Impact and Implications for the Future

**WC LIU<sup>1</sup>, G CHUA<sup>1</sup>, XT LAUW<sup>1</sup>, W LI<sup>1</sup>, W CHOO<sup>1</sup>, FT LEE<sup>1</sup>, H OON<sup>1</sup>, CF LIEW<sup>2</sup>**

<sup>1</sup>National Skin Centre, Singapore, <sup>2</sup>Raffles Hospital, Singapore

### Introduction:

Smoking has been associated with many dermatological conditions such as skin cancers, hidradenitis suppurativa, psoriasis. In a bid to relieve smoking as an aggravating factor and improve respective patient skin conditions, the National Skin Centre devised a dedicated pharmacy-led smoking cessation clinic. This study aims to describe the clinical impact of this clinic, to provide guidance on how such a model could be further improved and implemented more widely.

### Methods:

Single centre, retrospective case series of patients referred to smoking cessation clinic since the opening of the clinic from January 2010 to March 2013. Patients were counseled by one of the 4 smoking cessation trained pharmacists for 30 minutes using pamphlets as an aid. A questionnaire detailing patients' biodata, smoking history, methods used in quit attempt and number of cigarette reduction was completed at initial and follow-up visit. Retrospective data was collected and descriptive analysis of the data was performed

### Results:

In total, 74 patients were identified with an average of 12 smoking pack years. All patients received counseling. Twenty-seven received nicotine replacement therapy (NRT) as an aid to quit smoking. At first follow-up attended by 57 patients: 9 stopped smoking and 26 had reduction in number of sticks with an average reduction of 4.1 sticks per day.

### Discussion & Conclusion:

A structured smoking cessation clinic led by quit smoking pharmacists is effective. Smoking cessation can be part of a holistic management of dermatological conditions and further efforts should be continued to expand this service to other subspecialties and improve its effectiveness.

## Investigation of High Platelet Count in Random Platelet Unit and Its Viability

**Z LIU<sup>1</sup>, STT LIM<sup>1</sup>, KPL LIM<sup>1</sup>**

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

### Introduction:

The aims of this study were (i) to determine the correlation between donor initial platelet count and final platelet count in a unit of random platelets, and (ii) if high platelet counts (more than  $1.0 \times 10^{11}$ ) affect platelet viability. According to AABB standards, a unit of random platelets must have at least  $5.5 \times 10^{10}$  platelets, while no upper limits were set. From NUH monthly quality control records in 2012, 14.2% of the units' platelet count exceeded  $1.0 \times 10^{11}$ , the highest count recorded was  $1.924 \times 10^{11}$ . The lab is concerned if high count affects platelets viability. The hypothesis is donors with high initial platelet count should correlate to the final platelet count in the random platelet unit. Usage of different centrifuges and technologist technique may affect platelet yield.

### Methods:

Viability of platelets for units with high count is determined by pH, platelet count and swirling effect observed at 24 hours post collection and at day 5 of storage, and compared for changes. Units with count between  $5.5 \times 10^{10}$  and  $1.0 \times 10^{11}$  were tested for control purposes.

### Results:

There is a moderate correlation observed between donor initial count and final platelet count from the results collected thus far.

### Discussion & Conclusion:

High final platelet count is generally due to donors' high initial platelet count, while centrifuge and technologist technique do not have much effect. From initial studies, platelet viability for units with high platelet count was unaffected. However, one unit showed drastic drop in pH at day 5 of storage, indicating platelet viability may be affected.



## Public Attitudes Towards Mentally-Ill Persons in Singapore

**BK LI<sup>1</sup>, ZH SOH<sup>2</sup>, SS KYAW<sup>2</sup>, LL WONG<sup>2</sup>**

<sup>1</sup>*National Healthcare Group HQ, Singapore,* <sup>2</sup>*National University of Singapore, Singapore*

### Introduction:

Public attitudes towards mentally-ill persons vary with socio-demographic characteristics and have impact on community-based mental healthcare services. This study seeks to measure the public attitudes towards mentally-ill persons in Singapore.

### Methods:

An interviewer-administered survey was conducted among the general public in Singapore from October to December 2012. Respondents were interviewed on their attitudes towards mentally-ill persons using Community Attitudes toward the Mentally Ill (CAMI) inventory (a validated 40-item 5-point Likert scale that measures public attitudes towards mentally-ill persons using authoritarianism, benevolence, social restrictiveness, and community mental health ideology subscales).

### Results:

Survey response rate was 65.4% with 300 valid respondents. Authoritarianism correlated positively with older age groups and lower educational levels ( $P < 0.05$ ). Benevolence correlated positively with male gender, younger age groups, and higher educational levels ( $P < 0.05$ ). Social restrictiveness correlated positively with female gender, older age groups, and lower educational levels ( $P < 0.05$ ). Community mental health ideology correlated positively with male gender, younger age groups, and higher educational levels ( $P < 0.05$ ). Ethnicity did not correlate with CAMI subscales. Cluster analysis identified respondents aged above 60 and with primary school or lower educational level to be more likely to exhibit negative public attitudes towards mentally-ill persons. Positive public attitudes were more likely to be exhibited by respondents aged 21 to 30 and with tertiary or higher educational level.

### Discussion & Conclusion:

Negative public attitudes towards mentally-ill persons in Singapore were more likely to be exhibited by older age groups and those with lower educational levels. Understanding public attitudes towards mentally-ill persons is important for developing Singapore's community-based mental healthcare services.

## Revisiting the Association between Parental Bonding and Risk for Psychopathology: A Systematic Review

**V RENJAN<sup>1</sup>, J LEE<sup>1</sup>, A RAPISARDA<sup>1</sup>, GQR NAH<sup>1</sup>**

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

### **Introduction:**

Poor parental bonding has been purported to be one of the risk factors of psychopathology. As such, the association between poor parental bonding and risk for psychopathology was reviewed. This study hypothesised that perceived low ‘care’ and high ‘overprotection’ on the Parental Bonding Instrument (PBI) were associated with psychopathological risk.

### **Methods:**

Studies were retrieved via Google Scholar, PubMed, and Elsevier ClinicalKey. To be included in the review, studies had to: (i) focus on DSM diagnosable disorders and/or any psychiatric symptomatology; (ii) adopt the PBI as a parental bonding measure; and (iii) be published in the past 10 years.

### **Results:**

Twenty-one articles fulfilled the inclusion criteria and were selected. The effect size for perceived parental bonding on clinical vs. control group differences ranged from  $d = 0.35$  to  $1.08$  for mood disorders and  $d = 0.31$  to  $2.04$  for eating disorders.

### **Discussion & Conclusion:**

Overall, parental bonding was strongly associated with psychopathological risk. Perceived maternal bonding was consistently reported as strongly associated to clinical risk in subjects and healthy participants. However, mixed evidence was reported when the association between perceived paternal bonding and psychopathology was explored. No specific PBI dimension was consistently associated with a single diagnosis. Cross-study differences in sampling, PBI factor structure, cultural context and experimental hypothesis could explain this lack of a clear and consistent association. Our findings are clinically relevant in light of the recent interest on prevention and intervention in individuals at psychopathological risk. Educating parents on the importance of parental bonding and parenting skills may serve as a protective factor.

## **A Profile Study of Elderly Patients who were Remanded in Forensic Remand Ward in the Institute of Mental Health from November 2012 to March 2013**

**XY KANG<sup>1</sup>, BM TAN<sup>1</sup>**

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

### **Introduction:**

This study aimed to profile elderly offenders who were remanded for psychiatric evaluation in the Institute of Mental Health to identify their psycho-social needs. There is limited research on elderly offenders with mental health issues in Singapore.

### **Methods:**

A retrospective audit was conducted on the social reports of elderly offenders aged 65 years old and above and remanded between November 2012 and April 2013. Demographic characteristics and social information were gathered. Data were analysed using Microsoft Excel. The characteristics of the cases, types of charges and social needs were identified.

### **Results:**

The social reports of 8 cases were reviewed for the study. All were male Chinese and aged from 65 to 77 years old (median = 71). Four were single while 4 were married. The remand was the first encounter with psychiatric services for 5 of the cases. Three were charged with sexual offences, 2 for theft and one each for mischief by fire, voluntary causing hurt and vandalism. Four had been imprisoned previously. Six had no or limited family support in the community. Majority were retired or not meaningfully engaged in activities (n = 6) and 7 were financially dependent on others. Four stayed alone and 5 were not known to any community services prior to remand.

### **Discussion & Conclusion:**

The finding that majority of the elderly offenders have poor social support in the community suggests that more needs to be done to alleviate their situation upon their release. Future research directions and limitations of the study are also discussed.

## Pharmacist Reviews and Outcomes in Nursing Homes in Singapore

**HS CHIA<sup>1</sup>, J HO<sup>1</sup>, BDL LIM<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Pharmacy, Singapore*

### Introduction:

Nursing home residents in Singapore experience high prevalence of polypharmacy and inappropriate medication use, associated with increased costs, drug interactions, adverse effects and hospitalisations. The Ministry of Health of Singapore recommends the provision of pharmaceutical care to nursing home residents by pharmacists and suggested that a multidisciplinary approach involving several healthcare professionals could potentially address the medication issues. The benefits of pharmacist review would be explored in this study.

### Methods:

This is a retrospective, period prevalence study which involved 480 nursing homes residents in 3 different institutions. Cost savings, potential adverse events prevented through pharmacotherapy interventions, and acceptance rate of recommendations would be quantified. Our data is divided into a 1-month Pre-Setup period to review all patients and a 6-month Post-Setup period to review all patients again weekly, serviced by pharmacists from National Healthcare Group Pharmacy.

### Results:

Three hundred and ninety-two pharmacotherapy interventions were made in this study, 236 (60.2%) of them were accepted with increased acceptance rate from Pre- to Post-setup period ( $P < 0.001$ ). The total monthly direct cost savings from Pre-setup period and Post-setup period was \$388.30 and \$876.69 respectively. Ninety-six adverse outcomes were prevented (28 from Pre-setup, 68 from Post-setup), indirectly improved quality of life and reducing morbidity and mortality of residents.

### Discussion & Conclusion:

The limitation of this study is that indirect cost savings from various parameters of which are not quantifiable were not addressed. In conclusion, we recommend the provision of pharmaceutical care to nursing home residents by pharmacists.

## Evaluation of the Inpatient Smoking Cessation Programme in Tan Tock Seng Hospital

**KK KNG<sup>1</sup>, TN HIEW<sup>1</sup>**

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

### **Introduction:**

Smoking is a modifiable risk factor for many chronic diseases. Within the past few years, an increase was observed in the number of smokers in Singapore. This study hypothesised that an inpatient smoking cessation programme would have a significant difference in helping smokers achieve abstinence. Hence, this study aimed to evaluate the effectiveness of the inpatient smoking cessation programme in Tan Tock Seng Hospital (TTSH).

### **Methods:**

This was a retrospective, non-randomised, unblinded study approved by the institutional review board involving 156 patients. The study was conducted in TTSH using patient data from 1 January 2008 to 31 December 2009. The primary objective of this study was to evaluate the effectiveness of the inpatient smoking cessation programme in TTSH, while the secondary objective was to determine the predictors affecting inpatient smoking cessation outcomes. Independent student's t-test was used to compare the means between continuous variables and X<sup>2</sup>-test was used to analyse the categorical variables. Factors that were significantly associated with smoking cessation in the univariate analyses were included in a multivariate logistic regression model to ascertain if these factors could be predictors of successful smoking cessation.

### **Results:**

The percentage of patients who managed to quit smoking when contacted during 6-month follow-up was 41.7%. Cold turkey as preferred quitting method and race were significant predictors for successful smoking cessation.

### **Discussion & Conclusion:**

The quit rate achieved in this study was comparable to other studies. With the significant prediction factors in mind, smoking cessation counselling could be customised based on the patient's profile for more effective counselling.

## **Diagnostic Dilemma: Prenatal Counselling and Management of Monochorionic Twins with Discordant Somatic Features and Abnormal Karyotypes**

**J CHAN<sup>1</sup>, VTOH<sup>1</sup>, PLNG<sup>1</sup>, XLSUN<sup>1</sup>, YTAN<sup>1</sup>, A BISWAS<sup>1</sup>, L GOLE<sup>1</sup>**

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

### **Introduction:**

Monochorionic-diamniotic (MCDA) twins are identical twins who share a placenta but not an amniotic sac. They face various problems e.g. birth weight differences, amniotic fluid problems, umbilical cord entanglement, twin-to-twin transfusion, twin reversed arterial perfusion and increased risk of birth defects. In addition, when they have discordant somatic features on ultrasound, chromosomal karyotyping by amniotic fluid analysis is warranted.

### **Methods:**

Generally if the ultrasound examination appears normal for one twin, this twin may not be sampled for chromosomal analysis. We present here interesting cases of MCDA twins posing challenges in counseling and pregnancy management.

### **Results:**

Case 1 showed one fetus with generalized oedema, cystic hygroma, ascites and bilateral pleural effusion. The second fetus appeared normal with no obvious structural abnormalities. On karyotyping, the first fetus was 45,X and surprisingly the normal one showed 45,X[4]/46,XY[19]. The parents opted to continue the normal fetus, but unfortunately both were lost by miscarriage. Case 2 showed one fetus with cystic hygroma; the other appeared normal. The parents chose to sample only the abnormal twin who was 45,X. After radiofrequency ablation of the umbilical cord of the abnormal fetus, the other twin progressed well and a healthy baby was delivered. However, it is possible that there may exist a 45,X cell line in this child, which may have consequences in later life.

### **Discussion & Conclusion:**

These cases illustrate that despite a normal ultrasound in such cases, an abnormal cell line may be present in low percentages and more detailed and precise procedural guidelines need to be set for such pregnancies.

## Community Forums are Effective in Improving Osteoporosis Knowledge

**F JOHARI<sup>1</sup>, F CHIA<sup>1</sup>**

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

### **Introduction:**

The public often has misconceptions about osteoporosis. This study aims to assess the effectiveness of an Osteoporosis Public Forum in creating awareness about osteoporosis, its preventions and complications.

### **Methods:**

Two hundred and one participants took part in pre and post questionnaires during an osteoporosis public forum held in a public hospital. The questionnaire comprised of causes, signs and symptoms of osteoporosis and lifestyle measures for prevention.

### **Results:**

A total of 94.5% of participants were above the age of 50 and 71.6% were female. Nineteen percent had osteoporosis and 4% already had a fracture. Prior to the forum, 90% were aware that lack of calcium contributed to osteoporosis, but majority were unaware that lack of sunshine, smoking, menopause and an unhealthy lifestyle were contributory. After the forum, this improved significantly with participants answering that the following were risk factors for osteoporosis: lack of sunshine 59.7% from 32.8%, smoking 41.3% from 20.9%, menopause 51.2% from 41.3 % and not leading a healthy lifestyle 70.1% from 49.3%. More participants were aware that osteoporosis could be asymptomatic (42.3% from 24.9%) and that it caused fractures (64.7% from 50.7%). Awareness that milk prevented osteoporosis was high (>90%), and awareness that soy could prevent osteoporosis rose (75.1% from 57.7%). There was no significant difference in the self-assessment of risk of osteoporosis before and after the forum.

### **Discussion & Conclusion:**

Improving awareness and correcting misconceptions is crucial. Community forums and health programs are good mediums to create awareness.

## **Evaluation of an Electronic Dietetics Record System Incorporating the Nutrition Care Process (NCP) and International Dietetics and Nutrition Terminology (IDNT) in Tan Tock Seng Hospital (TTSH)**

**SL WONG<sup>1</sup>**

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

### **Introduction:**

The NCP and IDNT together is a framework for dietetic care. Dietitians from TTSH are partially implementing NCP and IDNT in the current manual documentation method. This project aimed to evaluate dietitians' attitudes, confidence and opinions before and after full incorporation of NCP and IDNT into an electronic dietetics record system and determine its acceptability.

### **Methods:**

An electronic dietetics record system was created through concept design and programming. Twenty-two dietitians tested the system. Anonymous questionnaires assessed on attitudes, confidence and opinions on using NCP, IDNT and the electronic system.

### **Results:**

Seventy-seven percent (n = 17) agreed that NCP and IDNT are applicable to their area of practice. Pre- and post-trial average likelihood rating on use of NCP and IDNT within the electronic system was 4.3 and 4.6 (where 1 is "not likely at all" and 5 is "very likely"), respectively. Post-trial, 45% (n = 10) and 27% (n = 6) reported greater time-consumption during initial implementation phase and lack of computer access as the main barriers, respectively. Post-trial average confidence rating of implementing NCP and IDNT within the electronic system was 3.5; increased from 3.0 pre-trial (where 1 is "not confident at all" and 5 is "very confident"). Post-trial, 32% (n = 7) recognised that the electronic system acted as a guide to document using NCP and IDNT and 64% (n = 14) recognised that it assisted to standardise documentation.

### **Discussion & Conclusion:**

Survey results identified the recognition of the need by dietitians to implement NCP and IDNT into dietetics practice. An electronic dietetics record system incorporating NCP and IDNT was well received by dietitians.



## Profile of Patients Referred for Podiatry Services in Primary Care

**LS TAN<sup>1</sup>, YF SIM<sup>1</sup>**

*<sup>1</sup>National Healthcare Group Polyclinics, Singapore*

### Introduction:

Podiatry services have been introduced in the National Healthcare Group (NHG) polyclinics since April 2011. This study aims to investigate the profile of patients referred to the podiatrist in primary care.

### Methods:

Patients, who were referred to the podiatrist between 3 January 2012 and 31 December 2012, were identified. The gender, age, race, physical measurements and laboratory test results of these patients were extracted from the polyclinic database and analysed using Stata version 12.0.

### Results:

A total of 2255 patients were referred to the podiatry clinics over the 12-month period. Out of the 2255 patients, 501 had diabetes. Among these 501 diabetic patients, 47.1% were elderly (65 years old and above) and 53.9% were female. The mean duration of diabetes was 7.2 years. There was no significant difference in age, gender, optimal glycemic control (HbA1c  $\leq 7\%$ ) or optimal lipid control (LDL-c  $< 2.6\text{mmol/L}$ ) between the diabetic patients in the study and the general NHGP diabetic population. However, there was a significantly higher proportion of Indians ( $P < 0.001$ ), patients with HbA1c  $> 9\%$  ( $P = 0.001$ ), blood pressure  $< 130/80\text{mmHg}$  ( $P = 0.013$ ) and body mass index (BMI)  $\geq 27.5\text{kg/m}^2$  ( $P = 0.027$ ) in the study group.

### Discussion & Conclusion:

The results suggest that diabetic foot problems are more commonly found in Indian patients than the other ethnic groups in the diabetic population. Additionally, poor glycaemic control and a high BMI may be contributory factors to the development of diabetic foot problems. Further study will be needed to determine if other factors such as occupation and footwear affects the occurrence of diabetic foot complications.

## Novel Use of Tigecycline for Multiple Myeloma in Vitro—Alternative Non-mitochondrial Pathways

**YYK NG<sup>1</sup>, LS TAY<sup>1</sup>, GRG SNG<sup>1</sup>, C BI<sup>1</sup>, WJ CHNG<sup>1</sup>**

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

### Introduction:

Tigecycline, an FDA-approved drug, has been reported as a potential therapeutic agent for acute myeloid leukemia (AML), acting via inhibition of mitochondrial translation. This study sought to explore its efficacy against another hematological malignancy, multiple myeloma (MM).

### Methods:

We assessed tigecycline's ability to inhibit proliferation of 16 MM cell lines in vitro by MTS assay. To establish its mechanism of action in comparison with that reported for AML, we evaluated tigecycline's ability to induce apoptosis and performed real-time PCR to determine expression levels of mitochondrially transcribed genes *cox-1* and *cox-2*. Furthermore, we used flow cytometry to evaluate if mitochondrial content also correlates with tigecycline sensitivity in MM. Lastly, we compared genome-wide expression profiles of MM cell lines to identify potential molecular targets of tigecycline.

### Results:

We found 7 highly sensitive and 3 moderately sensitive MM cell lines, in which tigecycline triggered apoptosis in these lines. However, in contrast to AML, we observed no correlation between mitochondrial content and tigecycline sensitivity in MM. We also did not detect any significant elevation in *cox-1* and *cox-2* mRNA levels in tigecycline-treated MM cells. Instead we observed molecular changes suggesting a different mechanism of action of tigecycline in MM.

### Discussion & Conclusion:

Our results suggest that tigecycline may be effective in the treatment of MM. Surprisingly, it seems to act via a novel mechanism. Further studies are planned to elucidate the mechanisms by which tigecycline acts in MM cells and to identify yet unreported molecular target(s) of this drug.

**Radioprotective Effect of Watermelon Juice (*Citrullus lanatus* (Thunb.) Matsum. & Nakai) Against Low Dose Ionising Radiation-Induced Inflammatory Response in Mice**

**MZ AINUL<sup>1</sup>, G HANISA<sup>1</sup>, MK AMRAN<sup>1</sup>, M IDHAM<sup>1</sup>, MI MAZRIAZIE<sup>1</sup>, AR HAIRIL RASHMIZAL<sup>1</sup>, MD WAN MAZLINA<sup>1</sup>**

<sup>1</sup>*UiTM Puncak Alam, Malaysia*

**Introduction:**

Exposure to ionising radiation (IR) may increase tumour formation risk and has been linked to inflammatory response. It is known that IR can cause direct tissue damage, with activation of pro-inflammatory mediators released by macrophages, epithelial cells and fibroblast. Production of pro-inflammatory cytokines induced by radiation may be overcome by lycopene, a naturally occurring antioxidant in watermelon. Watermelon is known to have about 40% higher lycopene than raw tomatoes. Lycopene has the ability in down regulation of inflammatory response that includes inhibiting the pro-inflammatory cytokines. The present study was design to evaluate the radioprotective effect of watermelon juice [*Citrullus lanatus* (Thunb.) Matsum. & Nakai] on low dose ionising radiation induced inflammation in mice.

**Methods:**

Fifteen mice were divided randomly into 3 groups: negative control (normal diet), positive control (normal diet + low dose IR) and supplementation (50% watermelon juice + low dose IR). Supplementation group was given 50% watermelon juice (v/v) for 28 consecutive day ad libitum and low dose IR was given on day 29 with single dose 100μGy.

**Results:**

In lung, TNF-α and IL-6 levels showed significant differences ( $P = 0.05$ ,  $P = 0.01$ ) respectively between supplementation and positive control groups. There were significant differences in lung IL-6 levels between negative and positive control groups ( $P = 0.01$ ). Significant differences were also observed in liver TNF-α levels between negative control and supplementation groups ( $P = 0.02$ ).

**Discussion & Conclusion:**

In conclusion, the study demonstrates that watermelon juice has protective effect against low dose IR - induced inflammatory response.

## Linking Human Leucine-Rich Repeat Kinase 2 (LRRK2) Gene Mutation to Cancer Development

**XW HENG<sup>1</sup>, YL LIM<sup>2</sup>, M TIO<sup>2</sup>, LH ONG<sup>3</sup>, Y ZHAO<sup>3</sup>, EK TAN<sup>3</sup>**

<sup>1</sup>*Duke-NUS Graduate Medical School, Singapore,* <sup>2</sup>*National Neuroscience Institute, Singapore,*

<sup>3</sup>*Singapore General Hospital, Singapore*

### Introduction:

Parkinson's disease (PD) is a progressive, neurodegenerative condition that results in dopaminergic neuronal cell death. LRRK2 gene mutations are found to be the single most important cause of development for both sporadic and familial autosomal dominant PD in humans. Recently, PD patients with LRRK2 gene mutations have been clinically observed to be at a higher risk of developing cancers, including urothelial cancers. We conducted an exploratory study to determine how LRRK2 gene mutations are linked to the cancer pathway.

### Methods:

We created transgenic drosophila with LRRK2 mutations in the kinase pathway to determine the proliferation propensity of LRRK2 gene mutations. By comparing eye tissues of these flies with controls under light microscope, we observed for excessive cell growth in the eye tissues of the transgenic flies. We also transfected plasmids containing LRRK2 gene mutations into urothelial cancer cells. Ribonucleic Acid (RNA) was extracted and the expression levels of various cancer pathway involving kinase proteins in these mutations was analysed.

### Results:

Comparing the eye tissues between the transgenic flies and controls, the transgenic flies were observed to have increased eye growth, implying that LRRK2 gene mutations are linked to increased cell growth via the kinase pathway. We also observed RNA expression levels of the selected cancer kinase pathway markers.

### Discussion & Conclusion:

Our results suggest that LRRK2 gene mutations in PD are linked to cancer development through the process of hyperphosphorylation in the kinase pathway. However, further investigations are warranted to allow potential identification of novel targets of therapy for better health outcomes in PD and cancer patients.

## **A Simple Triplet-Primed PCR-based Diagnostic Strategy for Rapid and Accurate Detection of Expansion and Methylation Patterns in FMR1-related Disorders**

**R INDHU SHREE<sup>1</sup>, CLARA RL TEO<sup>1</sup>, CAROLINE G LEE<sup>1</sup>, SAMUEL S CHONG<sup>1</sup>, HAI-YANG LAW<sup>2</sup>**

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>KK Women's and Children's Hospital, Singapore

### **Introduction:**

Full mutation expansion (>200 repeats) and consequent methylation of the 5' UTR CGG repeat region of the FMR1 (Fragile X Mental Retardation 1) gene is the most common cause of fragile X syndrome (FXS). Individuals with premutation alleles (~55 to 200 repeats) are at increased risk for late-onset FXS-related disorders, fragile X-associated tremor/ataxia syndrome and fragile X-associated primary ovarian insufficiency. Pre- and full mutation alleles are also at risk of expanding further upon maternal transmission. Early detection of expansion status by newborn and population-based carrier screening would facilitate timely clinical intervention, and greatly benefit carrier females in reproductive decision-making. Current PCR-based molecular diagnostic approaches either fail to successfully amplify high GC-rich large pre- and full mutation expansions and/or do not provide methylation information, and thus necessitate confirmatory tests by the labor- and time intensive Southern blotting, the gold standard FXS testing method.

### **Methods:**

We have developed a simple, high-throughput diagnostic assay based on our novel methylation-specific triplet primed PCR (msTP-PCR) strategy to drastically reduce the number of samples reflexed to Southern analysis. Methylation-specific fluorescent-labeled primers were used to amplify methylated and unmethylated FMR1 alleles from bisulfite-modified DNA samples in a single-tube reaction, followed by capillary electrophoresis.

### **Results:**

The assay was optimised on 29 genotype-known cell line-derived samples encompassing normal (~5 to 44 repeats), gray zone (~45 to 54 repeats), pre- and full mutation alleles. Expansion and methylation status were correctly identified in all the samples tested.

### **Discussion & Conclusion:**

Duplex msTP-PCR assay is a rapid and straightforward approach, ideal for diagnostic confirmation as well as population-based carrier and/or newborn FMR1 screenings.

## To Catch a Transient Metastatic Event in Blood—Weekly Enumeration of Circulating Tumour Cells to Identify Kinetic Variations for Metastatic Prediction

**KML TAN<sup>1</sup>, SM LEONG<sup>2</sup>, HW CHUA<sup>2</sup>, MH LI<sup>2</sup>, ES KOAY<sup>2</sup>, S TUCKER<sup>3</sup>**

<sup>1</sup>*National University Hospital, Singapore,* <sup>2</sup>*National University Health System, Singapore,*

<sup>3</sup>*Tucker Medical, Singapore*

### Introduction:

Circulating tumour cells (CTCs) are cancer cells of primary or secondary tumour origin, found in the peripheral blood of cancer patients.

### Methods:

CTCs from prostate and colorectal cancer patients were isolated and counted using a size-exclusion method (CellSieve, Singapore).

### Results:

CTC counts in 20 healthy individuals did not exceed 5 cells per 7.5 mL of blood (CI:  $1.3 \pm 1.6$ ). In contrast, we recorded an average CTC count of  $21.1 \pm 31.7$  for 42 colorectal cancer cases and  $13.4 \pm 13.8$  for 82 prostate cancer cases ( $P = <0.001$ ). We also report weekly or bi-weekly monitoring of CTC count in patients with metastatic cancers of different tissues of origin. In these patients, we documented transient spikes in CTC counts that occurred within mere 1 to 2 months. Serum tumour markers remained largely invariable during the same monitoring period. Using the same dataset, we performed a series of simulation tests, and demonstrate that up to two-third of the simulation models failed to detect any rise in CTC count, giving false negative results. This raises the questions as to whether published studies measuring only single or infrequent time-points of CTCs may be missing out on significant transient metastatic events.

### Discussion & Conclusion:

CTCs may be incorporated into clinical decision making in patients with metastatic cancer, especially when serum tumour markers fail to anticipate metastatic development. Our observations suggest that CTCs should be enumerated more frequently than the 1 to 2 monthly intervals currently practised, and ideally at 1 to 2 weekly intervals, in order to identify kinetic variations that may predict early metastases.

## Haploinsufficiency of TP53 in Multiple Myeloma

**PJ TEOH<sup>1</sup>**

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

### Introduction:

Hemizygous deletion of 17p13, which harbours the TP53 gene, has been identified in >30% of multiple myeloma (MM) patients and is associated with poor prognosis. To date, there is no conclusive evidence that TP53 is the critical gene. Furthermore, haploinsufficiency of TP53 has not been well characterised.

### Methods:

Human myeloma cell lines with 17p13(del) encompassing TP53 region was used as study models.

### Results:

We have identified a spectrum of unique protein expression profile amongst p53 WT/- cells upon induction of the p53 pathway. TP53 hemizygous loss was found to be associated with decreased basal expression level. This reduction of the p53 gene dosage led to a partially compromised or completely inactivated p53 responses in 17p13(del) cells when they were subjected to exogenous stress. The pathway deficiency was manifested as defective transcription of MDM2, p21 and PUMA at both the mRNA and protein level, together with significant resistance to apoptosis. In cases with monoallelic deletion of TP53 and no p53 protein expression, the remaining allele was found to be silenced by promoter hypermethylation. Demethylation of the promoter upon treatment with DNA methyltransferase inhibitor resulted in the re-expression of p53.

### Discussion & Conclusion:

In conclusion, this study identified TP53 as the critical gene located in 17p13, and revealed TP53 as a haploinsufficient tumour suppressor in MM. The decreased p53 gene dosage from hemizygous loss was sufficient to inhibit its tumour suppressive function. Essentially, p53 basal level was the critical determinant of the integrity of the pathway. These findings may have an important prognostic implication in MM.

## **Watermelon *Citrullus lanatus* (Thunb.) Matsum. and Nakai Juice Modulates Oxidative Stress Induced by Low Dose Ionising Radiation on Mice**

**MK AMRAN<sup>1</sup>, M IDHAM<sup>1</sup>, MI MAZRIAZIE<sup>1</sup>, G HANISA<sup>1</sup>, MZ AINUL<sup>1</sup>, AR HAIRIL RASHMIZAL<sup>1</sup>, MS WAN MAZLINA<sup>1</sup>**

<sup>1</sup>*UiTM Puncak Alam, Malaysia*

### **Introduction:**

Watermelon is a natural product that contains higher antioxidant properties which may benefit in combating free radical produced from various sources including low dose ionising radiation. This animal modelling study aimed to evaluate the ability of 50% watermelon [*Citrullus lanatus* (Thunb.) Matsum. & Nakai] juice as a radioprotective agent in alleviating oxidative stress induced by low dose ionising radiation.

### **Methods:**

Eighteen adult male ICR mice were randomly divided into control groups (negative and positive) and treatment group which consisted of 6 mice per group. Negative and positive control groups received filtered tap water while the treatment group was supplemented with 50% v/v watermelon juice ad libitum for 28 days prior to total body exposure of 100 µGy x-ray. The activities of SOD and total GSH level were determined in brains, livers and lungs using Oxiselect Total Glutathione and Oxiselect Superoxide Dismutase test kits.

### **Results:**

Brain GSH and SOD activities increased significantly in watermelon juice supplementation group (treatment group) compared to positive and negative groups ( $P < 0.05$ ). SOD activity in lung and liver showed significant increment in treatment group versus negative group with  $P = 0.001$  and  $P = 0.001$ , respectively. While in positive groups, SOD activity of both tissues decreased significantly compared with treatment group ( $P = 0.042$ ,  $P = 0.001$ ).

### **Discussion & Conclusion:**

The findings of this study may postulate that watermelon juice supplementation could significantly reduce low dose ionising radiation-induced oxidative stress.



## Platelet Reactivity Measurements Before and After Percutaneous Coronary Intervention Among Patients Undergoing Early Invasive Management for Acute Coronary Syndrome

**MX JING<sup>1</sup>, L CARVALHO<sup>1</sup>, M MEJIN<sup>2</sup>, A FONG<sup>2</sup>, R TROUGHTON<sup>3</sup>, CTCHIN<sup>4</sup>, ZL TEO<sup>4</sup>, BYAN<sup>5</sup>, AM RICHARDS<sup>6</sup>, HCTANG<sup>6</sup>, M CHAN<sup>6</sup>**

<sup>1</sup>National University Hospital, Singapore, <sup>2</sup>Sarawak General Hospital, Malaysia, <sup>3</sup>Cardiac, University of Otago, New Zealand, <sup>4</sup> National Heart Centre, Singapore, <sup>5</sup>The Chinese University Of Hong Kong, Hong Kong, <sup>6</sup>National University of Singapore, Singapore

### Introduction:

There are conflicting data on the optimal timing of platelet reactivity (PR) measurements to identify patients at risk of major adverse cardiovascular events (MACE) and bleeding. This study hypothesised that significant changes in PR occur peri-PCI.

### Methods:

We studied 395 patients undergoing PCI for NSTEMI/UA. Patients received, in the emergency room, aspirin (300 mg loading dose followed by 100 mg maintenance dose) and 1 of 2 P2Y<sub>12</sub> antagonists: clopidogrel (300 mg/ 75 mg OM) or ticagrelor (180 mg/ 90 mg BD). Adenosine diphosphate-induced multiple electrode aggregometry (Multiplate®) was performed to analyse PR at the time of PCI and post-PCI (24 hours). In-hospital and 30-day MACE, defined as cardiovascular death, recurrent MI, stroke or stent thrombosis, and bleeding, defined as bleeding academic research consortium (BARC) type 2 or greater bleeding, were assessed in all patients.

### Results:

Patients were treated with clopidogrel [n = 356 (89%)] or ticagrelor [n = 39 (11%)]. The mean pre- and post-PCI PR was consistently higher with clopidogrel than ticagrelor. However, the mean reduction between pre- and post-PCI PR was 3-fold higher for clopidogrel than ticagrelor ( $P < 0.01$  by Kruskal-Wallis test). In-hospital and 30-day post-discharge MACE and bleeding events corresponded closely with the frequency of pre- and post-PCI hyporesponders, defined as PR  $> 468$  AU\*min, and hyperresponders, defined as PR  $> 300$  AU\* min, respectively.

### Discussion & Conclusion:

Large differential reductions in PR were observed within 24 hours post-PCI. PR measurements tracked well with inhospital and post-discharge MACE and bleeding events. Among patients with only pre-PCI measurement, consideration should be given to repeating PR measurements within 24 hours post-PCI.

## Bioactive and Conductive Collagen Scaffold for Wound Healing Augmented by Electrical Stimulation

**G XIONG<sup>1</sup>, JK WANG<sup>1</sup>, NS TAN<sup>1</sup>, X HU<sup>1</sup>, CSN CHOONG<sup>1</sup>**

<sup>1</sup>*Nanyang Technological University, Singapore*

### Introduction:

Recent advances in biologically-active dressings have yet to demonstrate good clinical efficacies for chronic or deep wound healing. The aim of this project is to engineer a bioactive and electrically-conductive collagen-based scaffold for soft tissue replacement. By utilising heparin as the anionic dopant for polypyrrole (PPy), the scaffold can be conferred electrical properties and growth factor delivery functions. We hypothesised that our biohybrid material can be immobilised with growth factors and will be conducive for dermal fibroblast and endothelial cell growth.

### Methods:

The porous collagen scaffolds were fabricated from collagen extracted from fish scales using acid solubilisation, followed by freezing and lyophilisation. Coating of the collagen fibres with PPy/heparin was achieved by in situ oxidative polymerisation. The scaffolds were then immersed in solutions of vascular endothelial growth factor (VEGF) and fibroblast growth factor- $\beta$  (bFGF). The proliferation of fibroblasts and endothelial cells within the scaffolds were determined using resazurin-based assays.

### Results:

Mechanical and electrical characterisation of the scaffolds demonstrated enhancement of tensile strength and electrical conductivity of the PPy/heparin collagen scaffolds. The successful loading of VEGF and bFGF on the scaffolds were determined by ELISA, while resazurin-based cell proliferation assays demonstrated better proliferation of cells after immobilisation with growth factors.

### Discussion & Conclusion:

Our multi-functional scaffolds have enabled the conjugation of growth factors to improve the pre-seeding of relevant cell types for wound healing. The conductive properties of the scaffolds will open up clinical investigation into using electrical stimulation to treat the long-standing problems of deep tissue or chronic wounds.

## Time Series Analysis of 17-year Tuberculosis Notification Data in Singapore (1995 to 2011)

**W WAH<sup>1</sup>, LY HSU<sup>1</sup>, A EARNEST<sup>2</sup>, MEH ONG<sup>3</sup>**

<sup>1</sup>*National University of Singapore, Singapore,* <sup>2</sup>*Duke-NUS Graduate Medical School, Singapore,* <sup>3</sup>*Singapore General Hospital, Singapore*

### Introduction:

A resurgence of Tuberculosis (TB) has occurred in recent years after a decade of continuous decline in Singapore. Therefore, time series analysis of TB notification data could be helpful to study the impact of potential predictors on TB risk over time and make prediction of TB cases in the future. The objectives of this study are to determine the application of Autoregressive Integrated Moving Average (ARIMA) model in prediction of yearly TB incidence and study potential predictors on yearly TB incidence.

### Methods:

This is a retrospective study design. Time series analysis was used to study TB notification data collected from 1995 to 2011 from Singapore Tuberculosis Elimination Program (STEP) registry.

### Results:

The results showed population density and number of visitor's arrivals and other race group one year ago, mean daily temperature 2 years ago and number of non-residents in the current year appeared to have a significant impact on the yearly transmission of TB incidence. In multivariate analysis, an increasing number of non-residents in the current year was found to have a significant influence on the yearly incidence of TB ( $P = 0.023$ ). The yearly number of cases during January 1995 to December 2011 fell within the model's confidence interval for the predicted number of cases.

### Discussion & Conclusion:

This study supported that an increasing number of non-resident population could have played a significant role in an increasing trend of TB incidence in Singapore and the ARIMA model fits the fluctuations in TB frequency and it could be used for future prediction when applied to prevention and control of TB.

## Systematic Discovery of Novel Cilia and Ciliopathy Genes through Functional Genomics in the Zebrafish

**SP CHOKSI<sup>1</sup>**

*<sup>1</sup>Institute of Molecular and Cell Biology, Singapore*

### Introduction:

Cilia are microtubule-based organelles that are implicated in many human diseases, including Primary Ciliary Dyskinesia (PCD). As causative mutations in few PCD-causing genes have been described, we sought to systematically identify new ciliopathy genes in the zebrafish, then screen human PCD patients for mutations in these genes.

### Methods:

We used microarrays to identify targets of Foxj1, the master regulator of vertebrate motile ciliogenesis. We then used functional genomics and rapid phenotype screening to test the functional requirement of each of these genes in zebrafish cilia. Finally, with a combination of homozygosity mapping and Sanger sequencing, we screened a cohort of PCD patients with mutations near the orthologues of the Foxj1 target genes.

### Results:

We identified 660 cilia genes, the majority of which have never been associated with cilia before. We selected 50 genes at random and, remarkably, found that 64% (32) are required for ciliary function, and proteins encoded by 28% (14) have a ciliary localisation. We discovered that mutations in at least 3 of the novel genes result in human PCD, and go on to define the mechanism by which these genes cause PCD.

### Discussion & Conclusion:

We have successfully identified genes required for making vertebrate motile cilia, and shown that mutations in 3 of these genes cause PCD in humans. This collection of functionally-validated motile cilia genes will be invaluable for the study of ciliary biology, and in the identification of new ciliopathy mutations. These novel PCD mutations may aid in both the diagnosis and the treatment of the disease.

## Validation of the EGSYS-U Score in Predicting Patients with a Cardiac Cause of Syncope in a Singapore Cohort

**D TENG<sup>1</sup>, CK OOI<sup>2</sup>**

<sup>1</sup>Ministry of Health, Singapore, <sup>2</sup>Tan Tock Seng Hospital, Singapore

### Introduction:

Syncope is a common presenting complaint in Emergency Department (ED). It is important to identify patients with a cardiac cause of syncope. The Evaluation of Guidelines in Syncope Study (EGSYS) is a simple rule that can be used to identify such patients. This study aims to validate the EGSYS-U score in predicting patients with a cardiac cause of syncope in a Singapore cohort.

### Methods:

This was a retrospective cohort study from 1 December to 31 December 2011. Patients with an ED diagnosis of 'syncope' or 'loss of consciousness' were included. The following predictors of cardiac syncope were collected: Abnormal ECG and/or heart disease, palpitations before syncope, syncope during effort or in supine position, absence of autonomic prodromes and absence of predisposing and/or precipitating factors. Sensitivity and specificity of the score (with a cut of at 3) were analysed.

### Results:

One hundred and thirty-six patients were included in the study. Thirteen (9.56%) patients were found to have a cardiac cause of syncope after further investigations. Seventy (51.47%) patients did not have a cardiac-related syncope. Fifty-three (38.97%) patients had no identifiable cause. The sensitivity and specificity of the EGSYS score in predicting patients with a cardiac cause of syncope were 76.9% and 61.0% respectively.

### Discussion & Conclusion:

The EGSYS score has low sensitivity and low specificity after validation in a Singapore cohort. Further studies with a larger sample size are necessary to reaffirm these preliminary findings.

## Extracellular Matrix-Based Biohybrid Skin Substitutes

**B LUO<sup>1</sup>, C CHOONG<sup>1</sup>, NS TAN<sup>1</sup>, QL LOH<sup>2</sup>, TC WONG<sup>3</sup>**

<sup>1</sup>Nanyang Technological University, Singapore, <sup>2</sup>Institute of Cell and Molecular Biology, A\*STAR, Singapore, <sup>3</sup>Tan Tock Seng Hospital, Singapore

### Introduction:

Adipose tissue is often discarded after plastic and reconstructive surgery. The aim of the study is to utilise the discarded adipose tissues as a source of ECM for the development of in vitro biohybrid skin substitutes consisting of natural biological cues.

### Methods:

Lipoaspirates were decellularised by a novel chemical-free method, which is a series of homogenisation and centrifugation process, to obtain the ECM. The ECM was then conjugated to alginate monomers via carbodiimide chemistry and fabricated into highly porous alginate-ECM scaffolds. The 3D scaffolds were also treated to a second crosslinker (calcium chloride) treatment post-fabrication to tune the material properties.

### Results:

The decellularisation process was completed in approximately an hour as compared to days taken by the commonly-used chemical and hybrid methods. Successful decellularisation was shown by the absence of nuclear material, presence of fibrous ECM structures, and insignificant amount of dsDNA (47.1 ng/mg) left in the dry ECM. Moreover, key structural ECM proteins and Angiopoietin-like 4 (ANGPTL4) remained intact. The successful coupling of ECM to alginate was confirmed by the presence of amide I band (at 1642 cm<sup>-1</sup> and amide II band (at 1523 cm<sup>-1</sup>) in FTIR spectrum. Alginate-ECM scaffolds were shown to have highly porous structures and the size of the scaffolds was significantly tuned with the second cross-linker treatment.

### Discussion & Conclusion:

The novel concept of using discarded adipose tissues and conjugating ECM to improve cell-material interactions without additional biologics demonstrates the potential exploitation of adipose tissue as useful bioactive material for tissue engineering and regenerative medicine applications.

## Enzyme Sensor System for Determination of Total Cholesterol in Human Serum

**K DERINA<sup>1</sup>, E DOROZHKO<sup>1</sup>, E KOROTKOVA<sup>1</sup>, K MICHURINA<sup>1</sup>, E PETROVA<sup>1</sup>**

<sup>1</sup>*National Research Tomsk Polytechnic University, Russian Federation*

### Introduction:

Many studies show that high cholesterol blood level is correlated with cardio vascular diseases. That is why, analysis of cholesterol level is important in medicine. In previous years, biosensors were very popular for various types of analysis. Most sensor systems are amperometric, but usage of voltammetry helps to avoid some interference and to have higher sensitiveness. The main purpose of this work was to create simple sensor system for detection of blood cholesterol.

### Methods:

Experiments were carried out with a three-electrode cell in which the graphite electrode with immobilised cholesterol oxidase and horseradish peroxidase was used as a working electrode. All potentials were measured against the external silver chloride reference electrode. Standard solutions for electrochemical experiments were prepared by dissolving cholesterol in Triton X-100. As a background solution was used phosphate buffer with pH = 6.86. Cholesterol has no voltammetric signal, that is why, was used a reduction peak of hydrogen peroxide. Hydrogen peroxide was formed in oxidation of cholesterol by oxygen, which catalysed by cholesterol oxidase.

### Results:

Obtained voltammograms showed a reduction peak of hydrogen peroxide around -1,281 V vs Ag/AgCl. The calibration curves are linear within the range of concentration from  $2 \times 10^{-6}$  M to  $2 \times 10^{-4}$  M. Cholesterol content in serum was determined by the present biosensor, under its optimal working conditions.

### Discussion & Conclusion:

It was shown that voltammetric sensor has high sensitiveness and accuracy. Usage of voltammetric sensor helps to exclude ionisation of different analytes in serum. This study was supported by Grant FCP “Scientific and Science-pedagogical personnel of innovative Russia” № 14.B37.21.1183

## Intestinal Microbial Study of Gout Patients

**KYR ANG<sup>1</sup>, YK LEE<sup>1</sup>, EY KOH<sup>1</sup>, HP ZHANG<sup>2</sup>, JC ZHANG<sup>2</sup>**

<sup>1</sup>*National University of Singapore, Singapore,* <sup>2</sup>*Inner Mongolia Agricultural University, China*

### Introduction:

Gout is an auto-inflammatory, as well as metabolic, disease caused by a disorder in purine metabolism, resulting in elevated blood uric acid levels. Diet is known to influence the diversity of the human gut microflora, which in turn could lead to the development of inflammation and metabolic diseases. The intake of meat and alcohol has been suggested to be risk factors for gout development as these foods introduce exogenous purines. This is the first study to investigate the association between gout and intestinal microbiota, taking meat consumption and age into consideration.

### Methods:

A group of 11 (from 37 recruited) patients and 19 (out of 45) healthy subjects who were aged 30 to 60 had their fecal samples tested in triplicates for 7 groups of gut microflora via absolute quantification using real-time quantitative Polymerase Chain Reaction. The Mann-Whitney U test was used for statistical analyses.

### Results:

The total bacteria count, *Clostridium leptum* subgroup, *Clostridium coccoides* group, *Bifidobacterium*, and *Bacteroides fragilis* group were significantly lower ( $P < 0.05$ ) while *Enterobacteriaceae* was higher ( $P < 0.05$ ) in the gout patients than their healthy counterparts. *Lactobacillus* group and *Prevotella* were not significantly different ( $P > 0.05$ ) between the 2 groups.

### Discussion & Conclusion:

The gut microflora populations were observed to be altered in gout patients and results from this study could offer more possibilities to the diagnostics, treatment and/or prevention of gout. For instance orally-administered pro- or pre-biotics that favour the growth of beneficial bacterial groups could be introduced as alternative therapy for gout.



## Differences in Gut Microbiome Between Schizophrenic Patients and Healthy Individuals

**KYR ANG<sup>1</sup>, YK LEE<sup>1</sup>, EY KOH<sup>1</sup>, R MAHENDRAN<sup>1</sup>, L FENG<sup>1</sup>**

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

### Introduction:

The human gut is a complex ecosystem that host up to 1014 microbes. Recent studies have pointed to the gut microbiota in interacting with the host via the gut-brain axis in a bidirectional communication which has been implicated in psychological disorders.

### Methods:

In this study, differences in gut microflora between 20 male Schizophrenic patients, whose condition severity was assessed using the PANSS scoring system and 15 healthy male individuals with no previous history of mental illness were assessed. Real-time polymerase chain reaction was used to quantify subdominant gut bacterial counts for comparison between patients and controls.

### Results:

Significant differences ( $P < 0.05$ ) were observed for the total bacterial count, Prevotella, Bifidobacterium, Lactobacillus, Clostridium leptum subgroup and Bacteroides fragilis subgroup between patients and controls, with fold changes ranging from 1.1 to 2.9 observed between the different bacteria combinations. There was no significant difference for the Clostridium coccoides group and Enterobacteriaceae between patients and controls. Also, 5 and 2 sets of paired bacteria group were observed in patients and controls respectively, suggesting that there could be signature sets of bacteria present within each group.

### Discussion & Conclusion:

These preliminary findings could provide a potential choice of alternative therapy for mentally ill patients through modification of their gut microbiota. However, further studies and exploration of feasibility in this area would be necessary.

## Role of Neuroimaging in the Prediction of Neurodevelopmental Outcome in Preterm Infants

**W HOU<sup>1</sup>, PH TANG<sup>2</sup>, PK AGARWAL<sup>2</sup>**

<sup>1</sup>Duke-NUS Graduate Medical School, Singapore, <sup>2</sup>KK Women's & Children's Hospital, Singapore

### Introduction:

Preterm infants are at risk of neurodevelopmental impairment. The objective of the study is to determine the associations between neuroimaging abnormalities on cranial ultrasound with neurodevelopmental outcome at 2 years of age in preterm infants.

### Methods:

A total of 343 preterm infants born between 2005 and 2010 and cared for in KK Hospital with birth weight  $\leq 1250$  gram were assessed in this retrospective study. Serial cranial ultrasound scans were examined for intraventricular haemorrhage and cystic periventricular leukomalacia. Ventricular-brain ratio on term equivalent cranial ultrasound was measured. Neurodevelopmental outcome was assessed by the performance on Bayley Scales of Infant and Toddler Development, Third Edition (Bayley-III) at 2 years corrected age. Mental delay was defined as having combined Bayley-III score (the average of cognitive and language scores)  $< 80$ .

### Results:

The mean cognitive, language, and motor scores on Bayley-III in this cohort were  $93 \pm 15$ ,  $83 \pm 18$ , and  $92 \pm 15$  respectively. Twenty-six percent of the preterm infants had mental delay and 4 percent had cerebral palsy. On multivariate analysis, ventricular-brain ratio  $> 0.35$  was significantly associated with mental delay (OR 5.28, 95% CI 1.49-18.71,  $P = 0.01$ ). Other significant risk factors for mental delay were male gender, postnatal steroid, and necrotizing enterocolitis, whereas maternal tertiary education was a protective factor against adverse outcome.

### Discussion & Conclusion:

Ventricular-brain ratio  $> 0.35$  on cranial ultrasound in preterm infants strongly predicts mental delay at 2 years of age. This suggests a role for incorporating this measurement into current practice.

## **LRRK2 Genetic Variants Mediate the Neuroprotective Effect of Caffeine in Parkinson's Disease**

**S S T PAING<sup>1, 1</sup>, JC ALLEN<sup>1</sup>, Y ZHAO<sup>2</sup>, KM PRAKASH<sup>2</sup>, EK TAN<sup>2</sup>**

<sup>1</sup>*Duke-NUS Graduate Medical School, Singapore,* <sup>2</sup>*Singapore General Hospital, Singapore*

### **Introduction:**

Caffeine intake is associated with a reduced risk of Parkinson's disease (PD). A recent study showed that single nucleotide polymorphisms (SNPs) in the LRRK2 gene, G2385R (rs34778348) and R1628P (rs33949390) increase the risk of PD among the Chinese. This study aims to assess if the protective effect of caffeine against PD is modulated by the presence of G2385R or R1628P in our population.

### **Methods:**

Study participants of Chinese ethnicity were recruited prospectively and caffeine intake was assessed by clinical interview and scored into caffeine-decades by multiplying the amount of caffeine taken per day with the total number of years of consumption. Genotyping for LRRK2 SNPs was performed according to Sequenom genotyping assay protocol. Multivariate logistic regression analysis was used to investigate association between the disease status and the independent variables, caffeine consumption and LRRK2 genotype.

### **Results:**

A total of 1863 participants comprising 924 patients and 939 controls were included in the analysis. Caffeine intake was found to decrease the risk of PD, with an OR of 0.29 (CI: 0.19-0.43,  $P < 0.0001$ ) among our study population. G2385R and R1628P variants were found to increase the risk of PD with ORs of 2.80 (CI: 1.64-4.77,  $P = 0.0002$ ) and 2.11 (CI: 1.28-3.47,  $P = 0.0032$ ) respectively. On multivariate analysis, a significant interaction between R1628P variant and caffeine intake was found to influence PD risk ( $P = 0.0214$ ) but the interaction between G2385R and caffeine was not significant ( $P = 0.2027$ ).

### **Discussion & Conclusion:**

We found novel evidence that the protective effect of caffeine against PD can be modulated by the presence of R1628P mutation in our population.

## Changes in Gait Associated with Sarcopenia: Useful Motion Analysis Markers

**S BANERJI<sup>1</sup>, B PEREIRA<sup>1</sup>, G SINGH<sup>1</sup>, R MERCHANT<sup>1</sup>, E CHEW<sup>1</sup>, M SHARMA<sup>1</sup>,  
R KAMBADUR<sup>2</sup>**

<sup>1</sup>National University Health System, Singapore, <sup>2</sup>Nanyang Technological University, Singapore

### Introduction:

Muscle mass is known to decrease with age leading to sarcopenia which is a condition of declining muscle mass, strength and function. Sarcopenia is associated with adverse health outcomes including loss of ambulation and independence and increased mortality. This condition remains difficult to diagnose due to a lack of robust clinical criteria. The aim of this study was to identify physical markers for the early onset of sarcopenia using motion analysis.

### Methods:

One hundred and ten community dwelling subjects from the Singapore Chinese male population were studied (young, 20 to 30 years, n = 10; middle aged, 40 to 50 years, n = 10; elderly, 60 to 80 years, n = 90). Motion analysis was performed for standing, walking, step-up and down, sit-to-stand and one leg stance. Timed up and go (TUG) and 6 minute walk were also performed separately.

### Results:

Changes in walking speed, cadence, TUG, one leg stance, and hip and knee rotation were associated with decreased muscle mass. Posture adaptation during walking resulting in increased forward tilt of the neck and trunk in the direction of walking seemed to occur in the elderly prior to onset of functional deficits.

### Discussion & Conclusion:

Loss of muscle mass is difficult to measure as accurate quantification requires muscle imaging. This is the first study that evaluates motion analysis-based markers for sarcopenia in Singapore elderly males. Methods to reliably collect and process data were defined along with cut-off values which may indicate onset of sarcopenia. The parameters identified in this study may be useful in developing a community screening tool for sarcopenia in the elderly.

## Noncultured Cellular Grafting for Vitiligo—A Three-Year Follow-Up Study

**EY GAN<sup>1</sup>, BK GOH<sup>1</sup>, STG THNG<sup>1</sup>**

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

### Introduction:

Noncultured cellular grafting is an advanced surgical technique for vitiligo. We evaluated the 3-year follow-up results of our vitiligo patients who underwent noncultured cellular grafting.

### Methods:

All patients with stable vitiligo, who had undergone noncultured cellular grafting from March 2006 to February 2009, were included. Clinico-epidemiological characteristics and repigmentation data were reviewed. Vitiligo repigmentation was graded as “poor”, “fair”, “good” and “excellent”, corresponding to 25% intervals on a scale of 0% to 100% repigmentation.

### Results:

There were 83 patients, with mean age of 35 years and majority (89%) were Fitzpatrick skin type IV. Mean duration of vitiligo prior to grafting was 100 months. Forty-nine patients (59%) had non-segmental, 33 (40%) had segmental and 1 had mixed vitiligo. Of 112 grafting sessions, 90 were primary, 21 were repeated and 1 was staged. Most commonly grafted sites were face (49%) and trunk (17%). At the 3-, 6-, 12-, 24- and 36-month follow-ups, 58%, 64%, 71%, 71% and 100% of grafting sessions achieved good to excellent repigmentation respectively. At 12 months, more than 70% of patients with face and neck involvement and 83% with segmental vitiligo achieved good to excellent repigmentation, compared to scalp and acral (50%) and non-segmental vitiligo (64%). Seven patients lost initial repigmentation due to active disease. There was no significant scarring or adverse reactions.

### Discussion & Conclusion:

Noncultured cellular grafting is safe with durable results. Most patients achieve maximal repigmentation by 12 months, lasting till at least 36 months. Better repigmentation rates occurred on the face, neck and segmental vitiligo.

## CACNA1C Genome Wide Supported Psychosis Genetic Variation Affects Cortical Brain White Matter Integrity in Chinese Patients with Schizophrenia

**MY SUM<sup>1</sup>, CN KUSWANTO<sup>1</sup>, K SIM<sup>1</sup>, GL YANG<sup>2</sup>, TW SOONG<sup>3</sup>, YY SITOH<sup>4</sup>, WL NOWINSKI<sup>2</sup>**

<sup>1</sup>*Institute of Mental Health, Singapore,* <sup>2</sup>*Singapore Biomaging Consortium, A\*STAR, Singapore,* <sup>3</sup>*National University of Singapore, Singapore,* <sup>4</sup>*National Neuroscience Institute, Singapore*

### Introduction:

Several genome-wide association studies have implicated the CACNA1C gene in schizophrenia. Whilst CACNA1C is associated with functional brain imaging changes and cognitive deficits related to brain cortical regions in healthy individuals, the impact of CACNA1C genetic variation on brain white matter integrity in schizophrenia remains unclear. Based on prior evidence, we hypothesised that CACNA1C risk variant rs1006737 is associated with reductions of white matter integrity in the frontal, parietal, temporal regions and cingulate gyrus in schizophrenia.

### Methods:

One hundred and sixty Chinese participants (96 schizophrenia patients and 64 healthy controls) were genotyped using blood samples and underwent structural MRI and DTI. Two-way ANCOVA was employed to examine CACNA1C related genotype effects, diagnosis effects and genotype x diagnosis interaction effects on fractional anisotropy (FA) of relevant brain regions.

### Results:

Significant diagnosis-genotype interactions were observed (mean FA for left frontal lobe: adjusted  $F_{1,156} = 6.22$ ,  $P = 0.014$ ; left parietal lobe: adjusted  $F_{1,156} = 7.14$ ,  $P = 0.008$ ; left temporal lobe: adjusted  $F_{1,156} = 8.37$ ,  $P = 0.004$ ). Patients with schizophrenia and GG genotype had lower mean FA in left frontal lobe ( $F_{1,93} = 2.504$ ,  $P = 0.014$ ), left parietal lobe ( $F_{1,93} = 2.37$ ,  $P = 0.020$ ) and left temporal lobe ( $F_{1,93} = 3.01$ ,  $P = 0.003$ ) with standardised effect sizes of -1.43, -1.3 and -1.0 respectively.

### Discussion & Conclusion:

Our study revealed that rs1006737 contributes to morphological changes involving disruptions of white matter integrity within cortical brain regions in schizophrenia. Further study is warranted to understand the full impact of this risk gene in psychosis and its inter-related, interactional and integrated role with other genetic and non-genetic factors in the neurobiology of schizophrenia.

## Novel Biomarkers of Kidney Injury Improve Prediction of Kidney Function Decline over Albuminuria

**GC CHAN<sup>1</sup>, PJ HO<sup>1</sup>, HM LOH<sup>1</sup>, QC TOH<sup>1</sup>, BW TEO<sup>1</sup>**

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

### Introduction:

Urine albumin excretion rate (UACR) is a predictor of estimated glomerular filtration rate (eGFR) decline in chronic kidney disease (CKD). A panel of novel urine biomarkers of acute kidney injury (KIM-1, kidney injury molecule-1; L-FABP, liver-type fatty acid-binding protein; NGAL, neutrophil gelatinase-associated lipocalin;  $\alpha$ GST and  $\pi$ GST, glutathione s-transferase; collagen IV) may improve the prediction of eGFR decline. We hypothesise that these biomarkers will improve prediction without UACR, based on a population of Asian CKD patients.

### Methods:

We retrieved stored spot urine samples from the Asian Kidney Disease Study (n = 81, 49.4% male). We examined models of the biomarkers against eGFR decline using univariate, and multivariate analysis by exhaustive method for variables selection in multiple linear regression modeling with Akaike Information Criterion (AIC) to select the best predictive model.

### Results:

Population means: age  $58.7 \pm 12.3$  years, 53.1% with history of diabetes, serum creatinine  $2.03 \pm 1.17$  mg/dL, total protein  $70.67 \pm 5.78$  g/L, and beta trace protein  $1.5 \pm 1.0$  mg/L; and urine UACR  $1.2 \pm 1.9$  mg/g,  $\alpha$ GST  $6.5 \pm 23.8$  ug/L, L-FABP  $42.2 \pm 50.0$  ug/L, NGAL  $29.8 \pm 52.1$  g/L, and baseline eGFR  $45.2 \pm 28.6$  mL/min/1.73m<sup>2</sup>. In univariate analyses, UACR,  $\alpha$ GST, and LFABP are significantly associated with eGFR decline. The best model without UACR (AIC=201.46) includes initial GFR and serum beta-trace protein. The best model with UACR (AIC=202.63) includes history of diabetes. UACR is insignificant in the model. Both models include serum protein,  $\alpha$ GST, NGAL and LFABP.

### Discussion & Conclusion:

UACR alone predicts eGFR decline. When combined with other biomarkers, prediction is improved but UACR becomes insignificant. In CKD, novel biomarkers may improve eGFR prediction over UACR.

## Bariatric Surgery and Its Impact on Sleep

**H XIE<sup>1</sup>, C OBOYLE<sup>1</sup>, L DOHERTY<sup>1</sup>**

<sup>1</sup>*Bon Secours Hospital, Ireland*

### Introduction:

There is a strong association between morbid obesity and obstructive sleep apnoea syndrome (OSAS). Anecdotally, daytime sleepiness is noted in the morbidly obese without OSAS. We aimed to explore the effect of bariatric surgery on sleep in morbidly obese patients with and without OSAS.

### Methods:

Between June 2009 and July 2012, patients undergoing bariatric surgery were prospectively evaluated before and after surgery. Each subject underwent a sleep assessment, a quality of life questionnaire, the Functional Outcomes of Sleep Questionnaires Scores (FOSQ) and a screening sleep study when clinically indicated.

### Results:

A total of 167 subjects were studied; 75.4 % females, age 46 (14 to 75) years and Body Mass Index (BMI) 49 (36-69) kg/m<sup>2</sup> median (range). Pre-surgery, 92 (55%) were diagnosed with OSA; Apnoea-Hypopnoea index (AHI) 26(2.8) mean (standard deviation). Positive airway pressure (PAP) therapy was prescribed in 50(54%). Mean reduction in BMI post bariatric surgery was 12 (6 to 20) kg/m<sup>2</sup> at 6 (3 to 12) months. 87.9% reported improved sleep quality reflected in improved scores in all FOSQ domains (General Productivity, Social Outcomes, Activity Levels, Vigilance and Intimacy) ( $P < 0.001$ , paired t-test). Improvement in Total FOSQ score remained significant in those with and without OSA ( $P < 0.002$ ). 90.7% patients discontinued PAP due to resolution of daytime sleepiness.

### Discussion & Conclusion:

There is a high prevalence of OSA in patients undergoing bariatric surgery. Weight loss following bariatric surgery has a positive impact on sleep in the majority of patients with and without OSAS. In those with OSA there is a dramatic benefit with only a small minority still requiring nocturnal positive airway support.



## Subjective and Objective Outcomes of Permacol Augmentation Rhinoplasty in an Asian Population

**CG GOH<sup>1</sup>, S LO<sup>2</sup>**

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>Tan Tock Seng Hospital, Singapore

### Introduction:

Autologous cartilage is the preferred graft material for augmentation rhinoplasty due to their lower complication rates. However, harvesting these autologous cartilages requires longer operation time and may result in donor site morbidity. Permacol is an acellular biomaterial manufactured from porcine dermal cartilage. To date, the efficacy of Permacol as graft material in augmentation rhinoplasty Asians has not been determined. The aim of this pilot study is to evaluate the objective and subjective results of augmentation rhinoplasty using Permacol in Asian patients.

### Methods:

Patient's outcomes were prospectively reviewed during regular follow-ups by clinical assessment and photographic evaluation. Apart from objective measures by the surgeon, patient's subjective satisfaction was assessed pre- and 6 months post-surgery using the Rhinoplasty Outcome Evaluation (ROE) instrument.

### Results:

From 2011 to 2012, a total of 11 patients received the Permacol implant (6 male, 5 female). Four patients had previous rhinoplasty. Postoperative follow-up ranged from 8 to 24 months. Permacol was used for dorsal augmentation in 8 patients (median thickness 4 mm; range 2 mm to 6 mm), with significant post-operative resorption observed in 5; and camouflage of unilateral defects in 2 patients (both 2 mm thickness) with no resorption observed. The mean preoperative and postoperative ROE scores were 38.6 and 55.7 respectively and the improvement was significant ( $P = 0.003$ ).

### Discussion & Conclusion:

In conclusion, despite a general improvement of patients' ROE scores, a significant resorption rate has been observed when Permacol is used for dorsal augmentation rhinoplasty. The authors recommend further larger studies to confirm these findings.

## Heart Wellness Programme—A Community Based Cardiac Rehabilitation and Primary Prevention Programme to Reduce Cardiovascular Disease in a Multi-ethnic Society

**HY TAY<sup>1</sup>, YH KWAN<sup>2</sup>, KY ONG<sup>2</sup>, JY CHANG<sup>2</sup>**

<sup>1</sup>*Singapore Heart Foundation, Singapore,* <sup>2</sup>*National University of Singapore, Singapore*

### **Introduction:**

Community-based exercise programmes have been shown to be effective in the Western world. However, there is a dearth of literature on its effectiveness in Asia. This study aims to find out the effectiveness of the Health Wellness Programme (HWP) in Singapore. HWP provides community cardiac rehabilitation (CR) and primary prevention (PP) services.

### **Methods:**

A retrospective cross-sectional study was conducted on subjects who had completed a one-year wellness programme from 2010 to 2012. Subjects with incomplete one-year data were excluded. Socio-demographic, anthropometric, clinical and laboratory data were recorded. Changes between the baseline and final measurements were analysed. Differences between changes of CR and PP subjects were explored. Data was extracted and analysed in 2013.

### **Results:**

A total of 207 patients with complete data were analysed. Improvements were seen in diastolic blood pressure (DBP) ( $\Delta$ : -1.6 mmHg,  $P < 0.01$ ), body fat percentage ( $\Delta$ : -0.8%,  $P < 0.01$ ), distance walked ( $\Delta$ : 10.7 m,  $P < 0.01$ ), total cholesterol (TC) ( $\Delta$ : -0.2 mmol/L,  $P < 0.01$ ) and low-density lipoprotein (LDL) ( $\Delta$ : -0.3 mmol/L,  $P < 0.01$ ). CR subjects saw improvements in body fat percentage ( $\Delta$ : -1.4%,  $P < 0.01$ ), distance walked ( $\Delta$ : 9.7 m,  $P = 0.01$ ), TC ( $\Delta$ : -0.2 mmol/L,  $P = 0.03$ ), LDL ( $\Delta$ : -0.2 mmol/L,  $P = 0.03$ ) and triglyceride ( $\Delta$ : -0.2 mmol/L,  $P < 0.01$ ). PP patients experienced improvements in DBP ( $\Delta$ : -2.8 mmHg,  $P < 0.01$ ), distance walked ( $\Delta$ : 11.4 m,  $P = 0.01$ ) and LDL ( $\Delta$ : -0.5 mmol/L,  $P = 0.01$ ).

### **Discussion & Conclusion:**

The low to moderate intensity HWP seems to be effective in the multi-ethnic community setting. More research is needed to confirm its effectiveness and examine its cost-effectiveness in a prospective controlled trial.

## Clinico-epidemiological Profile of Moderate to Severe Paediatric Atopic Dermatitis

**EY GAN<sup>1</sup>, YC GIAM<sup>1</sup>, MSL HO<sup>1</sup>, CC CO<sup>1</sup>**

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

### Introduction:

The objective of our study was to review the clinico-epidemiological profile of paediatric patients with moderate to severe atopic dermatitis (AD).

### Methods:

All patients with moderate to severe AD, who visited the paediatric dermatology clinic in National Skin Centre from July 2010 to June 2011, were included. Medical records were retrospectively reviewed for data on clinico-epidemiological characteristics and treatment progress.

### Results:

There were 21 patients (14 males, 7 females) with a mean age at onset of AD at 2.5 years (1 month to 10 years). Most had a family history of atopy (n = 16, 76%). Seven patients (33%) developed allergic rhinitis and 2 had asthma (10%). Amongst the 11 patients with early-onset AD, all had an atopic family history, 3 developed other atopies (27%), 7 had allergic sensitisation to house dust mites (64%) and 3 (27%) to food allergens. Majority had excoriations (n = 18, 86%), suggestive of pruritus and infection. All patients had dryness and 4 had palmar hyperlinearity (19%), suggestive of filaggrin deficiency. Staphylococcus aureus infections averaged 5 per annum. Three of 7 patients (43%) tested positive for the human filaggrin gene (FLG) mutation. All patients required topicals and short courses of systemic corticosteroids, 8 had immunosuppressants (38%) and 3 had phototherapy (14%).

### Discussion & Conclusion:

This study analysed the more challenging and slow-to-respond AD patients. Our results are consistent with the atopic march theory. We report a higher proportion of patients with an atopic family history (76% versus 56% in a previous Singapore study). Closer doctor-patient interaction is needed in this more severe subgroup.

## **Vinorelbine-Cyclophosphamide Compared to Cyclophosphamide in Peripheral Blood Stem Cell Mobilisation**

**SDE MEL<sup>1</sup>, TG SOH<sup>2</sup>, LK TAN<sup>2</sup>, WJ CHNG<sup>2</sup>**

<sup>1</sup>*National University Hospital, Singapore,* <sup>2</sup>*National University Health System, Singapore*

### **Introduction:**

High dose therapy followed by autologous stem cell rescue is the standard of care for transplant eligible patients with multiple myeloma. Cyclophosphamide (Cy) at 4 to 7 g/m<sup>2</sup> with granulocyte colony stimulating factor (GCSF) is a commonly used mobilisation regimen. Vinorelbine 25 mg/m<sup>2</sup> in combination with Cy 1500 mg/m<sup>2</sup> (Vino-Cy) is also an effective regimen which may be better tolerated. Cy with GCSF was the mobilisation regimen of choice in our institution before 2007. Vino-Cy subsequently gained preference. We report a retrospective analysis of mobilisation outcomes using Vino-Cy compared with Cy.

### **Methods:**

Patient data was extracted from our institutional database. Eighteen patients underwent mobilisation using the Cy-GCSF regimen while 47 patients had Vino-Cy using GCSF or Pegfilgrastim.

### **Results:**

The median CD34+/Kg collection was 5.5 with Cy and 12.8 with Vino-Cy, the mean collection with Cy was 7.8 compared to 13.2 with Vino-Cy. The median time to harvest with Cy was 3 days, this was reduced to 2 days with Vino-Cy. The median day of harvest was day 9 using Vino-Cy compared to day 11 with Cy. The harvest timing for Vino-Cy was less variable than Cy as evidenced by a standard deviation of 0.77 versus 2.5 days.

### **Discussion & Conclusion:**

Our data suggest that Vino-Cy is superior to Cy based on the higher CD34+ stem cell collection (more than adequate for tandem transplant) and earlier completion of harvesting. The timing of harvest is also highly predictable with Vino-Cy. Prospective analyses are required to determine if Vino-Cy mobilisation confers a survival benefit over Cy.

## Influenza Vaccination of Healthcare Workers: Factors and Patterns in Singapore

**CH SUN<sup>1</sup>, LT LEE<sup>1</sup>, I LIM<sup>1</sup>, LN LEE<sup>1</sup>**

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

### **Introduction:**

Healthcare workers (HCW) are at an increased risk of exposure to influenza and other infectious diseases. Vaccinations reduce these occupational risks by conferring protection from exposure, reducing transmission to other HCW and patients if exposed and resulting in earlier resolution of symptoms if infected. Influenza vaccination is an integral component of infection control. However, coverage remains low worldwide despite recommendations from health authorities. Accessibility and cost of vaccination have been shown to be the main determinants of vaccination uptake. We attempt to examine the sociocultural factors that affect influenza vaccination uptake in a large multiethnic healthcare workforce in a healthcare facility in Singapore that offers easy access to free vaccines.

### **Methods:**

We reviewed the total population vaccination rates of Tan Tock Seng Hospital from 2009 to 2013 and conducted a questionnaire to understand the reasons and patterns for influenza vaccination.

### **Results:**

Analysis of the vaccination patterns and demographic profiles identified several factors influencing uptake rate. Social-cultural perception of influenza and the importance and risks of vaccination are the main factors determining uptake rate in a successful campaign that had addressed the ease of access to free vaccines.

### **Discussion & Conclusion:**

To overcome these barriers and increase uptake, future vaccination promotion campaigns must be designed and implemented with care to address the various needs of each distinct group of staff.

## Screening for Avian Influenza A (H7N9) During the 2013 Outbreak in Tan Tock Seng Hospital

**V GAN<sup>1</sup>, MK WIN<sup>1</sup>, SY TAY<sup>1</sup>, PU KRISHNAN<sup>1</sup>, YS LEO<sup>1</sup>, A CHOW<sup>1</sup>**

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

### Introduction:

Human influenza A (H7N9) infections were first reported in China on 31 March 2013. Tan Tock Seng Hospital was designated to screen suspect H7N9 cases from 8 April 2013. This study evaluated the screening programme with a prospective cohort study.

### Methods:

From 8 April to 23 June 2013, cases at risk for H7N9 were screened at the emergency department (ED) and by ward teams. Testing of respiratory samples for influenza A/B was by multiplex PCR; subtyping was done for cases of influenza A. Clinical and epidemiological information was obtained from hospital records.

### Results:

Of the 65 at-risk cases screened, the median age was 35 (range, 4 to 87) years, 51% were female and 97% Chinese. ED identified all except 1 case that was investigated after admission by the ward team. Forty-two cases were discharged to ambulatory care without investigation for H7N9. All except 2 of 23 admitted cases were investigated by influenza PCR. Of those investigated, 7 of 21 tested positive for non-H7N9 influenza. Median length of stay for admitted patients was 2.5 days (range 1-10). Six cases fulfilled Ministry of Health (MOH) criteria for suspect cases for investigation. All were appropriately managed for investigation. Effective surveillance at ED was successful in triaging all cases fulfilling MOH criteria for investigation with a sensitivity of 100% (95% CI, 54% to 100%) and a specificity of 70% (95% CI, 56% to 81%).

### Discussion & Conclusion:

Our screening programme was successful in identifying all cases fulfilling MOH criteria for H7N9 investigation. Adequate resources are required to support additional workload for screening.

## A Snapshot of Audits in the Phototherapy Unit

**SP CHAN<sup>1</sup>, A TAN<sup>2</sup>, Y HAO<sup>2</sup>, MK WIN<sup>2</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore,* <sup>2</sup>*Institute of Infectious Disease & Epidemiology, Singapore*

### **Introduction:**

Risk factors for MRSA colonisation include antibiotic exposure, medical comorbidities and immunocompromised state. A retrospective case-control study was conducted in 2009 at Tan Tock Seng Hospital, Singapore, to ascertain the sociodemographic and clinical factors' association with MRSA infections.

### **Methods:**

The data of 600 cases and controls each was analysed with conventional logistic regression (logit) and several decision tree models (CHAID, CART, QUEST, C5.0, GUIDE), which could generate "if-then" rules in quantifying risk factors' association with MRSA infections. To compare the models' out-sample predictive accuracy, a hold-out method was applied and the areas under the receiver operating characteristic curves (AUROC) were computed.

### **Results:**

The use of antibiotics, previous hospitalisation and surgery were identified to be the most important risk factors. The cut-off of the number of antibiotics was identified to be 6. A person treated with more than 6 antibiotics, with previous hospitalisation and surgery, was more likely to be infected with MRSA. In terms of predictive accuracy, the less complicated decision trees (AUROCs ranging from 0.86 to 0.88) were comparable to logit (AUROC: 0.90).

### **Discussion & Conclusion:**

While the results were expected, the decision tree models confirmed the relevance and importance of antibiotic exposure and previous hospitalisation and surgery in explaining new MRSA infections. Owing to their rule-based modelling setup, the decision trees are useful in developing clinical guidelines. Widely recommended as an alternative to conventional statistical modelling, the decision trees are recommended for routine use in clinical decisionmaking in view of their interpretability and ease in application.

## Personal Strength in Singapore Youths: A Naturalistic Longitudinal Study in Healthy Children

**MY ONG<sup>1</sup>, Y XIE<sup>2</sup>, MJ MEANEY<sup>2</sup>, BFP BROEKMAN<sup>3</sup>, SM SAW<sup>3</sup>**

<sup>1</sup>*Singapore Institute for Clinical Sciences, A\*STAR, Singapore,* <sup>2</sup>*Institute of Mental Health, Singapore,* <sup>3</sup>*National University of Singapore, Singapore*

### Introduction:

Previous studies showed individual and environmental factors influencing resilience. Studies were usually conducted in western populations with low social economic status or traumatic experience. Our study sought to examine individual, parental, and environmental factors that may predict resilience/personal strengths in Singapore youths in a healthy paediatric population longitudinally. We hypothesised that these factors will interact dynamically to influence personal strength.

### Methods:

In a longitudinal study, 491 Singapore youths originally participated in the Singapore Cohort study Of the Risk factors for Myopia (SCORM); data were collected at 2 waves. Between ages 7 years and 9 years, IQ, Child Behavioural Checklist (CBCL), and social economic information were collected. Youth Self Report (YSR), Parental Bonding Instrument (PBI), Parenting Authority Questionnaires (PAQ), and Singapore Youth Resilience Scale (SYRESS) were collected at ages 18 years to 20 years. SYRESS is used for measuring personal strength. Correlational analyses and Univariate GLM were used to examine the relationship between variables in predicting personal strength.

### Results:

Gender effect showed boys scoring higher on SYRESS total score. CBCL did not show any predictive value on SYRESS. A negative association between YSR internalised symptoms and SYRESS was found. Positive associations between PBI maternal care and PAQ authoritative father with SYRESS were found. No significant interaction was found between CBCL and parenting.

### Discussion & Conclusion:

Gender effect may indicate the SYRESS as sensitive to strengths specific to boys. Parent-reported emotional and behavioural problems at younger age have no significant predictive value on personal strengths in adolescence. Internalised symptoms, perceived parental care and parenting style contribute to the development of personal strengths in Singapore youths.



## Retrospective Study on Autoimmune Blistering Disease in Paediatric Patients

**YL KONG<sup>1</sup>, NS CHANDRAN<sup>2</sup>, YL LIM<sup>3</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore,* <sup>2</sup>*National University Hospital, Singapore,* <sup>3</sup>*National Skin Centre, Singapore*

### Introduction:

Autoimmune blistering diseases (AIBD) are rare in children, and local prevalence is unclear. We aim to investigate the clinical and immunopathologic characteristics of paediatric patients diagnosed with AIBD locally.

### Methods:

The clinical/histology databases at the National Skin Centre were searched to identify patients <18 years old diagnosed with AIBD from 1 January 1998 to 31 December 2012. Patient demographics, presentation, triggers, investigations, treatment and disease course were analysed.

### Results:

Twelve patients with AIBD were identified; 5 (41.7%) had linear immunoglobulin A (IgA) disease; 2 (16.7%) had pemphigus vulgaris; 2 (16.7%) had bullous pemphigoid; 2 (16.7%) had bullous systemic lupus erythematosus and 1 (8.3%) had pemphigus foliaceus. Four (33.3%) were females and 8 (66.7%) were males. The mean age of onset was 8.7 years (range: 2-17). Most patients were treated with steroids and adjuvant immunosuppressants. Intravenous rituximab was used effectively in a patient with recalcitrant pemphigus vulgaris. The mean follow-up period was 3.2 years (range, 0.17 to 10.1). Four (33.3%) patients went into complete remission not requiring maintenance therapy after a mean of 1.1 years (range, 0.17 to 2.2); 2 (16.7%) had complete remission requiring maintenance therapy after a mean of 4.7 years (range, 2.1 to 7.3) and 4 (33.3%) achieved stable disease after a mean of 4.5 years (range, 2.4 to 10.1). Two (16.7%) patients were lost to follow-up.

### Discussion & Conclusion:

Consistent with existing literature, our study shows that linear IgA disease is the commonest cause of AIBD in childhood. While common in the West, dermatitis herpetiformis is not seen locally. Bullous pemphigoid, though predominant in the elderly, is an important differential diagnosis in children presenting with AIBD. Intravenous rituximab may be used to treat recalcitrant childhood pemphigus vulgaris.

## **Emerging Diseases Outbreaks and their Effects on the Attitudes and Beliefs of Nurses towards Influenza Vaccinations**

**CH SUN<sup>1</sup>, LT LEE<sup>1</sup>, I LIM<sup>1</sup>, LN LEE<sup>1</sup>**

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

### **Introduction:**

Singapore is a global city at risk of emerging diseases. Having withstood severe acute respiratory syndrome (SARS) in 2003 and H1N1 influenza in 2009, we face the possibility of an outbreak of the Middle East Respiratory Syndrome (MERS) from the Middle East and H7N9 from China in 2013. Influenza vaccination coverage among healthcare workers (HCW) is essential for protection from occupational hazards especially during times of outbreaks of emerging diseases. We attempt to understand the attitudes and beliefs of HCW towards influenza vaccinations and the impact that emerging infections such as MERS and H7N9 have on their decision for vaccinations.

### **Methods:**

A randomised cross-sectional study was performed. A self-administered anonymous questionnaire was administered to ward nurses in Tan Tock Seng Hospital, the designated emerging diseases outbreak management hospital in Singapore.

### **Results:**

A total of 1073 respondents were recruited with a response rate of 94%. Significant variations were seen between locations of work, nationality, years working and job type. The effect of recent MERS and H7N9 outbreaks on vaccine uptake were moderate. For some responders, the decision for vaccination was due to the perception that seasonal influenza vaccine protects against MERS and H7N9 viruses.

### **Discussion & Conclusion:**

Misconceptions and misperceptions remain the main barrier for influenza vaccine uptake while accessibility, free vaccines and organised vaccination campaigns contribute to increased uptake. Media and global concerns for MERS and H7N9 have a moderate impact on influenza vaccine uptake in a designated infectious diseases outbreak management hospital in Singapore.

## **Metabolic Syndrome and Hyperuricaemia: A Systemic Review, Meta-Analysis and Meta-Regression of Cross-Sectional Data**

**W LEE<sup>1</sup>, SE EAPEN<sup>1</sup>, RCM HO<sup>2</sup>**

<sup>1</sup>*National University of Singapore, Singapore*, <sup>2</sup>*National University Hospital, Singapore*

### **Introduction:**

Hyperuricaemia is a known risk factor for hypertension, type 2 diabetes mellitus, coronary heart disease and stroke but its association with metabolic syndrome remains unclear. This meta-analysis aims to systematically evaluate this association and explore underlying moderators that potentially explain heterogeneity of the effect size.

### **Methods:**

Random-effects meta-analyses were conducted on cross-sectional studies examining the association between metabolic syndrome and hyperuricaemia. Meta-regression and subgroup analysis were performed to identify factors that may contribute to heterogeneity.

### **Results:**

Thirty-one studies were analysed, and the aggregate prevalence of metabolic syndrome was significantly higher among the 44,064 participants with hyperuricaemia than the 128,058 controls (pooled OR = 2.54, 95% CI, 2.24 to 2.88,  $P < 0.001$ ). Subgroup analysis for gender showed a stronger association in females (pooled OR = 2.99, 95% CI, 2.39 to 3.73) than males (pooled OR = 2.10, 95% CI, 1.74 to 2.54) ( $P = 0.019$ ). Mixed-effects meta-regression revealed that proportion without central obesity ( $P = 0.0014$ ) was a significant moderator which explained the significant heterogeneity. Fixed-effects meta-regression revealed 11 other statistically significant moderators. In the second analysis of 20 studies, the mean serum uric acid level of the 8224 participants with metabolic syndrome was significantly higher than the 28,932 controls (pooled standard difference in means 0.488, 95% CI, 0.396 to 0.579,  $P < 0.001$ ). Mixed-effects meta-regression revealed that proportion without hypertriglyceridaemia ( $P < 0.0001$ ), mean DBP ( $P = 0.0033$ ), mean total cholesterol ( $P = 0.0002$ ) and mean LDL cholesterol ( $P = 0.0389$ ) were significant moderators which explained the significant heterogeneity. Fixed-effects meta-regression revealed 8 other statistically significant moderators.

### **Discussion & Conclusion:**

We demonstrated a strong bidirectional association between metabolic syndrome and hyperuricaemia, which appears to be stronger in females. Hyperuricaemic patients should be screened for metabolic syndrome components.

## Can Water be Used to Replace Gastrograffin as an Oral Contrast Medium in Routine Computed Tomography of the Abdomen and Pelvis?

H GU<sup>1</sup>, CH TAN<sup>1</sup>, CH LEE<sup>1</sup>

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

### Introduction:

Even though positive oral contrast (OC) has been routinely used for multidetector row computed tomography (MDCT) to achieve enhancement of gastrointestinal tract, recent studies have provided evidence suggesting negative or neutral OCs are also effective, while having significantly less side effects. Hence, we hypothesised that water, a neutral OC, is as effective in bowel wall delineation and visualisation of abdominopelvic organs.

### Methods:

A retrospective study of MDCTs of 103 adult patients was conducted to compare the effect of positive and neutral OC. Each patient selected by convenience sampling had CTs with both gastrograffin and water done between 2008 and 2011. The randomly sequenced 206 scans were reviewed in consensus by 2 radiologists who were blinded to the patients' identity and diagnosis. The visualisation quality of each abdominopelvic organ as well as artefacts and small bowel wall delineation, was qualitatively scored on a 5-point scale. Paired scores from the 2 OC groups were evaluated by Wilcoxon signed rank test at a confidence interval of 95%.

### Results:

There was significantly better delineation of small bowel wall in the duodenum ( $P < 0.001$ ) and its visualisation ( $P = 0.005$ ) using water as OC. Only minimal differences were demonstrated between the 2 groups for visualisation of abdominopelvic organs, delineation of the rest bowel wall and contrast associated artefacts. Mural features were masked with positive OC as lumen density approached wall density, causing poorer delineation.

### Discussion & Conclusion:

Water provided excellent delineation of abdominopelvic organs, especially for the small bowel, where it was superior to gastrograffin. Hence, routine administration of positive OC is unnecessary.

## Association Between CHA65S2 Score and Obstructive Sleep Apnoea

**G LOO<sup>1</sup>, L SHEN<sup>2</sup>, P ONG<sup>3</sup>, HH HO<sup>3</sup>, CH LEE<sup>4</sup>, AM RICHARDS<sup>4</sup>**

<sup>1</sup>National University Hospital, Singapore, <sup>2</sup>National University Health System, Singapore, <sup>3</sup>Tan Tock Seng Hospital, Singapore, <sup>4</sup>National University of Singapore, Singapore

### Introduction:

The CHADS2 score is used to predict stroke risk in patients with atrial fibrillation. Based on the known association between individual components of the CHADS2 score and obstructive sleep apnoea (OSA), we hypothesised that the CHA65DS2 score (modified from CHADS2 using age  $\geq 65$  as cutoff) was associated with OSA in cardiac patients.

### Methods:

A total of 93 patients with known coronary artery disease underwent a home-based sleep study using a level 3 portable diagnostic device. OSA was defined as Apnea-Hypopnea Index  $>15$ . The CHA65DS2 score was calculated by allocating 1 point each for the presence of congestive heart failure, hypertension, age  $\geq 65$  and diabetes mellitus, and 2 points for a history of stroke or transient ischaemic attack. The patients were stratified based on the CHA65DS2 score of 0, 1 and  $\geq 2$  in accordance with CHADS2 stratification for anticoagulation therapy.

### Results:

Of the 93 patients, 32 patients (34.4%) were diagnosed with OSA. The overall median CHA65DS2 score was 1 (range 0-3). The CHA65DS2 score of 0, 1 and  $\geq 2$  were found in 32, 35 and 26 patients, respectively. The prevalence of OSA in these 3 groups was 15.6% (CHA65DS2 = 0), 37.1% (CHA65DS2 = 1) and 53.8% (CHA65DS2  $\geq 2$ ), respectively ( $P = 0.009$ ). After adjusting for body mass index, smoking and coronary artery disease presentation, the CHA65DS2 score remained independently associated with OSA ( $P = 0.037$ ).

### Discussion & Conclusion:

In patients with coronary artery disease, the CHA65DS2 score is directly related to the prevalence of OSA. Validation of our findings and the determination of an optimal cut-off in a larger cohort of patients are warranted.

## **Evidence of Frontal Lobe Cognitive Impairment in Patients with First Episode of Schizophrenia: The Critical Early Detection and Intervention for Improved Outcomes in Cognitive Functions**

**CN KUSWANTO<sup>1</sup>, MY SUM<sup>1</sup>, K SIM<sup>1</sup>**

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

### **Introduction:**

Neurocognitive impairments represent a core feature of schizophrenia (SCZ) but the severity may vary at different stages of illness and can impact on psychosocial functioning. Based on existing literature, we hypothesised that the cognitive deficits are present early in SCZ illness and can progress over time.

### **Methods:**

Sixty healthy controls (HC), 55 patients with first episode of schizophrenia (FES) and 40 with chronic schizophrenia (CS) who were matched for age, gender, and premorbid IQ were administered the Brief Assessment of Cognition for Schizophrenia (BACS). Severity of psychopathology and socio-occupational functioning were assessed using clinical scales such as the Positive and Negative Syndrome Scale (PANSS) and Global Assessment of Functioning (GAF).

### **Results:**

Both FES and CS performed significantly worse compared to HC in the majority of domains, except for verbal fluency and executive function (denoting frontal lobe function) where only FES performed significantly worse than HC ( $t_{(2,152)} = 11.32$ ,  $P = 0.001$  and  $t_{(2,152)} = 7.29$ ,  $P = 0.008$ , respectively). There was no significant difference between FES and CS patients in the majority of cognitive tests ( $P > 0.05$ ). Patients with longer years of education and shorter duration of illness performed significantly better in BACS ( $P < 0.001$  and  $P = 0.043$ , respectively).

### **Discussion & Conclusion:**

Our study revealed that frontal-lobe cognitive impairments were apparent in the early stage of the illness, but these impairments remain stable years after onset. This should caution clinicians to recognise early frontal cognitive deficits and implement ways to ameliorate its persistence over time.

## Primary Localised Cutaneous Amyloidosis: Association with Atopic Dermatitis

**BKY CHIA<sup>1</sup>, HL TEY<sup>2</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore,* <sup>2</sup>*National Skin Centre, Singapore*

### Introduction:

Primary localised cutaneous amyloidosis (PLCA) is a chronic pruritic dermatological disorder of unknown aetiology. Genetic mutations in cases of familial PLCA have been mapped to the oncostatin-M receptor (OSMR) $\beta$ , a subunit of interleukin(IL)-31 receptor. IL-31 has been implicated in the pathogenesis of atopic dermatitis (AD). We aim to assess if AD is more prevalent in patients with PLCA compared to patients with other conditions attending the same dermatology clinic and secondarily, to investigate if the prevalence of AD, severity of itch, morphology and locations of PLCA differ between familial and sporadic form.

### Methods:

Consecutive patients with the clinical diagnosis of PLCA visiting a dermatology clinic were evaluated by a single investigator. Data on demographics, family history, morphological types and locations of PLCA, and itch score were collected and they were screened for concomitant AD based on history and physical examination. The control population consisted of consecutive patients with diagnoses other than PLCA seen in the same clinic.

### Results:

The prevalence of AD in patients with PLCA was significantly higher than in controls, at 75% and 39.2% respectively (OR = 4.66,  $P \leq 0.0005$ ). The prevalence of AD in sporadic cases was significantly higher than familial cases, at 84.4% and 50% respectively (OR = 5.4,  $P \leq 0.045$ ). Mean itch levels, morphological types and locations of PLCA did not differ between familial and sporadic cases.

### Discussion & Conclusion:

AD was associated with PLCA and the association was stronger with the sporadic compared to the familial cases.

## High STOP-BANG Scores Herald Adverse Perioperative Outcomes

**J MACACHOR<sup>1</sup>, P CHIA<sup>1</sup>, E SEET<sup>1</sup>, IU SHRIDHAR<sup>1</sup>, W DAN<sup>1</sup>, WL QUAH<sup>2</sup>, TP NG<sup>2</sup>**

<sup>1</sup>*Khoo Teck Puat Hospital, Singapore,* <sup>2</sup>*National University of Singapore, Singapore*

### Introduction:

The aim of the study was to determine the associated clinical and demographic variables associated with unexpected perioperative adverse events.

### Methods:

Elective surgical patients were assessed at the preoperative clinic of Khoo Teck Puat Hospital. Clinical comorbidities, BMI, ASA status, age, sex, ethnicity, smoking history, were encoded into a proprietary database system called OTSys. Answers to the STOP-BANG (an acronym which stands for snoring, tiredness, observed to have stopped breathing, Pressure (BP), BMI >35, Age >50, Neck circumference greater than 40, and male gender were likewise digitised.

### Results:

There were 5432 elective surgical patients from 1 January to 31 December 2011. There were 407 (7.5%) adverse perioperative events. A multivariate regression model using SPSS version 20 (IBM, USA) determined the variables associated with unexpected outcomes. The following were significant (odds ratio/95% confidence interval): STOP-Bang score 5 (6.4, 2.7-15), STOP-Bang score  $\geq 6$  (5.6, 2.1-15.4), ASA 4 (4.1, 1.6-10.2), STOP-Bang 3 (3.6, 2.1-6.3), STOP-Bang 4 (3.4, 1.8-6.5), uncontrolled hypertension (2.4, 1.1-5.0), OSA 1.2 (0.7-2.1), asthma (1.1, 0.7-1.6).

### Discussion & Conclusion:

The STOP-BANG questionnaire can limit the preoperative failure to diagnose obstructive sleep apnoea. We found a novel association between higher preoperative STOP-BANG scores and postoperative complications, which can help risk stratify elective surgeries. A STOP-Bang score of 6 or more was associated with a 5-fold increased rate of postoperative critical care unit admission. Asthma and uncontrolled hypertension and ASA score of 4 may imperil surgery.



## The Best Glomerular Filtration Rate Estimation Equation for a Multiethnic Asian Population is the Cystatin C and Creatinine CKD-EPI Equation

**BW TEO<sup>1</sup>, HM LOH<sup>1</sup>, AK SINHA<sup>1</sup>, S SETHI<sup>1</sup>, E LEE<sup>1</sup>, YY KOH<sup>2</sup>, QC TOH<sup>2</sup>, H XU<sup>2</sup>, J LI<sup>2</sup>, B SHUTER<sup>2</sup>**

<sup>1</sup>National University Hospital, Singapore, <sup>2</sup>National University of Singapore, Singapore

### Introduction:

Current practice guidelines recommend using serum creatinine-based equations for predicting glomerular filtration rates (eGFR). These equations apply to Caucasian-American patients and include an adjustment coefficient for African-Americans, but are not validated for other ethnicities. New CKD-EPI equations using both cystatin C and creatinine were recently developed and combination biomarkers equations may improve accuracy and remove the need for ethnicity adjustments. We assessed the accuracy of GFR prediction in a multiethnic Asian population of participants with normal kidney function and chronic kidney disease (CKD) using these new equations.

### Methods:

We used serum samples from the Asian Kidney Disease Study and the Singapore Kidney Function Study (n = 335, 69.3% CKD, 38.5% Chinese, 29.6% Malays, 23.6% Indians, 8.3% Others), which had measured GFR by plasma clearance of <sup>99m</sup>Tc-DTPA. We estimated GFR using the CKD-EPI equations. We examined the performance of GFR estimation accuracy with median bias, inter-quartile range (precision), and accuracy to within 20% and 30% of the measured GFR.

### Results:

Population means: age of 53.5 ± 15.1 years, mean standardised serum creatinine 1.44 ± 0.97 mg/dL, standardised serum cystatin C 1.43 ± 0.74 mg/L, measured GFR 67 ± 33.3 mL/min/1.73m<sup>2</sup>. Overall, the CKD-EPI cystatin C and creatinine combination equation performed the best, eGFR 67 ± 34.9 mL/min/1.73m<sup>2</sup>.

### Discussion & Conclusion:

The new creatinine-cystatin C equation estimated glomerular filtration rate with little bias, increased precision and accuracy in a multiethnic Asian population. This two-marker equation will greatly increase the accuracy of population studies of CKD without the need to consider “ethnicity”.

## **Incidence of Leptomeningeal Involvement in Aggressive B-Cell Lymphomas Detected by Flow Cytometry, the Utility of Flow Cytometry Compared with Cytology and Clinical Significance of Occult Leptomeningeal Disease**

**SH LIM<sup>1</sup>, YL CHEE<sup>1</sup>, TC LIU<sup>1</sup>, B LI<sup>1</sup>, SF TAN<sup>1</sup>, SY LEE<sup>1</sup>**

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

### **Introduction:**

Flow cytometry (FCM) and conventional morphology (CM, cytospin or cytology) studies using cerebrospinal fluid (CSF) are the tools to exclude central nervous system (CNS) involvement by aggressive B-cell lymphoma (ABCL). The incidence and clinical significance of leptomeningeal disease and superiority among those tests have yet to be clarified at our centre.

### **Methods:**

We retrospectively analysed the CSF samples from 78 ABCL patients at presentation by FCM and CM. These were patients at high risk of CNS involvement. Most patients received meningeal prophylaxis.

### **Results:**

Eight samples were FCM+ (10.3%) at presentation with 4 patients without neurological symptoms. All the asymptomatic but FCM+ patients died of either disease relapse or progression while on treatment. The remaining FCM+ patients, 2 were still alive. Of the 66 patients with both FCM and cytospin negative studies, 18 (27.3%) relapsed with 6 being CNS relapse. Thirty (45.5%) were still alive, 27 (40.9%) died and 9 (13.6%) lost to follow-up. Asymptomatic patients with initial FCM-/CM- have a later CNS relapse rate of 9%. Cytology was not routinely done and only performed on 40 samples (51.3%). There were only 2 cases where cytology (equivocal) was discordant with FCM, both were treated without CNS directed therapy and remain disease free. The concordant rate of FCM and cytospin was 97.3% (7 FCM+/cytospin+, 66 FCM-/cytospin-).

### **Discussion & Conclusion:**

Patients with FCM+ at presentation have a poor outcome. FCM and cytospin are complementary as only 2.7% have discordant results. Cytology may be of limited value if cytospin and FCM are performed.

## Neurobehavioral Outcomes After Traumatic Brain Injury

**LG CHAN<sup>1</sup>, SE GOH<sup>1</sup>, K CHUA<sup>1</sup>**

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

### Introduction:

Traumatic brain injury (TBI) is known to be associated with neurobehavioural sequelae such as aggression and depression. This study aims to characterise the pattern of neurobehavioural symptoms among the different TBI severity groups.

### Methods:

Patients with mild, moderate and severe TBI 3 to 5 years ago were recruited and administered the Neurobehavioral Functioning Inventory (NFI). The frequencies of the different neurobehavioural sequelae were described for the different TBI severity groups and logistic regression performed to investigate the factors that predict the presence of significant aggression.

### Results:

For the mild TBI group, memory/attention deficits (35%), somatic complaints (30%) and aggression (25%) were the commonest sequelae. For the moderate TBI group, somatic complaints (40%) was the commonest and depression, memory/attention deficits and aggression (30% each) were the next commonest. For the severe group, communication difficulties (38.1%), depression (33.3%) and memory/attention deficits (28.6%) were the common concerns. In a limited regression model, the presence of significant depressive symptoms predicted the presence of aggression (OR 5.17,  $P = 0.018$ ). In an expanded model, depressive symptoms ceased to be significant and a composite score combining NFI depression, memory/attention and communication subscale scores became significantly associated with the presence of aggression (OR 1.05,  $P = 0.001$ ).

### Discussion & Conclusion:

Neurobehavioural sequelae are common after TBI but its pattern varies with TBI severity. Depressive symptoms are significantly associated with aggression post-TBI and results suggest that cognitive impairment may play a role as well. Psychiatric assessment and focused rehabilitation strategies may be useful after TBI, and may have a role in the management of post-TBI aggression.

## **Reticulate Pigmentation of the Neck in Atopic Dermatitis—An Epidemiological and Histological Study**

**A SEGHERS<sup>1</sup>, M BOON<sup>2</sup>, M HO<sup>2</sup>, YC GIAM<sup>2</sup>, J LEE<sup>2</sup>, AC SEGHERS<sup>2</sup>, CS TAN<sup>3</sup>, YP KOH<sup>3</sup>**

<sup>1</sup>National Healthcare Group HQ, Singapore, <sup>2</sup>National Skin Centre, Singapore, <sup>3</sup>National University Singapore, Singapore

### **Introduction:**

Reticulate pigmentation of the neck (RPN) in atopic dermatitis (AD) is a poorly understood acquired hyperpigmentation. The study aimed to determine the epidemiological, clinical and histopathological characteristics of RPN in a local cohort of AD patients.

### **Methods:**

All AD patients with a clinical diagnosis of RPN seen over a 4-month period at the National Skin Centre were prospectively enrolled. Subjects underwent clinical examination, photography and completed standardised data sheets on their condition and quality of life (QoL). Four patients underwent biopsies for clinicopathological correlation.

### **Results:**

Out of the 551 patients seen with AD, 75 (13.1%) had RNP. The mean age was 23±8.8 (range, 4 to 55 years) with a male:female ratio of 7:1. There was no racial predilection. The onset of RPN was most commonly reported between 13-20 years old. In 29.3%, there was also involvement of the axillae and flexures. The severity of the RPN was assessed to be mild (40.3%), moderate (36.1%) and severe (20.8%). The mean objective SCORAD was 38.4±12.6. RNP had a significant impact on the QoL. A positive association was found between the severity of RPN and the objective SCORAD ( $P = 0.049$ ). Key histopathological features were basement membrane thickening, increased melanin throughout epidermis and increased dermal melanophages compared to non-lesional skin.

### **Discussion & Conclusion:**

RPN in AD has a high prevalence in Asians and often has its onset in adolescent years. RNP is more common and severe in patients with an increased severity of AD. The clinical and histopathological features suggest that the increased pigmentation most likely is caused by frictional melanosis.

## **Mortality of Bullous Pemphigoid in Singapore—Risk Factors and Causes of Death in 359 Patients Seen at the National Skin Centre**

**S CAI<sup>1</sup>, JC ALLEN<sup>1</sup>, M TANG<sup>2</sup>**

*<sup>1</sup>Duke-NUS Graduate Medical School, Singapore, <sup>2</sup>National Skin Centre, Singapore*

### **Introduction:**

Bullous pemphigoid (BP) is a high morbidity, autoimmune-mediated subepidermal blistering skin disease. Local data on its mortality is lacking. We hypothesised BP is associated with a significantly increased mortality compared to the general population.

### **Methods:**

We conducted a retrospective cohort study of all Singaporean patients with newly diagnosed BP at the National Skin Centre, from 1 January 2004 to 31 December 2009. We obtained demographic and clinical data on comorbidities and treatment. Mortality information was obtained from the National Registry of Diseases.

### **Results:**

In total, 359 patients were included in our study. The median age of patients was 77 years with no sex predilection. The 1-, 2-, 3- year mortality rates were 26.7%, 38.4%, and 45.7%, respectively. The 3-year standardised mortality risk for BP patients was 2.74 (95% CI, 2.34 to 3.19) times higher compared to the age/sex-matched general population. Parkinson's disease, heart failure and chronic renal disease were associated with increased mortality, while combination corticosteroid-immunosuppressant treatment was associated with lower mortality. Overall, infections were the commonest cause of death (60.4%), while the main causes of death were pneumonia (42.7%), cardiovascular disease (14.6%) and stroke (11.0%).

### **Discussion & Conclusion:**

This study confirmed an increased 3-year mortality rate for BP in Singapore. Risk factors for increased mortality include concomitant comorbidities, especially neurological, cardiac and renal diseases. Treatment with combination therapy was associated with lower mortality, suggesting that proper management of BP is crucial. Physicians should be aware of the high mortality risk of infections in BP patients, suggesting the need to institute early and aggressive treatment.

## Extended Outcomes by Dialysis Modality Selection in Incident Patients with End-Stage Renal Disease and Ischaemic Cardiomyopathy

**V PANDAY<sup>1</sup>, P NG<sup>1</sup>, ZP TONG<sup>2</sup>, E LEE<sup>3</sup>, T LAU<sup>3</sup>**

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>University of Queensland, Australia, <sup>3</sup>National University Hospital, Singapore

### Introduction:

Peritoneal dialysis (PD) allows for daily ultrafiltration with better haemodynamic tolerability, and is often preferred over haemodialysis (HD) in patients with end-stage renal disease (ESRD) and ischaemic cardiomyopathy (ICMP), but such presumption warrants examination.

### Methods:

Using a single centre, prospectively maintained incident dialysis database from 2005 to 2010, we retrospectively evaluated 2-year outcomes in patients with ESRD and ICMP (pICMP). ICMP was defined as left ventricular ejection fraction (LVEF) <45% with documented coronary ischaemia. Cox-proportional hazard ratio (HR) for death by modality selection was adjusted for known early mortality predictors.

### Results:

A total of 983 patients were studied. First-year mortality in 139 (14%) pICMP initiated on HD versus PD, and 844 (86%) non-pICMP on HD versus PD, were 34%, 42%, 14%, 13%, respectively ( $P < 0.001$ ). Fifty-four pICMP started on PD and 85 on HD, with comparable demographics, cardiovascular diseases, and LVEF. Fifteen percent and 9% of PD patients switched to HD at 90 days and 1 year respectively, versus 0 and 4% for HD to PD correspondingly. Comparing PD versus HD, cumulative hospitalisation duration over 2 years was 37 (24-67) versus 38 (23-63) days ( $P = 0.95$ ), with 0.89 versus 0.86 major adverse cardiac events (MACE) per patient-year, and 2-year mortality was 56% versus 45% ( $P = 0.21$ ), respectively. Adjusted first-year and 2-year mortality HRs (PD over HD) were 1.06 (95% CI, 0.60 to 1.88,  $P = 0.84$ ), and 1.12 (95% CI, 0.68 to 1.83,  $P = 0.66$ ), respectively.

### Discussion & Conclusion:

Initiation on PD versus HD did not confer improved 2-year mortality, MACE, or hospitalisation outcomes in pICMP. These results will influence patient counseling, modality selection, and even advance care planning in ESRD and ICMP.

## Laparoscopic Gastrectomies in Gastric Cancer Patients: Tan Tock Seng Hospital Experience

AM OO<sup>1</sup>, A KOURA<sup>1</sup>, J RAO<sup>1</sup>

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

### Introduction:

Cancer of the stomach is the fifth most common cancer in men and the seventh most common cancer in women in Singapore. Laparoscopic gastrectomy with D2 lymphadnectomy has been shown to be a safe and feasible procedure for gastric cancer patients. The objective of the study is to review the short-term outcomes of laparoscopic gastrectomies done in Tan Tock Seng Hospital.

### Methods:

A retrospective review of patients who underwent laparoscopic gastrectomies for stomach cancer from July 2008 to December 2012 was done.

### Results:

A total of 52 patients underwent laparoscopic gastrectomies for stomach cancer from July 2008 to Dec 2012. Three cases (5.77%) were converted to open; 61.5% (n = 32) were male and 38.5% (n = 20) were female. The mean age of the patients was  $64.12 \pm 11.68$ . The median ASA score of the patients was 2 and average length of stay was  $10.88 \pm 8.01$  days. Among 52 patients, 3.85% (n = 2) had proximal gastrectomies, 21.15% (n = 11) had total gastrectomies and 75% (n = 39) had distal/subtotal gastrectomies. Mean operative time was  $252.92 \pm 59.21$  minutes. The mean number of total lymph nodes dissected was  $26.22 \pm 16.33$ . Mean months of follow-up was  $14.15 \pm 12.09$ . Three patients (5.77%) had metastatic disease during follow-up. All patients had R0 resection and resection margins were all clear. Thirty days perioperative mortality rate was 1.92% (n = 1); 1.92% (n = 1) had anastomotic leak and thus unplanned return to OT rate was 1.92% (n = 1).

### Discussion & Conclusion:

Our initial series showed that laparoscopic gastrectomies are safe and feasible. The oncological clearance, morbidity and mortality rates are comparable to that of open surgeries.

## **Application of WHO 2009 Warning Signs for Prediction of Dengue Haemorrhagic Fever (DHF) and Severe Dengue (SD)**

**Y HAO<sup>1</sup>, SP CHAN<sup>1</sup>, EL NG<sup>1</sup>, YS LEO<sup>1</sup>, D LYE<sup>1</sup>, VC GAN<sup>1</sup>**

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

### **Introduction:**

In 2009, the World Health Organization proposed warning signs as the good indicators of a higher risk of developing severe dengue. We assessed which of these warning signs are more crucial in recognising progression to the critical phase.

### **Methods:**

Based on a prospective cohort study from January 2010 to September 2012, adjusted by gender and age, warning signs record of each confirmed dengue (PCR positive or NS1 positive) patient before DHF or SD onset were used in decision tree algorithm (GUIDE) and logistic model to identify the essentiality of each of warning signs and overall performance of using warning sign to predict severity of the disease.

### **Results:**

DHF I was defined as presence of mild bleeding phenomena, only more severe outcomes DHFII-IV and SD were used in the analysis. Mucosal bleeding was identified as the first criterion in the decision tree for predicting either DHFII-IV or DHFII-IV and SD; abdominal pain or tenderness and increasing in HCT concurrent with rapid decreasing in platelet count were also crucial risk factors for disease progress. The AUC of the logistic model using warning signs adjusted by gender and age was 0.85.

### **Discussion & Conclusion:**

Due to limitation of the data – 2 patients had hepatomegaly and 3 had clinical fluid accumulation, we might not sufficiently evaluate these 2 warning signs in prediction of disease progression. Our findings showed that warning signs were very important indicators in recognising progression but no single warning sign could be used in dengue prognosis. Decision tree could be an easily applied approach for clinicians in decision-making.



## Survey on Factors Influencing Medication Adherence in Psychiatric Patients

**HF TIONG<sup>1</sup>, SY LOW<sup>1</sup>, L TAN<sup>2</sup>**

<sup>1</sup>*National University of Singapore, Singapore,* <sup>2</sup>*Tan Tock Seng Hospital, Singapore*

### **Introduction:**

Medication non-adherence is a long-standing problem in treating psychiatric patients. Studies showed the reported incidence of non-adherence with patients on antipsychotics ranges from 11% to 80%. Other studies show non-adherence to antidepressants is high, with 28% of patients discontinuing treatment within the first month of therapy. Consequently, relapse rate for depression is high, with 20% of patients remaining inadequately treated. Our study aimed to identify significant factors associated with medication adherence in psychiatric outpatients. This will help improve compliance and treatment outcomes. Our hypothesis is: Medication adherence is associated with modifiable factors.

### **Methods:**

A total of 207 patients were surveyed at Tan Tock Seng Hospital psychiatry outpatient clinic from February to April 2013. The anonymous and voluntary questionnaire consisted of questions to identify factors associated with medication adherence and reasons for non-adherence. Patients who scored >3 points using the Morisky 4-Item Adherence Scale (MMAS-4) were considered adherent.

### **Results:**

Via Chi-square test analysis, 6 factors were identified ( $P < 0.05$ ) as associated with medication non-adherence: (i) absence of carer to remind patient to take medications ( $P = 0.042$ ); (ii) presence of >3 coexisting medical conditions ( $P = 0.007$ ); (iii) increasing number of concurrent medications ( $P = 0.006$ ); (iv) perceived large number of psychiatric medications to take ( $P < 0.0001$ ); (v) fear of medications' side effects ( $P = 0.002$ ); and (vi) perceived ineffectiveness of medications ( $P = 0.010$ ).

### **Discussion & Conclusion:**

Through this study, factors found to be associated with medication adherence include social, medication/ disease-related factors, and patients' personal perceptions towards medications. As they are potentially largely modifiable factors, they should be regularly assessed for by healthcare professionals. This will help improve medication adherence and further, reduce disease recurrence.

## Serum Brain-Derived Neurotrophic Factor and Metabolic Indices in Patients with Schizophrenia

**M NURJONO<sup>1</sup>, J LEE<sup>1</sup>**

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

### Introduction:

Brain derived neurotrophic factor (BDNF) is downregulated in schizophrenia and expressed systematically. Circulating BDNF is involved in energy homeostasis and plays an important role in metabolic regulation. Patients with schizophrenia have an increased risk of developing cardio-metabolic diseases. However, it is unknown if the low levels of BDNF in patients with schizophrenia is involved in the observed metabolic dysregulations. We hypothesised that serum BDNF in patients with schizophrenia plays a role in metabolic regulation. This study aims to examine the associations between BDNF and metabolic risk factors in patients with schizophrenia.

### Methods:

Sixty-four Chinese patients with schizophrenia were recruited. A fasting sample of blood was collected for lipid, glucose measurements and quantification of serum BDNF. Age, gender, blood pressure, waist circumference and smoking information were obtained at the same visit. Metabolic syndrome (MetS) status was assessed according to AHA/NHLBI guidelines.

### Results:

From the study participants, 42.8% were found to have MetS. There were no significant differences in serum BDNF levels between participants with and without MetS. After adjusting for age, gender and current smoking status, BDNF was associated with triglycerides ( $P = 0.036$ ), diastolic blood pressure ( $P = 0.015$ ) and high density lipoprotein-C (HDL-C) ( $P = 0.027$ ).

### Discussion & Conclusion:

We found a high prevalence of MetS in patients with schizophrenia. Serum BDNF was significantly associated with triglycerides, diastolic blood pressure and HDL-C. This provides evidence of the possible role of BDNF in metabolic regulation in patients with schizophrenia, and suggests that BDNF could be a potentially useful surrogate marker of metabolic dysregulation in this group of patients.

## Progression of Hearing Loss in Hearing Aid Users over 5 Years: Trend and Determinants

**KX LI<sup>1</sup>, HY ZHANG<sup>1</sup>, WMW ONG<sup>1</sup>, SVR MEDAPATI<sup>2</sup>, EC HO<sup>2</sup>**

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>Tan Tock Seng Hospital, Singapore

### Introduction:

Old age has been associated with faster decline in hearing but hearing aid (HA) usage is not known to affect the latter. We aim to study the rate of hearing loss progression and associated factors.

### Methods:

Audiological records (2001 to 2012) from Tan Tock Seng Hospital, Singapore were analysed retrospectively. The first cohort (n = 464) has a first year pure tone audiometry (PTA) and at least one other assessment. Average rate of PTA<sub>0.5,1,2,4kHz</sub> change per year was computed. The second cohort (n = 132) has both 1st and 5th year assessments. Progression of hearing loss was defined as worsening of PTA<sub>0.5,1,2,4kHz</sub> by more than 10dB over 5 years.

### Results:

For the first cohort, mean hearing thresholds declined at  $1.78 \pm 4.0$  dB/year. Users with more severe baseline hearing loss decline slower (spearman rho -0.093,  $P = 0.044$ ). Older users ( $1.85 \pm 3.9$  dB/year) and female users ( $1.94 \pm 4.0$  dB/year) declined faster but this was not statistically significant. Self-reported HA usage regularity or non-usage did not affect the rate of decline. For the second cohort, the mean increase of hearing threshold over 5 years was 6.71dB. Using 10dB as the cutoff, 20.5% of users experienced progression of hearing loss. Females are 2.4 times more likely to progress than males ( $P = 0.009$ ) and users with mixed hearing loss are 6.5 times more likely to progress than sensorineural ( $P = 0.013$ ).

### Discussion & Conclusion:

Hearing thresholds increased about 1.78 dB/year. Females are more likely to have significant decline over 5 years and those with more severe hearing loss decline slower. However, age or HA usage are not associated with the rate of decline.

## Outcomes of Non-Tbitrauma Patients in a Surgical Intensive Care Unit

**S SIDDQUI<sup>1</sup>, KF KOH<sup>1</sup>, G RAMALINGAM<sup>1</sup>**

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

### Introduction:

Modern trauma care has become highly specialised, especially for the critically ill patient with multi-system injuries. Despite the fact that emergency care and trauma surgery literature is satiated with early outcomes and management paradigm shifts, intensive care unit (ICU) mortality and length of stay in ICU of trauma victims have not been extensively described. Our aim was to study early outcomes in our SICU (surgical ICU) of all non-TBI trauma patients admitted over the past 3 months.

### Methods:

Our study was a retrospective analysis of all non-TBI adult trauma patients admitted to the SICU over the past 3 months extracted from an established database of all SICU patients.

### Results:

Eleven patients were admitted after non-TBI polytrauma to our SICU during the period from July to September 2012. There was a 91% survival till ICU discharge and the mean LOS was 4.73 days with a standard deviation of 5.12 days. Mortality rate was 9%. Regression analysis did not show an association between any variable and an increased LOS or poor outcome except for the initial severity of the trauma.

### Discussion & Conclusion:

This study shows that despite many factors contributing to morbidity of non-TBI trauma patients in the ICU the short-term outcomes in the SICU are mostly affected by the initial severity of injury and nature of the physiological insult resulting in a high lactate and BE as well as hypothermia and shock.

## Changing Profile of First-Time Hearing Aid Users Managed by a Tertiary Medical Institution from 2003 to 2012

**KX LI<sup>1</sup>, WMW ONG<sup>1</sup>, HY ZHANG<sup>1</sup>, SVR MEDAPATI<sup>2</sup>, EC HO<sup>2</sup>**

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>Tan Tock Seng Hospital, Singapore

### Introduction:

With increasing awareness, hearing aids (HA) should be fitted at a younger age and milder hearing loss. We aim to study these important trends and also provide clinicians and researchers with a general profile of first-time HA users.

### Methods:

Audiological records from Tan Tock Seng Hospital, Singapore were analysed retrospectively. A total of 833 first-time HA users were stratified into 4 cohorts by year of first fitting (1:2003 to 2007 n = 135, 2:2008 to 2009 n = 213, 3:2010 to 2011 n = 316, 4:2011 n = 179). Complete yearly data were available from 2009 onwards.

### Results:

HAs were first fitted at a mean age of  $69.7 \pm 14$  and mean  $PTA_{0.5, 1, 2, 4 \text{ kHz}}$   $63.8 \pm 14 \text{ dB}$  with approximately equal gender distribution. The absolute number of users increased by 27.9% (2009 to 2012) with only a 6.5% increase in the corresponding population. The following statistically significant trends were observed over the years: (i) mean age of users increased across the 4 cohorts (67.3/69.4/71.6/68.7,  $P = 0.010$ ). However, the age range also widened (24 to 88 / 11 to 109/ 17 to 96 / 10 to 96); (ii) increasingly higher proportions are presenting with sensorineural hearing loss (77.0%/81.6%/82.4%/72.1%,  $P < 0.001$ ); (iii) increasingly higher proportions are fitted with behind-the-ear HAs (53.4%/70.0% /75.8%/78.4%,  $P < 0.001$ ) and bilateral HAs (8.9%/10.8%/15.4%/24.6%,  $P < 0.001$ ); and (iv) after adjusting for inflation, users are spending more on HAs (S\$1768/1918/2426/2693,  $P < 0.001$ ). Baseline  $PTA_{0.5, 1, 2, 4 \text{ kHz}}$  increased over the years (61.5/63.2/64.0/65.7,  $P = 0.063$ ) and it is also positively correlated with the year of fitting (spearman rho 0.079,  $P = 0.020$ ). Baseline hearing threshold at which HAs are fitted dropped over the years (35.0/22.5/21.3/33).

### Discussion & Conclusion:

More HAs are fitted over the years. The mean age and hearing threshold on first fitting is rising but increasingly younger and less hearing impaired users are being fitted.

## Utility of Montreal Cognitive Assessment (MOCA) in the Detection of DSM5 Mild and Major Neurocognitive Disorder

**TM LIEW<sup>1</sup>, P YAP<sup>2</sup>**

<sup>1</sup>*Institute of Mental Health, Singapore,* <sup>2</sup>*Khoo Teck Puat Hospital, Singapore*

### **Introduction:**

MOCA is a convenient tool to screen patients with mild cognitive impairment (MCI) and dementia. The new criteria for DSM5 mild neurocognitive disorder (NCD) defines subjects with cognitive decline but no dementia, and major NCD (dementia). We explored the usefulness of MOCA to detect mild and major NCD in patients presenting to a tertiary hospital memory clinic.

### **Methods:**

Subjects with questionable dementia (CDR = 0.5) and early dementia (CDR  $\leq$  1) over a period of 1 year were identified from the memory clinic registry. A clinician steeped in dementia care reviewed the patients records and applied the diagnostic labels of mild and major NCD accordingly. Healthy controls (HC) (CDR = 0, MMSE >26) were recruited from the ongoing community based Singapore Longitudinal Ageing Study. Receiver operating characteristic curve (ROC) analysis was performed to evaluate the diagnostic performance of MOCA on the outcomes of mild and major NCD.

### **Results:**

A total of 251 subjects were included, 41 mild NCD, 64 major NCD, 146 HC. On ROC analysis, the diagnostic performance by area under the curve (AUC) for MOCA was 0.99 (95% CI, 0.98 to 1.0) for major NCD and 0.77 (95% CI, 0.67 to 0.86) for mild NCD. For diagnosis of mild NCD, MOCA performed better in those with lower education (primary and below) (AUC 0.90) compared to those with secondary education and beyond (AUC 0.66).

### **Discussion & Conclusion:**

MOCA has high diagnostic utility for major NCD but its usefulness in detecting mild NCD is more modest. Possible reasons include greater heterogeneity in subjects with mild NCD and the lack of objective neuropsychological norms to define mild NCD subjects.

## Oral Clindamycin and Rifampicin in the Treatment of Hidradenitis Suppurativa: An Up-to-Date Literature Review and the National Skin Centre, Singapore Experience

**C TAN<sup>1</sup>, HB OON<sup>1</sup>**

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

### **Introduction:**

Hidradenitis suppurativa (HS) is a complex disease with genetic, immunological and metabolic influences. It often runs a chronic fluctuating course and management has been challenging due to frequent relapses. Topical clindamycin has shown efficacy for HS in some reports as early as the 1980s. Separately, encouraging results from the combination of oral clindamycin and rifampicin in treating folliculitis decalvans have led to more research in recent years using this combination to treat HS. We aim to assess current evidence on the efficacy and safety of oral clindamycin-rifampicin for HS.

### **Methods:**

A literature search (using keywords: hidradenitis, suppurativa, clindamycin and rifampicin) was conducted from databases of MEDLINE and EMBASE on all relevant published trials. Moreover, unpublished data on patients at the National Skin Centre, Singapore was also included in this review.

### **Results:**

We identified 4 trials (187 patients), 3 of which were retrospective studies and 1 prospective study. There were another 10 patients from the National Skin Centre Singapore. Overall results were promising with improvement rates from 71.4% up to 85.7%. Reported side effect rates were uncommon and were usually mild.

### **Discussion & Conclusion:**

With current available data, this meta-analysis suggests the safe and effective use of oral clindamycin and rifampicin in the treatment of HS. However, the evidence may be suboptimal as too few trials have been published to date. Trial heterogeneity, publication biases, and deficits in reporting may also affect results. There is hence a need for a randomised, control trial with large patient numbers to assess this combination therapy for HS.

## Evaluation of Patients Screened For MERS-CoV Infection at Tan Tock Seng Hospital, Singapore

**MK WIN<sup>1</sup>, V GAN<sup>1</sup>, SY TAY<sup>1</sup>, P KRISHNAN<sup>1</sup>, YS LEO<sup>1</sup>, A CHOW<sup>1</sup>**

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

### Introduction:

A novel coronavirus named Middle East respiratory syndrome coronavirus (MERS-CoV) was first identified on the Arabian Peninsula in September 2012.

### Methods:

We reviewed all cases screened for MERS-CoV infection at our hospital between 26 September 2012 and 19 June 2013.

### Results:

Of 75 screened, 31 patients (41%) were admitted. The median age among admitted patients was 56 (range, 22 to 80 years), and the female-to-male ratio was 1.2:1. Five cases (16%) fulfilled both the clinical and epidemiological criteria provided in the guidelines by the Ministry of Health, Singapore for suspected cases of MERS-CoV infection. Compared to those who did not fulfill clinical and/or epidemiological criteria, patients who fulfilled both criteria had a higher leukocyte count ( $12.1$  (SD,  $3.9$ )  $\times 10^9/L$  and  $9.1$  (SD,  $2.9$ )  $10^9/L$ ;  $P = 0.002$ ) on admission. They were also slightly older (59 years vs. 56 years;  $P = 0.381$ ) and had a higher maximum temperature ( $38.1$  °C vs.  $37.5$  °C;  $P = 0.219$ ). Chest X-ray changes were observed in all patients who fulfilled both criteria, compared to only a third in those who did not (100% vs 35%;  $P = 0.027$ ). All admitted patients were tested for MERS-CoV by real-time reverse-transcription polymerase chain reaction (RT-PCR) method and the tests were negative. However, influenza A virus was detected in 5 (19%) patients who fulfilled only epidemiological criteria (4 patients with A/H3 and 1 with A/H1N1-2009) via PCR.

### Discussion & Conclusion:

The source of MERS-CoV remains unknown, as is the extent of transmission. This highlights the importance of enhanced epidemiological surveillance by active screening and early investigation of suspected cases of MERS-CoV infection.



## Translation and Cross-Cultural Adaptation of Hearing Handicap Inventory for Adults - Screening (HHIA-S) in the Bilingual Singapore Population—A Pilot Study

**KX LI<sup>1</sup>, HY ZHANG<sup>1</sup>, Y XU<sup>2</sup>, SC CHAN<sup>3</sup>, SY TAN<sup>3</sup>, EC HO<sup>3</sup>**

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>The University of Sheffield, United Kingdom,

<sup>3</sup>Tan Tock Seng Hospital, Singapore

### Introduction:

Many translated questionnaires are validated in monolingual populations. However, our bilingual Singapore population uniquely allows a more robust validation that directly correlates translated and original questionnaires in the same population.

### Methods:

We adopted a rigorous translation process of conceptual definition, 3 independent forward translations, 1 back-translation and consensus by a review panel. For the pilot study, 15 bilingual patients at Tan Tock Seng Hospital completed the Chinese HHIA-S before their audiometric assessment. After medical consultation, patients completed the English and a second Chinese HHIA-S.

### Results:

Validity was assessed through: (i) technical equivalence: Chinese and English scores correlated strongly (Pearson coefficient 0.919,  $P < 0.001$ ); (ii) construct validity: Compared with normal hearing participants, those with hearing loss above 25dB scored 9.4 ( $P = 0.031$ ) and 7.3 ( $P = 0.035$ ) points higher for Chinese and English HHIA-S respectively; and (iii) criterion validity: Chinese scores correlated positively with PTA<sub>0.5,1,2,4kHz</sub> (Pearson coefficient 0.548,  $P = 0.034$ ). Reliability was assessed through: (i) internal consistency (Cronbach's alpha 0.81); and 2) test-retest reproducibility (intraclass coefficient 0.942,  $P < 0.001$ ). User acceptance was high with mean user rating of 4.1/5 and comparable mean completion time with the English HHIA-S ( $3.9 \pm 1.4$  and  $3.1 \pm 0.8$  minutes respectively). However, mean Chinese scores dropped after medical consultation ( $10.1 \pm 8.7$  to  $7.6 \pm 6.7$ ). The sensitivity and specificity also changed from 0.75 (95% CI, 0.22 to 0.99) and 0.73 (95% CI 0.40 to 0.93) to 0.50 (95% CI, 0.09 to 0.91) and 0.82 (95% CI, 0.48 to 0.97) respectively after consultation.

### Discussion & Conclusion:

The Chinese HHIA-S demonstrated high reliability and validity. The phenomenon of lower scores and higher specificity after consultation warrants further study. A second validation should eliminate this effect and incorporate user feedback from the pilot study.

## Validation of the Distress Thermometer as a Brief Screening Tool for Borderline Clinical Cases of Anxiety and Depression in Cancer Outpatients on Treatment in Singapore

**HA LIM<sup>1</sup>, R MAHENDRAN<sup>1</sup>, CX PEH<sup>1</sup>, J CHUA<sup>1</sup>, ENK ANG<sup>1</sup>, EH KUA<sup>1</sup>, SE LIM<sup>2</sup>**

<sup>1</sup>*National University of Singapore, Singapore,* <sup>2</sup>*National University Health System, Singapore,*

### Introduction:

Screenings in cancer patients for anxiety and depressive disorders is essential because these disorders are prevalent and often under-recognised. In this study, we sought to validate the use of the Distress Thermometer, a 1-item questionnaire, as a brief screening tool detecting borderline clinical cases of anxiety/depression in cancer outpatients.

### Methods:

Ninety-seven patients from the National University Cancer Institute, Singapore, completed the Distress Thermometer (DT), and Hospital Anxiety and Depression Scale (HADS). To distinguish between normal and borderline clinical cases of anxiety and depression for both subscales of the HADS (HADS-A and HADS-D, respectively), we used the suggested cutoff score of 7/8.

### Results:

Receiver operating characteristic (ROC) curve analyses identified an area under curve (AUC) of 0.87 (95% CI, 0.79 to 0.95,  $P < 0.001$ ) for DT on HADS-A. Similarly, the ROC curve of DT on HADS-D had an AUC of 0.85 (95% CI, 0.76 to 0.94],  $P < 0.001$ ). Our analyses further revealed that a cutoff score of 4/5 on the DT yielded the best sensitivity-specificity balance for both HADS-A (sensitivity = 0.79, specificity = 0.80) and HADS-D, (sensitivity = 0.83; specificity = 0.76). Thirty-seven percent ( $n = 37$ ) of our population scored 5 or more on the DT.

### Discussion & Conclusion:

The DT showed optimal sensitivity (0.79 to 0.83) and specificity (0.76 to 0.80) in detecting borderline clinical cases of anxiety/depression in our population, comparable to that of the HADS. Therefore, because of its brevity and good performance, we propose that the DT is a quick effective tool, over the HADS, for routine screenings in clinical oncology outpatient settings.

## Thinking Twice Before Using the LMA for Obese and Older Patients—A Prospective Observational Study

**S SIDDIQUI<sup>1</sup>, MALAR<sup>1</sup>, T LIM<sup>1</sup>, KF KOH<sup>1</sup>, E SEET<sup>1</sup>, G CHEONG<sup>1</sup>, Q BING<sup>2</sup>**

<sup>1</sup>*Khoo Teck Puat Hospital, Singapore,* <sup>2</sup>*National University Singapore, Singapore*

### Introduction:

Laryngeal mask airways (LMAs) have traditionally been used for short surgery under general anaesthesia with good results. However, there is an under reporting of complications arising during ventilation with this device and the risk factors associated with such complications in adult patients. These can be significantly serious and life-threatening. Often times, it is wrong patient selection for the wrong surgery that results in an undesirable outcome.

### Methods:

By means of this prospective observational study we aimed to audit all general anaesthesia cases performed with an LMA at our hospital over 6 months from February till August 2012. Included in the parameters observed were induction techniques, ventilation strategies and intraoperative problems during LMA ventilation. By means of a data collection form, the anaesthetist in charge indicated the intraoperative events and outcomes.

### Results:

A total of 1095 patients were included in the audit; 7.1% of patients encountered problems with insertion whilst 7.8% had intraoperative problems related to difficulty with ventilation. This was more prevalent with the LMA Supreme<sup>TM</sup> ( $P = 0.031$ ). Age and BMI of the patient increased the incidence of complications ( $P = 0.002$  and  $0.0008$ ). A BMI >30 and an age >46 years are associated with a significant 2-fold increase in the probability of all ventilatory problems intraoperatively.

### Discussion & Conclusion:

The risk of problems increases 2-folds with patients with a BMI >30 and age >46 years. LMA Supreme<sup>TM</sup> was more problematic compared with Proseal.

## Prevalence of Body Dysmorphic Disorder and Impact on Subjective Outcome Amongst Asian Rhinoplasty Patients

**CG GOH<sup>1</sup>, S LO<sup>2</sup>**

<sup>1</sup>*National University of Singapore, Singapore,* <sup>2</sup>*Tan Tock Seng Hospital, Singapore*

### Introduction:

Despite the growing awareness and recognition of body dysmorphic disorder (BDD), the diagnosis and management of BDD in rhinoplasty remains challenging. There is a paucity of literature on BDD in Asian rhinoplasty patients. The aim of this study is to determine the prevalence of BDD in patients who underwent rhinoplasty and to investigate its impact on their surgical outcome.

### Methods:

A cross-sectional study of patients who received cosmetic rhinoplasty between January 2009 and December 2012 was performed. Telephone interview using validated instruments (Body Dysmorphic Disorder Questionnaire and Rhinoplasty Outcome Evaluation) was performed to determine the prevalence of BDD and the subjects' pre- and post-operative subjective scoring of their noses.

### Results:

Of the 47 patients who participated in the study, 7 (15%) were identified to have possible BDD. Six out of 7 of them were male. The BDD-group (mean age = 26) was significantly younger than the non-BDD group (mean age = 32). Although the revision rate was clinically higher for the BDD group (29%) than the non-BDD group (12.5%), this was not statistically significant. Both groups reported overall improvement in ROE scores but patients with BDD had significantly lower pre and postoperative ROE scores compared to non-BDD patients ( $P \leq 0.05$ ).

### Discussion & Conclusion:

Our results show that BDD is quite prevalent amongst patients who have received cosmetic rhinoplasty. BDD patients are likely to have poorer subjective outcomes after surgery although they may experience some improvement in satisfaction when compared to before surgery.

## Association of CTL4 and CD8B Genotypes and Densities of Regulatory and Cytotoxic T-Lymphocytes in the Tumours and Blood of Colorectal Cancer Patients

**A PILLAY<sup>1</sup>, SW TOH<sup>1</sup>, R SOONG<sup>2</sup>, PY CHONG<sup>2</sup>, NS SAPARI<sup>2</sup>**

<sup>1</sup>*Ngee Ann Polytechnic, Singapore*, <sup>2</sup>*National University of Singapore, Singapore*

### Introduction:

High densities of tumour-infiltrating lymphocytes (TILs) are associated with improved prognosis in colorectal cancer (CRC). The underlying mechanism of TILs remains unclear. Previous work reveals associations between blood and tumour T-lymphocyte densities, and the correlation of these densities with genotypes of several T-lymphocytes markers. The aim of the study was to characterise the association between genotypes of CTL4 and CD8b, FOXP3- and CD8-expressing T-cell levels respectively in blood DNA of CRC patients.

### Methods:

Relevant single nucleotide polymorphisms (SNPs) in CTL4 and CD8B for analysis were identified from interrogation of the public dbSNP database. Genotyping of SNPs was performed by mass spectrometry-based MassArray iPLEX analysis (Sequenom). The first series of samples analysed were normal colonic tissue DNA samples from 38 CRC patients previously characterised for T-lymphocyte densities in blood and colorectal tumours. Genotypes with a significant association ( $P < 0.05$ ) with corresponding T-lymphocyte levels were then tested for association in an independent series of normal colonic tissue DNA from 320 CRC cases with known tumour TILS densities. Associations were assessed by chi-square analysis.

### Results:

Ten and 17 SNPs in CTL4 and CD8B respectively were identified for analysis. In the first series, 2 genotypes in CD8B (rs12616984 and rs12466105) were significantly associated with both tissue and blood regulatory T-lymphocyte densities. However, these genotypes were not significantly associated with T-lymphocyte densities in the second validation series.

### Discussion & Conclusion:

Genotypic variation in CD8B (rs12616984 and rs12466105) could be linked to inter-individual variation in cytotoxic T-lymphocyte densities, although the analysis of larger sample series is required to confirm this.

## Comparison Study Between Two Apheresis Machines: SPECTRA OPTIA Versus COBE SPECTRA

**E KOH<sup>1</sup>, T CHAN<sup>1</sup>, TG SOH<sup>1</sup>**

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

### Introduction:

Donors were injected with G-CSF for mobilisation of bone marrow CD34+ stem cells into the peripheral blood, resulting in an increase of mononuclear cell-rich leukopheresis product. Harvesting of CD34+ cells from the peripheral blood was done by apheresis machines, namely Spectra Optia and Cobe Spectra. Clinically significant differences were compared across both systems.

### Methods:

Prior to and after apheresis, patients' CD 34+ were evaluated by flow cytometry and full blood count (FBC); 7-aminoactinomycin D (7-AAD) viability stain and FITC/PE staining were used, and ISHAGE gating protocol was followed in flow cytometry investigations. After which, the following were calculated: CD34+ cell collection efficiency; neutrophil exclusion efficiency; and correlation coefficient between the peripheral blood and the product CD34+ cell count.

### Results:

A total of 203 and 24 data were collected for Cobe Spectra and Spectra Optia respectively. The median CD34 collection efficiency, neutrophil exclusion efficiency and residual red cell contamination were 53.20% ( $\pm 21.44\%$ , 4.34% to 118.92%), 91.70% ( $\pm 19.96\%$ , 4.58% to 100%) and 14.25 mL ( $\pm 5.34$  mL, 2.18 mL to 31.5 mL) respectively for Cobe Spectra and 55.66% ( $\pm 18.90\%$ , 39.36% to 110.81%), 92.11% ( $\pm 11.79\%$ , 54.01% to 98.24%) and 4.34 mL (2.91 mL, 1.23 mL to 12.72 mL) respectively for Spectra Optia. The correlation coefficient (r) for Cobe Spectra and Spectra Optia are 0.97 and 0.98 respectively.

### Discussion & Conclusion:

The project achieved its objective to prove clinical significance across both systems. Spectra Optia median values for both neutrophil exclusion efficiency and CD34+ cell collection efficiency for Spectra Optia were higher than the respective values for Cobe Spectra, indicating the superior efficacy of Spectra Optia. Our findings provide a good reason to phase out Cobe Spectra

## Extensive Prurigo Nodularis: Characterisation and Aetiology

**WS TAN<sup>1</sup>, HL TEY<sup>1</sup>**

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

### Introduction:

Prurigo nodularis (PN) has multiple reported disease associations, and this study analyses the demographics, clinical distribution and underlying aetiologies in a cohort of Asian PN patients.

### Methods:

A 1-year retrospective study was carried out on PN patients with extensive lesions (>10) who attended a specialised itch clinic.

### Results:

A total of 37 patients (45.9% male, 54.1% female, median age 53 years) were included in the study. In all patients, an underlying cause could be identified. 48.6% (n = 18) of patients had a single aetiology attributable to causing their PN, whilst 51.4% (n = 19) had multiple aetiologies. Among all patients, dermatological disease was the most common cause (82.4%), of which endogenous eczema comprised the majority of cases (54.0%), followed by systemic disease (37.8%). The seroprevalence of chronic hepatitis B infection was higher (13.5%) compared to the age-specific seroprevalence rate in Singapore (2.8%). Patients with an atopic diathesis had a significantly lower median age of onset of PN compared to patients without ( $P = 0.022$ ).

### Discussion & Conclusion:

All patients with extensive PN have identifiable causes in this study. A dermatological condition was the predominant aetiology in both patients with monofactorial and multifactorial disease, of which endogenous eczema accounts for majority of the cases. A significant number of patients had underlying systemic causes, highlighting the need for systemic investigations in extensive PN, in particular, chronic hepatitis B in prevalent populations.

## Role of Contrast Ultrasound Scan in Differentiation of Benign and Malignant Focal Lesions of the Breasts

**T SHIMPI<sup>1</sup>, BV REYNOLDS<sup>1</sup>**

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

### Introduction:

This study aims to assess the efficacy of contrast-enhanced ultrasound (CEUS) to differentiate breast lesions based on their enhancement patterns.

### Methods:

CEUS examination of 28 breast lesions were performed using dedicated equipment (Toshiba Aplio XG). After injection of 2.4 ml of SonoVue (Bracco, Milan, Italy), the lesion was scanned using colour doppler and 3 dynamic sequences were recorded for 3 minutes. Two ROIs (region of interest) of similar size (6.2 mm<sup>2</sup>) and at similar depth were placed in the lesion and in the normal breast tissue. Data was postprocessed using Toshiba Contrast Harmonic Imaging Quantification (CHI-Q) software. The time-enhancement intensity curves (TEIC) were obtained and compared with each other.

### Results:

A total of 17 invasive ductal carcinomas, 5 fibroadenomas, 2 fibro-cystic disease, 3 papillomas, and 1 stromal fibrosis were diagnosed. TEIC for all malignant lesions were comparable, showed lesser enhancement intensity than the normal breast parenchyma (mean: -32.8). In the initial phase (0 to 60 sec), they revealed lower intensity (mean: -51.14), followed by slow, steady increase in intensity in the later phase of scanning, (mean: -47.8) 180 sec. The benign lesions (category B), had a relatively wider range of intensities as compared to the category A lesions with mean value (-52.9), being slightly higher than that of the category A lesions (-49.21).

### Discussion & Conclusion:

CEUS breast has limited role in differentiation of breast lesions due to overlap in their time-enhancement intensity curves. Larger study with more number of patients would be required to put more light on this emerging technique and to understand the post contrast behavioural pattern of benign vs. malignant lesions.



## Customised Computerised Decision-Support System: Patient Factors that Determine Physician Acceptance of Antibiotic Recommendations

**A CHOW<sup>1</sup>, B ANG<sup>1</sup>, LM LING<sup>1</sup>, TM NG<sup>1</sup>, C TENG<sup>1</sup>, D LYE<sup>1</sup>**

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

### Introduction:

ARUS-C is a customised point-of-care computerised antibiotic decision-support system that takes into account individual patient's clinical data. Our study aims to determine patient factors associated with physician acceptance of ARUS-C's antibiotic recommendations.

### Methods:

We included all inpatients who were: (i) prescribed piperacillin-tazobactam or carbapenem for empiric therapy; and (ii) auto-triggered on ARUS-C, 1 October 2011 to 30 April 2012. Wilcoxon rank-sum and Chi-square tests were used for univariate analyses. To account for nesting of patients within physicians and to control for confounding, we used a multilevel random-intercept logistic regression model.

### Results:

Overall, 36% of 942 patients received antibiotics in accordance with ARUS-C's recommendations. Forty-four percent of pneumonia patients, compared to 19% and 21% of patients with urinary tract infection (UTI) and sepsis ( $P < 0.0001$ ) received ARUS-C's recommendations. Patients who received ARUS-C's recommendations were older than those who did not (median 77 [range, 21 to 104] years vs 73 [range, 15 to 101],  $P = 0.0004$ ) and more likely to be from medical than surgical specialties (39% vs 27%,  $P = 0.0011$ ). After accounting for gender, illness severity, and renal impairment, patient's age (OR 1.06 per 5-year increase, 95% CI 1.01 to 1.12), infection source (pneumonia vs. UTI OR 4.43, 95% CI 2.18 to 9.00; pneumonia vs sepsis OR 2.72, 95% CI, 1.55 to 2.78) and clinical specialty (medical vs surgical OR 1.64 95% CI, 1.09 to 2.48) were independent factors associated with physician acceptance of ARUS-C's recommendations.

### Discussion & Conclusion:

Patient factors that determine physician acceptance of ARUS-C's recommendations include age, infection source, and clinical specialty. Understanding the reasons for physicians' non-acceptance of recommendations in certain patient groups is crucial for the enhancement of ARUS-C for optimal management of these patients.

## Diabetes Knowledge in Older Adults with Type 2 Diabetes in Singapore

**R. MERCHANT<sup>1</sup>, SB CHIONH<sup>1</sup>, SL COLLINSON<sup>2</sup>, JFS TONG<sup>2</sup>**

<sup>1</sup>*National University Hospital, Singapore,* <sup>2</sup>*National University of Singapore, Singapore*

### **Introduction:**

Studies have shown that patient's health literacy and self-management education has an impact on glycaemic control (Tang et al, 2008; Norris et al, 2002; Tan et al, 1997). However, there are no recent studies that examine diabetes knowledge in our local population with type 2 diabetes. This paper aims to ascertain diabetes knowledge in older adults with type 2 diabetes.

### **Methods:**

This study is part of an ongoing cross-sectional study carried out at the National University Health System. Fifty-eight patients with type 2 diabetes, 55 years old and above were recruited. Diabetes knowledge was assessed using a modified version of the Revised Diabetes Knowledge Scale.

### **Results:**

The mean age of participants was 66.1 years and the mean number of years of education was 9.93. Participants had a mean percentage score of 70.3%. Item analyses revealed lack of knowledge in some areas. Patients performed most poorly on item 16 (long-term consequences of hypoglycaemia) with only 13.8% of patients answering correctly. Patients also performed poorly on item 6 (what not to take to treat low blood sugar) where 54.7% of patients chose the wrong answer.

### **Discussion & Conclusion:**

Overall, patients displayed a good knowledge of diabetes and its management. However, there were significant gaps in knowledge about hypoglycaemia and management. This study highlights areas that need to be addressed in future diabetes education efforts.

## Establishing an Intensive Care Unit Database: What You Know Can Help You

**S SIDDQUI<sup>1</sup>, U IYER, SF YAP<sup>1</sup>, D TAN<sup>1</sup>, E SHANTHAKUMAR<sup>1</sup>**

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

### **Introduction:**

The ICU is a complex healthcare delivery system for critically ill patients who are in dynamic flux at all times. With an ageing population and an explosion of data, the intensive care unit (ICU) will become ever more complex, and the critically ill more susceptible to medical problems.

### **Methods:**

We aimed to establish an SICU database after DSRB approval in our 14-bedded ICU.

### **Results:**

Our admission rate from November 2011 till August 2012 is on average 120 patients per month. Our total admission in this 10-month period is 1300 patients. Of these, 70% were high dependency and 30% SICU admissions. Our male to female ratio was 60:40 and the average age was 55 years. Mortality rate on average was 6.25% and the average length of stay was 2.3 days. The commonest patients admitted were for 'postoperative care' (25%), however this varied over the year.

### **Discussion & Conclusion:**

Prognostic assessment of critically ill patients and resource allocation for their care are in the forefront of critical care debates currently. With too many patients requiring ICU beds, an ageing population and medical technology available for life sustaining measures advancing in leaps and bounds (most often requiring a critical care setting), our supply demand ratio is grossly inadequate.

## Comparison of Two Mechanical Techniques of Reconstructions After Laparoscopic Roux-en-Y Gastric Bypass: Tan Tock Seng Hospital Experience

**AM OO<sup>1</sup>, A KOURA<sup>1</sup>, J RAO<sup>1</sup>**

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

### Introduction:

Obesity is the fifth leading risk for global deaths. Laparoscopic Roux-en-Y gastric bypass (LRYGB) is one of the best surgical procedures for obesity and metabolic disorder. There are 2 different techniques for the construction of the gastric pouch-jejunal anastomosis (GPJA): mechanical (circular or linear stapler) or hand-sewn GPJA. Our study objective is to review and compare the 2 techniques of reconstructions after LRYGB done in Tan Tock Seng Hospital.

### Methods:

A retrospective review and analysis of patients who underwent laparoscopic Roux-en-Y gastric bypass surgeries from January 2010 to December 2012 was done using a prospectively collected database and medical records.

### Results:

Among 38 patients who underwent LRYGB, 29% (n = 11) were male and 71% (n = 27) were female. Thirty-four percent (n = 13) of the GPJA reconstruction were done using circular staplers while 66% (n = 25) were done using linear staplers. Mean (SD) of Age of circular group was 46.16 (9.84) and linear group was 48.68 (8.41) ( $P = 0.4714$ ). Mean (SD) of pre-op body mass index (BMI) of circular group was 39.2 (4.48) and linear group was 40.99 (6.69) ( $P = 0.3911$ ). Mean (SD) of length of stay (LOS) of circular group was 5.15 (1.068) and linear group was 5.6 (1.47) ( $P = 0.3405$ ). Mean (SD) of total operative time in minutes for circular group was 207.85 (30.75) and linear group was 194.72 (64.63) ( $P = 0.4949$ ). One anastomosis leak was observed in the circular group and zero 30-days mortality in either group.

### Discussion & Conclusion:

The 2 mechanical techniques of reconstructions in LRYGB (circular versus linear staplers) did not show any difference in terms of operative time, length of stay and perioperative morbidity, mortality in our study.

## Insights into Disease Trajectories of Delirium among Older Patients Admitted to Specialised Delirium Unit (Geriatric Monitoring Unit – GMU)

**J LAM<sup>1</sup>, L TAY<sup>2</sup>, M CHAN<sup>2</sup>, YY DING<sup>2</sup>, YM WONG<sup>2</sup>, MS CHONG<sup>2</sup>**

<sup>1</sup>*Queen Elizabeth Hospital, Hong Kong,* <sup>2</sup>*Tan Tock Seng Hospital, Singapore*

### Introduction:

Research data on disease trajectories of delirium are sparse. Therefore, the aims of our study were to describe the disease trajectories of delirium and to determine factors predicting the course of recovery.

### Methods:

A prospective observational study was conducted on patients (age  $\geq 65$ ) admitted to GMU from December 2010 to August 2012. Data collected included demographics, comorbidities, severity of illness, functional status, as well as daily scoring of Chinese Mini-Mental State Examination (C-MMSE) and Delirium Rating Scale-revised-98 (DRS-98). Resolution of delirium, and thus GMU discharge, was determined by clinical assessment of geriatrician and multidisciplinary team. The primary outcome was residual subsyndromal delirium (rSSD) (score  $\geq 8$  on DRS-98) on discharge from GMU. Univariate and multivariate methods were performed to determine the predictors of rSSD.

### Results:

A total of 238 patients (43%: male) with mean age of  $84.2 \pm 7.4$  were included. Compared with subjects in non-rSSD group, their rSSD counterparts presented with a slower rate of improvement in delirium severity ( $1.5 \pm 1.6$  vs  $3.5 \pm 2.1$  decrease in DRS-R98/day,  $P < 0.001$ ) and cognition ( $0.6 \pm 1.1$  vs  $2.0 \pm 2.1$  increase in C-MMSE/day,  $P < 0.001$ ). In multivariate analysis, underlying dementia (OR: 8.18, 95% CI, 2.71 to 24.66), DRS-R98 on day 1 (OR: 1.16, 95% CI, 1.01 to 1.33) and day 3 (OR: 1.19, 95% CI, 1.04 to 1.35) were independent predictors of rSSD. ROC analysis showed DRS-R98 cutoff at 14.5 on day 3 predicted rSSD with 85% sensitivity and 70% specificity.

### Discussion & Conclusion:

Among the patients recovering from delirium, those with rSSD represent the group running a more protracted course of illness. These new insights into the disease trajectories of delirium may potentially help formulate early discharge planning and provide basis for future research on delirium treatment.

## Pregnancy Dermatoses: A Case Series

**SL TAN<sup>1</sup>, YK HENG<sup>1</sup>, HHB OON<sup>1</sup>**

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

### **Introduction:**

Pregnancy is an exciting chapter in a women's life filled with many changes. Skin manifestations are most worrisome as they are readily visible. Specific dermatoses of pregnancy are a heterogenous group of poorly defined pruritic skin diseases unique to pregnancy, with confusing terminology and controversial classification.

### **Methods:**

We conducted a retrospective review of all pregnancy dermatoses seen at the National Skin Centre.

### **Results:**

We characterised the individual pregnancy dermatoses and described their epidemiology, presentation, investigations and management options. We provided a flow chart to aid in diagnosis and management of pregnancy cases.

### **Discussion & Conclusion:**

We hope to provide insight and clarity to this confusing group known as 'pregnancy dermatoses' by presenting a series of patients with pregnancy rashes. A good knowledge of the time of presentation with respect to the stage of pregnancy, morphological features as well as histological and laboratory findings would guide one to the correct diagnosis and allow adequate and timing management.

## Necrotising Fasciitis of the Head and Neck

**MC CHAN<sup>1</sup>, ECH HING<sup>2</sup>, WC ONG<sup>2</sup>, J LIM<sup>2</sup>, TC LIM<sup>2</sup>, TKS LOH<sup>3</sup>, CM LIM<sup>3</sup>**

<sup>1</sup>*National University Hospital, Singapore,* <sup>2</sup>*National University Health System, Singapore*

### Introduction:

Necrotising fasciitis (NF) of the head and neck is a rare, destructive soft tissue infection with an innocuous early presentation, associated with high mortality and morbidity. Aims: (i) to present patient incidence and data encountered in NUHS; and (ii) to propose an algorithm encompassing diagnosis, inpatient treatment, and postdischarge management.

### Methods:

A retrospective review of all patients treated for NF of the head and neck in NUHS from January 2000 to June 2013. An algorithm was formulated following review of our patients and existing literature.

### Results:

A total of 8 patients were treated; 7 had NF of the neck, 1 of the head. Typical presentation; rapidly progressing erythema, swelling, and pain. Seven had poorly controlled diabetes mellitus. Possible aetiology included tonsillitis, insect bite and acupuncture. All received emergency surgical debridement, intravenous antibiotics, and multidisciplinary supportive management. Six required reconstructive surgery. Two patients passed away. Morbidity included dysphagia, renal failure, facial palsy and depression. No recurrences were recorded.

### Discussion & Conclusion:

Our findings show: (i) the head and neck is rarely affected, consisting 4.2% (8 of 190) of all NF in NUHS during the study period; (ii) poorly controlled diabetes mellitus was a significant comorbidity; (iii) imaging and investigations should not delay aggressive surgical and medical therapy; (iv) patients suffer numerous complications; from the condition itself, prolonged hospitalisation (e.g. infections), debridements (e.g. functional impairment, wound cosmesis), and psychologically (e.g. depression); (v) a multidisciplinary approach is crucial to treat the condition and complications; (vi) postdischarge follow-up is essential for sequelae management; and (vii) a comprehensive algorithm was formulated.

## Diabetic Chronic Kidney Disease Patients Should Increase Protein Intake

**QC TOH<sup>1</sup>, PY CHOW<sup>2</sup>, HM LOH<sup>2</sup>, BW TEO<sup>2</sup>, E LEE<sup>2</sup>**

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>National University Hospital, Singapore

### Introduction:

Different clinical practice guidelines recommend different levels of dietary protein intake in predialysis chronic kidney disease (CKD) patients. It is unknown how effectively these recommendations perform in a multiethnic Asian population, with its varied diets and cultural beliefs. We assess the profile of protein intake in a multiethnic Asian population.

### Methods:

We analysed the 24-hour urine collections of the Asian Kidney Disease Study and the Singapore Kidney Function Study to estimate total protein intake (TPI; g/day):  $6.25 \times \text{urine urea nitrogen} + 30 \times \text{actual body weight (ABW)}$ . We calculated ideal body weight (IDW; kg):  $22.99 \times \text{height}^2 \text{ (m)}$ .

### Results:

There were 232 stable chronic kidney disease patients and 103 healthy participants with mean age  $53.5 \pm 15.1$  year; comprising of 51% male, 38.5% Chinese, 29.6% Malay, 23.6% Indian, and 8.4% Others, and 35.5% diabetics. Mean protein intake: SKFS1\* AKDS\* *P* value\* TPI (g/day)  $58.89 \pm 18.42$   $53.64 \pm 19.39$  0.0206 TPI-IDW (g/kg/day)  $0.97 \pm 0.28$   $0.91 \pm 0.30$  NS TPI-ABW (g/kg/day)  $0.91 \pm 0.27$   $0.77 \pm 0.26$   $<0.001$ . By NKF KDOQI guidelines, 29/232 (12.5%) of CKD patients with GFR  $<25$  (in mL/min/1.73m<sup>2</sup>) had TPI-IDW of  $<0.6$  g/kg/day. By American Dietetic Association guidelines, 34.7% (44/127) of CKD patients with GFR  $<50$  had TPI-IDW between 0.6 to 0.8 g/kg/day. Only 1/6 non-diabetic CKD patients with GFR  $<20$  had a protein intake of 0.3 to 0.5 g/kg/day. And 21.9% (25/114) of diabetic CKD patients, had protein intake of 0.8 to 0.9 g/kg/day.

### Discussion & Conclusion:

On average, protein intake of most CKD patients exceeds recommendations of guidelines. Diabetic CKD patients should aim to have higher protein intakes.



## Neurocognitive Functioning and Clinical Profiles in Schizophrenia and Bipolar Disorder —Clarifying Concepts of Dichotomy Versus Continuum in Psychiatric Nosology

**CN KUSWANTO<sup>1</sup>, MY SUM<sup>1</sup>, K SIM<sup>1</sup>**

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

### **Introduction:**

The Kraepelinian dichotomy posits that patients with schizophrenia (SCZ) and bipolar disorder (BD) present as 2 separate psychotic entities with differing level of clinical severity and neurocognitive deficits. Based on extant data, we hypothesised that the cognitive deficits in SCZ and BD were comparable and sought to identify predictors of poor neurocognitive functioning in these patients.

### **Methods:**

The Brief Assessment of Cognition battery (BAC) was administered to 49 healthy controls (HC), 72 SCZ and 42 BD patients matched for age, gender, and premorbid IQ. Severity of psychopathology and socio-occupational functioning were assessed using Global Assessment of Functioning (GAF), the Positive and Negative Syndrome Scale (PANSS) and the Young Mania Rating Scale (YMRS).

### **Results:**

Both BD and SCZ groups demonstrated similar patterns of cognitive deficits across several domains (verbal memory, working memory, semantic fluency, processing speed) compared with HC subjects. However, we did not find significant difference in cognitive functioning between BD and SCZ patients, suggesting that both patient groups suffer the same degree of cognitive impairment. Patients with lower GAF score ( $t_{(104)} = 2.661$ ,  $P = 0.009$ ) and older age ( $t_{(104)} = -2.625$ ,  $P = 0.010$ ), not their diagnosis or doses of psychotropic medications, predicted poorer overall cognitive functioning.

### **Discussion & Conclusion:**

Our findings suggest comparable levels of cognitive impairment within schizophrenia and bipolar disorder, which support less the Kraepelinian concept of dichotomy but more of a continuum of psychotic spectrum conditions. This has implications for moving psychiatric psychotic nosology towards dimensional rather than categorical paradigms.

## The Skin-Endocrine Axis in the Management of Dermatology Patients

**M LIANG<sup>1</sup>, HHB OON<sup>1</sup>, CF LIEW<sup>2</sup>**

<sup>1</sup>National Skin Centre, Singapore, <sup>2</sup>Raffles Diabetes & Endocrine Centre, Singapore

### **Introduction:**

The skin and systemic endocrine disorders have a close interconnected relationship. Manifestations of endocrine disorders commonly cause recognisable cutaneous signs. It is important to recognise these signs for prompt diagnosis of underlying or associated endocrinopathies so that appropriate treatment is administered. Endocrinopathies like Cushing's disease and lipid derangements can also result from treatment of dermatological diseases and dermatologists should bear this in mind as part of their practice. Lastly, to further highlight the close link between the skin and endocrinopathies, medical treatment of the latter can result in adverse drug eruptions.

### **Methods:**

We present 5 interesting patients each highlighting a different aspect of how cutaneous signs and endocrinopathies are interlinked.

### **Results:**

Our first patient presented with thyroid pretibial myxoedema which is a rare but diagnostic sign of Grave's disease. Thyroid disease can also be associated with other autoimmune mediated dermatological conditions like vitiligo. The second patient presented with eruptive xanthoma and was subsequently diagnosed to have hypertriglyceridaemia. The third patient developed cutaneous features of exogenous Cushing's disease from corticosteroids given to treat her immunobullous blistering disorder. Our fourth patient has psoriasis vulgaris as well as the metabolic syndrome which is closely associated with psoriasis. Treatment of underlying metabolic syndrome may result in improvement of psoriasis. The final patient developed fenofibrate induced photosensitivity with reduced minimal erythema dose to ultraviolet B (UVB) which resolved on cessation of the drug.

### **Discussion & Conclusion:**

Endocrine-skin interactions remain an important and often helpful clinical feature for both dermatologists and endocrinologists to bear in mind.

## Prevalence and Pattern of Psychiatric Disorders after Traumatic Brain Injury and Its Association with Long-Term Psychosocial Outcomes in a Singaporean Sample

**LG CHAN<sup>1</sup>, SE GOH<sup>1</sup>, K CHUA<sup>1</sup>**

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

### Introduction:

Traumatic brain injury (TBI) is the most common causes of death and chronic disability in the under-35 age group in Singapore. There is an absence of local data on the psychiatric morbidity after TBI and its impact on long-term outcomes.

### Methods:

Patients with mild, moderate and severe TBI 3 to 5 years ago were recruited and administered the Structured Clinical Interview for DSM-IV (SCID) and Mayo-Portland Adaptability Inventory-4 (MPAI-4). The prevalence and pattern of psychiatric disorders were described. Those with and without psychiatric disorders were compared in sociodemographic factors and scores on MPAI-4.

### Results:

From the sample, 25.9% (n = 54) had at least 1 psychiatric disorder. Mood disorders (11.1%), alcohol use disorders (9.3%) and psychotic disorders (5.5%) were the commonest disorders found. The prevalence of psychiatric disorders was 8.7%, 40.0% and 38.1% for the mild, moderate and severe groups respectively. For the mild group, substance use disorder was the only diagnosis found. Psychotic disorders were only found in the severe group. Those with psychiatric diagnosis were younger ( $P = 0.002$ ) and more of them were living with caregiver assistance ( $P = 0.012$ ), engaged in supported employment ( $P = 0.011$ ) and had psychosocial disability ( $P = 0.003$ ). They also scored worse on the Abilities, Adjustment and Participation subscales and total score ( $P \leq 0.002$ ) on the MPAI-4. No significant predictors of psychiatric morbidity were found. The presence of a psychiatric disorder significantly predicted psychosocial disability (OR 8.53,  $P = 0.003$ ).

### Discussion & Conclusion:

Psychiatric disorders are common in the Singaporean TBI sample. Psychiatric morbidity predicted psychosocial disability. Early detection and treatment for TBI survivors is recommended to improve outcomes.

## Hearing Results of Stapes Surgery in Singapore and Predictive Factors Affecting Outcome

**CG GOH<sup>1</sup>, WS TAN<sup>1</sup>, SB YEO<sup>2</sup>**

<sup>1</sup>*National University of Singapore, Singapore,* <sup>2</sup>*Tan Tock Seng Hospital, Singapore*

### **Introduction:**

Otosclerosis is a localised disease of the otic capsule resulting in ankylosis of the stapes footplate causing conductive hearing loss. Due to the rarity of the disease among Asians, earlier small-scale regional studies have reported unsatisfactory stapes surgery results. In this relatively large scale study, we performed a review of all the stapes surgery performed over a 12-year period in a single institution and determined the predictive factors affecting postoperative results.

### **Methods:**

This retrospective cohort study included all patients who underwent primary surgery for otosclerosis from January 2000 to December 2012. Case records were reviewed. The primary outcome measurement was a postoperative air-bone gap (ABG) of 10dB or less and the percentage improvement in ABG. Potential predictors affecting postoperative ABD were analysed.

### **Results:**

A total of 76 patients underwent 92 stapes surgery (77 stapedotomies, 14 stapedectomies). Seventy-two (80%) cases achieved closure of air-bone gap to less than 10dB. The mean percentage improvement in ABG was 78.8% (range, 19 to 100). Univariate logistic regression showed patients with bilateral disease and preoperative ABG of >35 had significantly greater percentage improvement in ABG. Other factors such as sex, age, ethnicity, duration of disease, piston size/length, type of surgery did not affect postoperative ABG closure or percentage improvement of ABG.

### **Discussion & Conclusion:**

Although our <10dB air-bone closure rate of 80% is lower than that reported in some of the overseas studies, we believe it is one of the highest in the region. More studies to determine the prognostic factors affecting stapedotomy results are needed.

## Dematiaceous Mycoses of the Skin in Singapore from 2003 to 2010

**LCM LOW<sup>1</sup>, SH TAN<sup>2</sup>, SI TEE<sup>2</sup>**

<sup>1</sup>National Healthcare Group HQ, Singapore, <sup>2</sup>National Skin Centre, Singapore

### Introduction:

Dematiaceous fungi cause subcutaneous mycoses such as eumycetoma, chromoblastomycosis and phaeohypomycosis. Relatively uncommon, they often occur in parts of the world with a tropical climate, especially in rural populations after a penetrating injury. Its epidemiology in Singapore is currently unknown.

### Methods:

In this study, the histopathology database of a tertiary dermatological centre in Singapore were analysed for reports of eumycetoma, chromoblastomycosis and phaeohypomycosis between the years 2003 and 2010. Four cases were identified from 60 records analysed.

### Results:

The patients, 3 females and 1 male, in these cases were between 41-71 years and affected sites were on the exposed parts of the body. Immunosuppression may have played an influential role in 2 of the cases whilst the other 2 patients reported occupational exposure to soil. Fungal cultures performed were positive for *Cladophialophora spp.* in 2 cases, *Cladosporium carionii* in 1 case and *Exophiala jeanselmei* in the fourth case. All 4 patients were treated with itraconazole for 3-6 months, and excision of the lesion was performed in 1 case. Recurrence occurred in 2 cases treated with 4-5 months of terbinafine. No episodes of disseminated fungaemia were noted.

### Discussion & Conclusion:

Dematiaceous deep fungal infections are rare in Singapore, however, the potential of mortality from dissemination encourages vigilance in diagnosis and treatment. Host immunosuppression appeared to play a role in the need for prolonged treatment. It is noteworthy that 2 of 4 cases identified were attributed to *Cladophialophora spp.*, which is an unusual causative species.

## An Audit on the Management of Cutaneous Squamous Cell Carcinoma at the National Skin Centre, Singapore

**D LIM<sup>1</sup>, WS TAN<sup>2</sup>, TWM CHIO<sup>2</sup>**

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>National Skin Centre, Singapore

### Introduction:

This audit assesses the management of squamous cell carcinoma (SCC) in the National Skin Centre (NSC), in particular physician documentation and recurrence rate with different treatment modalities.

### Methods:

This retrospective audit included 89 patients with histologically-proven SCC, with biopsy and/or surgery done within NSC from 2008 to 2010. Case records from the Vesalius electronic medical records were retrieved.

### Results:

Forty-six patients were male and 43 female (mean age: 77.16±13.8 years). At diagnosis, females were older than males (mean difference: 9.325 years,  $P = 0.001$ ). Seventy-three (82.02%) were Chinese, 4 (4.49%) Malay, 6 (6.74%) Caucasian and 6 (6.74%) of other ethnicities. Seventy-nine (89.8%) were primary tumours, and 9 (10.2%) recurrent tumours. Mean size was 21.1 mm. Poorly differentiated tumours were significantly larger ( $P = 0.013$ ), with no impact on recurrence rates. Forty (44.94%) were high-risk based on American Joint Committee on Cancer 2011 size criteria. Thirty-nine (44.8%) underwent excision by plastic surgeons, and 19 (21.8%) by Moh's micrographic surgery. One underwent radiotherapy. On first excision, 12 of 65 (19.5%) SCCs had histological margins involved, of which 8 (66.7%) had no documentation of surgical margins. Of 71 excisions, 35 (49.2%) had no surgical margins documented, of which 20 were high-risk tumours. Fourteen (17.7%) primary tumours recurred postexcision, with no significant association with high-risk factors and treatment modality. Mean follow-up duration was 65.20 weeks. Females had a shorter ( $P = 0.009$ ) follow-up duration (47.81 weeks) compared to males (81.46 weeks). Nineteen of 67 (28.3%) lacked documentation on tumour duration, 13 of 80 (16.2%) on tumour size, and 46 of 89 (51.7%) on regional lymph node examination.

### Discussion & Conclusion:

Clinicians should emphasise to patients the need for regular follow-up. Better documentation of tumour size and excision margins would aid tumour staging and follow-up.

## Impact of Hearing Loss on Quality of Life of Singapore Patients and Correlation Between Audiogram and Hearing Disability

**HY ZHANG<sup>1</sup>, SVR MEDAPATI<sup>1</sup>, EC HO<sup>1</sup>, KX LI<sup>2</sup>, WMW ONG<sup>2</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore,* <sup>2</sup>*National University of Singapore, Singapore*

### Introduction:

This study analyses impact of hearing loss (HL) on quality of life in Singapore patients and correlates audiometric assessment with patient's own perception of hearing disability.

### Methods:

This is a retrospective study on 643 subjects fitted with hearing aids from Tan Tock Seng Hospital, Singapore. Cases were stratified into 2 cohorts by audiometric assessment (PTA): mild HL (21-40db), moderate-severe HL (>41db). Hearing disability was measured by a locally-modified Hearing Handicap Inventory for the Elderly Screening (HHIE-S) questionnaire which assessed 8 locally-relevant scenarios affected in hearing loss.

### Results:

Mean age of patients was 73.1 years (range: 22-113). There were 327 males and 316 females. Racial proportion was Chinese 87.9%, Malay 4.2%, Indian 5.8%, Others 2.2%. The severity of HL showed correlation with reporting handicap in 5 out of 8 daily scenarios. Significantly higher proportion of patients with moderate-severe HL reported difficulty in the 5 scenarios compared to patients with mild HL: private conversation 89.5% vs 54.2%,  $P < 0.001$ ; group conversation 97.7% vs 87.5%,  $P = 0.002$ ; hearing in noise 99.2% vs 91.7%,  $P < 0.001$ ; using telephone 88.6% vs 75%,  $P = 0.045$ ; communication with family member 81.2% vs 58.3%,  $P = 0.006$ . The proportion of patients reporting difficulty hearing TV/radio was the same between mild and moderate-severe HL (95.7% vs 95.6%,  $P = 0.999$ ). There was also no correlation between HL severity and limitation of social life (mild 79.2% vs moderate-severe 85.5%,  $P = 0.362$ ).

### Discussion & Conclusion:

Hearing impairment leads to difficulties in communication which is worse in group and noisy situations. Patients with more severe hearing loss are more likely to report more hearing disability, hence highlighting the importance of early treatment.

## **Preliminary Findings on the Effects of Nutritional and Social Skills Intervention among Children with Attention Deficit Hyperactivity Disorder**

**N LIM-ASHWORTH<sup>1</sup>, YP OOI<sup>1</sup>, SJ WENG<sup>1</sup>, CG LIM<sup>1</sup>, DSS FUNG<sup>1</sup>, A GLENN<sup>2</sup>, RP ANG<sup>3</sup>, A RAINE<sup>4</sup>**

<sup>1</sup>*Institute of Mental Health, Singapore*, <sup>2</sup>*University of Alabama, United States*, <sup>3</sup>*National Institute of Education, Singapore*, <sup>4</sup>*University of Pennsylvania, United States*

### **Introduction:**

Standard treatments such as psychostimulants and psychosocial therapies for ADHD often have side effects and/or are resource intensive. This prompted families to consider alternative intervention. The effectiveness of Omega-3 supplementation and social skills training in reducing attention problems among ADHD children is assessed through a randomised, double-blind, place-controlled trial. It is hypothesised that children who received Omega-3 supplementation, social skills training, or both Omega-3 supplementation and social skills training would show greater reductions in attention problems than those who received Omega-3 placebo only.

### **Methods:**

A total of 39 participants (aged 9 to 16 years) diagnosed with ADHD only were included in our current analyses. They were randomly assigned to one of the following groups: (i) omega-3 only (n = 15); (ii) social skills + omega-3 placebo (n = 8); (iii) omega-3 + social skills (n = 9); or 4) omega-3 placebo only (n = 4). Parents of children in all groups also received standard treatment which consists of 7 lessons of behaviour management training. Parent report questionnaires such as the CBCL and the CPRS were administered at pretreatment (0-month), midtreatment (3-month), and post-treatment (6-month).

### **Results:**

Contrary to our hypotheses, the groups did not differ significantly on parent-rated attention problems. However, all groups showed a greater trend toward improvement on parent-rated attention problems at post-treatment (6-month).

### **Discussion & Conclusion:**

Findings of this subset of participants showed preliminary support for the use of omega-3 and social skills training in treating attention problems although not superior to the other treatment groups. Implications of the findings will be discussed and limitations of the study will be presented.



## Prospective Randomised Trial Comparing Outcomes of Combined Acupuncture and Lubricants Versus Lubricants Aloe for the Treatment of Dry Eyes in Singapore: Interim Analysis

**NY GAN<sup>1</sup>, P YEO<sup>1</sup>, D NG<sup>1</sup>, KH KONG<sup>1</sup>, BA LIM<sup>1</sup>**

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

### Introduction:

This study aims to evaluate the effect of combining acupuncture and lubricants versus lubricants alone for dry eyes.

### Methods:

Outpatients from general ophthalmology clinics and healthy volunteers were recruited. Inclusion criteria: TBUT (tear-film breakup time) <10 seconds and ST (Schirmer's test) <10 millimeters. Patients were randomised into arm A (6-week course of acupuncture and lubricants) or arm B (lubricants only); and evaluated at weeks 0, 7, 12, 24. Outcome measures included TBUT, ST, and Ocular Surface Disease Index (OSDI) questionnaire.

### Results:

Twenty-six patients have completed the study; arm A (14) and arm B (12). Majority were females. Mean age (years) was 59.9 in arm A, 62.8 in arm B ( $P = 0.363$ ). Baseline characteristics of both arms were similar; (TBUT [OD:  $P = 0.156$ ; OS:  $P = 0.078$ ]; ST [OD:  $P = 0.467$ ; OS:  $P = 0.272$ ]; OSDI [OD:  $P = 0.547$ ; OS:  $P = 0.665$ ]). Compared to baseline, arm A had significant mean increase in TBUT at week 7 [OD: 2.18;  $P = 0.006$ ; OS: 2.31;  $P = 0.006$ ], week 12 [OD: 3.04;  $P = 0.006$ ; OS: 2.81;  $P = 0.018$ ] and week 24 [OS: 2.16;  $P = 0.003$ ]. Arm A had significant mean increase in ST at week 7 [OD: 2.14;  $P = 0.012$ ; OS: 3.50;  $P = 0.042$ ]. Arm B showed significant decrease in OSDI scores at week 12 [OD: 12.85;  $P = 0.024$ ; OS: 12.67;  $P = 0.024$ ]. Compared to arm B, arm A had a trend towards superior TBUT and ST at weeks 12 and 24, although the difference was not significant. No adverse events were reported.

### Discussion & Conclusion:

Results from this interim analysis support the synergistic role of acupuncture in dry eyes, with significant improvement seen in both TBUT and ST outcomes and a trend towards superior TBUT and ST compared to lubricants alone.

## Profile of Hearing Aids Users in Singapore: Single and Successive Fittings

**KX LI<sup>1</sup>, HY ZHANG<sup>1</sup>, WMW ONG<sup>1</sup>, SVR MEDAPATI<sup>2</sup>, EC HO<sup>2</sup>**

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>Tan Tock Seng Hospital, Singapore

### Introduction:

A general profile of hearing aid (HA) users is useful for future comparison and stratification. With an ageing population, more users should fit multiple HAs so differences in user characteristics between single and successive fittings are important.

### Methods:

Audiological records (2001 to 2012) from Tan Tock Seng Hospital, Singapore were analysed retrospectively. A total of 926 HAs were fitted: (i) single fittings (832 HAs fitted to users who acquired only 1 HA); and (ii) successive fittings (94 HAs fitted to users who acquired sequential HAs).

### Results:

For all users, HAs are first fitted at a mean age of  $69.6 \pm 14$  and mean baseline  $PTA_{0.5,1,2,4\text{kHz}}$   $64.0 \pm 14\text{dB}$  with approximately equal gender distribution. Significant differences between single and successive fittings include: (i) users below 65 years old are 3.14 times more likely to fit successive HAs ( $P = 0.004$ ); (ii) multiple users fit their first HA earlier than single users (64.4 and 69.9 years old respectively,  $P = 0.011$ ); 3) multiple users fit their first HA at milder hearing loss (59.2 and 64.0 dB respectively,  $P = 0.033$ ); and 4) multiple users follow up more than single users (4.33 and 1.33 yearly follow-ups respectively,  $P < 0.001$ ). Sixty-four percent of successive fittings were on the ipsilateral ear at a mean interval of 6.0 years (range, 2.0 to 12.0); and 36% were sequential bilateral fitting at a mean interval of 2.6 years (range, 1.0 to 6.0).

### Discussion & Conclusion:

About 10% of HA users fitted successive HAs. Multiple users fit their first HA earlier, at milder hearing loss and they follow-up for a longer period. About a third of successive HAs were fitted on users who subsequently acquired bilateral HAs.

## Factors Affecting Hearing Aid Satisfaction in a Singapore Population (2001 to 2013)

**HY ZHANG<sup>1</sup>, SVR MEDAPTI<sup>1</sup>, EC HO<sup>1</sup>, KX LI<sup>2</sup>, WMW ONG<sup>2</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore,* <sup>2</sup>*National University of Singapore, Singapore*

### Introduction:

This study aims to explore the satisfaction of hearing aid (HA) users in Singapore and the factors affecting the level of satisfaction.

### Methods:

Retrospective study on 643 subjects fitted with hearing aids from Tan Tock Seng Hospital, Singapore between 2000 and 2013. Demographics, pure tone audiometry (PTA), HA laterality and pre and postfitting scores of hearing-disability questionnaire were collected. The questionnaire was a locally-modified Hearing Handicap Inventory for the Elderly Screening (HHIE-S).

### Results:

There were 643 patients (mean age: 73.1 years, range, 22 to 113); 327 males and 316 females; Chinese 87.9%, Malay 4.2%, Indian 5.8%). Factors found to correlate with the HA satisfaction were: age, gender, hearing loss (HL) severity and HA laterality. Patients older than 75 were twice as likely to experience improvements in 1:1 or group conversations respectively ( $P = 0.013$ ;  $P = 0.023$  respectively). Women were 1.5 times more likely as men to report improvement for group conversation ( $P = 0.029$ ), but men were 2.5 times more likely than women to report improvement in workplace ( $P = 0.011$ ). The odds of experiencing an improvement in 1:1 conversation was 5 times higher for patients with moderate-severe HL compared to mild HL ( $P < 0.001$ ). Finally patients with bilateral HA were 6 times more likely to experience an improvement in workplace than unilateral HA users ( $P = 0.011$ ) and 2 times more likely to feel an improvement in social life ( $P = 0.013$ ). Race and frequency of HA usage were not found to correlate with satisfaction.

### Discussion & Conclusion:

Elderly patients with severe hearing loss fitted with bilateral HA benefitted the most from HA usage.

## Factors that Affect the Degree of Hearing Loss at Presentation and Hearing Aid Usage

**HY ZHANG<sup>1</sup>, SVR MEDAPATI<sup>1</sup>, EC HO<sup>1</sup>, WMW ONG<sup>2</sup>, KX LI<sup>2</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore,* <sup>2</sup>*National University of Singapore, Singapore*

### **Introduction:**

This study analyses factors that affect severity of hearing loss (HL) at presentation and hearing aid usage pattern.

### **Methods:**

This is a retrospective study on 643 subjects fitted with hearing aids from Tan Tock Seng Hospital, Singapore between 2000 and 2013. Demographics, average pure tone audiometry (PTA0.5, 1, 2, 4 kHz), details of HA usage were collected. Severity of HL was classified as mild HL (21 to 40db), moderate (41 to 70db), and severe HL (>71db).

### **Results:**

Patients had a mean age of 73.1 years (range, 22 to 113). Patients presented with mild HL were significantly younger than those with moderate-severe HL (64.1 years vs 73.5 years,  $P < 0.001$ ). Malays make up only 5.1% of all patients compared with the national proportion of 13.9%, and they make up 4.2% of our HA users. Among the Malay patients, 48.1% had severe HL which is much higher than the proportion amongst the Chinese, Indians and Others at 26.7%, 37.8% and 7.1% respectively,  $P = 0.001$ . Mean age of Malay patients is younger than that of non-Malay patients (70.3 years vs 73.2 years,  $P = 0.235$ ). Patients with more severe HL use their HA for longer periods each day. A total of 45.8% of patients with severe HL use HA for more than 7 hours daily (vs 25.3% for 4 to 7 hours, 22.5% for <4 hours,  $P = 0.016$ ).

### **Discussion & Conclusion:**

Younger patients presented with milder degree of hearing loss. Malay patients tend to present with more severe hearing loss. Severity of hearing loss led to longer daily usage of HA.

## Cross Diagnostic Comparisons of Quality of Life Between Schizophrenia and Bipolar Disorder Patients: Similar More than Dissimilar

**MY SUM<sup>1</sup>, CN KUSWANTO<sup>1</sup>, K SIM<sup>1</sup>**

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

### Introduction:

Data are wanting on cross diagnostic comparisons of quality of life (QOL) within psychotic spectrum conditions in view of its impact on and interaction with psychosocial functioning. This study examines QOL differences and predictors between schizophrenia (SZ) and bipolar disorder (BD). Based on extant literature, we hypothesised that healthy controls will report higher QOL than patients, there will be no difference in QOL between patient groups, and that age, psychopathology, and psychosocial functioning predict QOL in our patients.

### Methods:

A total of 222 subjects (44 BD, 122 SZ, 56 healthy controls), matched for sex and age, were assessed on QOL, psychosocial functioning and psychopathology using the WHOQOL-Bref, GAF, and PANSS respectively. Multiple linear regression was used to determine predictors of QOL.

### Results:

Healthy controls reported significantly higher QOL than patients in all domains of QOL: physical health,  $F(2,219) = 9.294, P < .00001$ , psychological,  $F(2,219) = 9.670, P < .0001$ , social relationships,  $F(2,219) = 14.206, P < .0001$ , and environment,  $F(2,219) = 13.788, P < .0001$ , overall perception of QOL,  $F(2,219) = 8.872, P < .0001$ , and health satisfaction,  $F(2,219) = 5.888, P < .01$ . BD patients had significantly higher QOL than SZ patients in environment domain,  $t(164) = -2.680, P < .01$ . Better psychosocial functioning, older age, being married and longer years of education, not diagnosis, are associated with higher QOL, while more severe psychopathology and higher antipsychotics dosage, with lower QOL.

### Discussion & Conclusion:

Patients with SZ and BD are equally affected in their QOL. The association of psychosocial functioning and psychopathology with QOL in patients behooves greater clinical attention to optimise management of these crippling psychotic spectrum disorders.

## **Survey of Current Practices in Perioperative Management of Functional Endoscopic Sinus Surgery (FESS) Patients and a Review of Literature**

**CG GOH<sup>1</sup>, KT LOKE<sup>2</sup>**

<sup>1</sup>*National University of Singapore, Singapore, <sup>2</sup>Khoo Teck Puat Hospital, Singapore*

### **Introduction:**

Functional endoscopic sinus surgery (FESS) has become the mainstay treatment for recalcitrant nasal polyposis (CRSwNP) and chronic rhinosinusitis (CRSsNP). It is widely acknowledged that meticulous pre and postoperative care is important in producing good functional outcome. However, conclusive evidence or guidelines regarding the perioperative management of FESS patients are lacking. The aim of this study is to survey the pre and early postoperative management protocols currently used by otolaryngologist and to compare the differences in management between patients with chronic rhinosinusitis, nasal polyposis and revision FESS.

### **Methods:**

A cross-sectional survey was delivered by hand/postal to 110 otolaryngology consultants registered under the Singapore Medical Council. The questionnaire was devised to ascertain the medications used pre and postoperative management of patients undergoing FESS for CRSwNP, CRSsNP and recurrent nasal polyposis.

### **Results:**

From the data collected, we observed some notable patterns in the perioperative management of FESS patients. Intranasal steroids, oral antibiotics and nasal irrigation are commonly prescribed preoperatively and were often continued postoperatively. Nasal packing is commonly used in the immediate postoperative period. Pre and postoperative oral steroids were used more often in patients undergoing FESS for NP and revision FESS. It does not appear that surgeons are more aggressive in their perioperative management of revision FESS patients.

### **Discussion & Conclusion:**

In conclusion, although no consensus currently exists, this survey study demonstrates that there are not only certain patterns in the perioperative management of FESS patients but also consistent differences between the management of NP patients, CRS patients and revision cases.

## Effect of Traditional Chinese Medication on Singaporean Children with Attention Deficit Hyperactivity Disorder

**W LIANG<sup>1</sup>, SH ONG<sup>1</sup>, Y XIE<sup>1</sup>**

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

### Introduction:

The side effects of methylphenidate have led clinicians to explore alternative treatments for attention deficit hyperactivity disorder (ADHD). This ongoing observational study examines the effect of a traditional Chinese medicine (TCM) herbal formula on ADHD and related behaviours.

### Methods:

One-hundred participants aged 6 to 12 who meet the diagnostic criteria for ADHD and agree to initiate TCM treatment will be recruited. Participants will consume the herbal mixture twice daily for 3 months and undergo assessments at months 0, 3 and 6. Behavioural changes will be detected using the Children's Global Assessment Scale (CGAS), Clinical Global Impressions-Severity (CGI-S) and Improvement (CGI-I) scales as well as the Child Behavior Checklist (CBCL) and ADHD Rating Scale-IV (ADHD-RS-IV). Currently, 17 participants have completed the study.

### Results:

Preliminary analyses revealed significant differences in mean scores across all time points on the CGAS ( $P < 0.001$ ), CGI-S ( $P < 0.001$ ), ADHD-RS-IV Inattention subscale ( $P = 0.001$ ), ADHD-RS-IV Hyperactivity-Impulsivity subscale ( $P < 0.001$ ) and all CBCL scales ( $P < 0.001$ ). No significant differences were found in the CGI-I scores. Pairwise comparisons between months 0 and 3 as well as months 0 and 6 indicated significant improvements in mean scores on all scales except the CBCL Withdrawn/Depressed subscale. Scores did not differ significantly for all scales between months 3 and 6.

### Discussion & Conclusion:

Preliminary results suggest that the TCM formula reduces ADHD symptoms and related behaviours. Furthermore, its effects are sustained for 3 months after discontinuation. TCM may prove to be an effective alternative to stimulant medication. Future studies could involve more rigorous designs and other TCM interventions as possible treatment modalities for ADHD.

## **Pilot Study of Prevalence and Potential Predictors of Rapid Tranquilisation in a Psychiatric High Dependency Unit**

**D YEO<sup>1</sup>, AK GNOSH<sup>1</sup>, R JACOB<sup>1</sup>**

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

### **Introduction:**

This study aims to assess the prevalence and risk factors for rapid tranquilisation (RT) in HDU. It is a retrospective study looking at a 3-month period in 2012. Data from medical records including demographic and clinical factors were obtained and the prevalence of rapid tranquilisation episodes obtained from the case notes were analysed.

### **Methods:**

Case records of 74 patients admitted in the high dependency unit for 3 months in 2011 were reviewed and the data collection completed. Statistical analysis of the data was done using SPSS 18.

### **Results:**

There was no statistical difference between the group receiving rapid tranquilisation and the group not receiving rapid tranquilisation with regard to sociodemographic variables. Both the groups were found to be similar. There was no specific diagnosis that would make a patient more likely to receive rapid tranquilisation in the HDU. Patients who did not receive RT had a higher number of hospitalisations compared to those who received RT ( $P = 0.003$ ). RT patients had a higher mean duration of stay (9.1 days) as compared to control without RT (4.6 days),  $P = 0.001$ .

### **Discussion & Conclusion:**

The mean BPRS scores for both the HDU patients that received RT and the patients that did not receive RT are not different significantly both at admission and at time of discharge from HD. This suggests that other factors in the HDU are responsible for lowering the BPRS scores of that RT is not a significant factor in this.



## Clinical Outcome of a Longitudinal Cohort of Patients with Nasopharyngeal Carcinoma Treated in a Multiethnic Society in Singapore

**HW MAK<sup>1</sup>, SH LEE<sup>1</sup>, IW THAM<sup>2</sup>, CS TAN<sup>2</sup>, BC GOH<sup>2</sup>, T LOH<sup>2</sup>, CM LIM<sup>2</sup>**

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>National University Hospital, Singapore

### Introduction:

This study aims to evaluate the clinical outcome and identify predictors for survival and recurrence of patients with nasopharyngeal carcinoma in Singapore.

### Methods:

Retrospective chart review of 303 patients with nasopharyngeal carcinoma was performed. Survival and recurrence rates were analysed and predictive factors were identified using Cox regression model.

### Results:

Our cohort comprised 221 males (72.9%) and 82 females (27.1%) with a median age of 50 years. There were 275 Chinese (90.8%), 23 Malays (7.6%), and 5 of other ethnic groups (1.7%). The 3-year and 5-year overall survival (OS) and disease-specific survival (DSS) rates were 80.0%, 71.1%, and 84.0%, 78.2% respectively. Age >50 ( $P = 0.009$ , CI, 1.15 to 2.61), N3 disease ( $P = 0.001$ , CI, 1.59 to 6.11), and metastatic disease ( $P < 0.001$ , CI, 2.21 to 6.74) were independently associated with poor OS. There was no difference in the OS and DSS among Chinese and other ethnic groups ( $P = 0.152$  and  $P = 0.075$  respectively). Fifty-one patients (18.5%) experienced locoregional recurrence (LRR) and 46 (16.7%) distant failure (DF) after definitive treatment. The mean time to LRR or DF was 30.5 (CI, 24.8 to 36.2) and 26.3 (CI, 21.2 to 31.3) months respectively ( $P = 0.246$ ). No predictive factors were associated with LRR. However, N3 disease (H.R. 6.77,  $P < 0.001$ , CI, 2.58 to 17.73) was independently associated with DF. Median survival for patients with LRR was 93 months (CI, 66.8 to 119.2) and 41 months for DF ( $P < 0.001$ , CI, 27.4 to 54.6).

### Discussion & Conclusion:

Ethnicity is not a predictive factor for clinical outcome among NPC patients. However, N3 disease is independently associated with distant failure, which confers a worse survival than locoregional recurrence. More effective treatment regime may be warranted in this group of patients.

## Value of Hearing Questionnaire in Predicting Hearing Impairment

**WMW ONG<sup>1</sup>, HY ZHANG<sup>1</sup>, JS LIE<sup>1</sup>, EC TAN<sup>1</sup>, Q ZHANG<sup>2</sup>, EC HO<sup>3</sup>**

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>University of New South Wales, Australia, <sup>3</sup>Tan Tock Seng Hospital, Singapore

### Introduction:

The objective of the study is to evaluate sensitivity and specificity of Screening Version of the Hearing Handicap Inventory for the Elderly (HHIE-S) and Hearing Handicap Inventory for Adult (HHIA) questionnaires in screening for hearing impairment amongst the general population in Singapore.

### Methods:

A review of 91 participants at screening events organised by a tertiary hospital in 2010 and 2013 was performed. Information recorded include HHIE-S results for participants >60 years, HHIA results for participants <60 years and Pure Tone Audiogram (PTA) at 0.5, 1, 2, 4kHz done by an experienced audiologist. Higher scores in the questionnaire (10 to 40) are considered strongly suspicious of moderate to severe hearing impairment.

### Results:

A total of 55 participants filled the HHIA questionnaire, while 36 participants filled the HHIE questionnaire. Defining hearing impairment as PTA average >25dB in the better hearing ear (mild hearing loss), the HHIA questionnaire yielded a sensitivity and specificity of 54.5% and 63.6% respectively. If defined as >40dB (moderate hearing loss), it yielded a sensitivity and specificity of 100% and 61.1% respectively. Defining hearing impairment as >25dB, the HHIE questionnaire yielded a sensitivity and specificity of 47.6% and 46.2% respectively. If defined as >40dB, it yielded a sensitivity and specificity of 75.0% and 53.1% respectively.

### Discussion & Conclusion:

Findings show that HHIA and HHIE-S questionnaires are poor predictors for mild hearing loss. However, it can be useful for screening for moderate hearing loss due to its high sensitivity. As specificity is low, all patients with high scores need formal audiogram to confirm hearing levels.

## Usefulness of WHODAS 2.0 (Quality of Life Assessment) in Detecting Changes in Quality of Life in Hearing-Impaired Individuals

**WMW ONG<sup>1</sup>, KX LI<sup>1</sup>, HY ZHANG<sup>1</sup>, Q ZHANG<sup>2</sup>, EC HO<sup>3</sup>**

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>University of New South Wales, Australia, <sup>3</sup>Tan Tock Seng Hospital, Singapore

### Introduction:

The objective of this study is to evaluate the relationship of pure tone audiogram (PTA) score, screening questionnaire and quality of life assessment via World Health Organisation Disability Assessment Schedule 2.0 (WHODAS 2.0).

### Methods:

A retrospective review of 56 participants recruited for hearing screening from 29-30 May 2013 was done. Information recorded Hearing Handicap Inventory for Elderly Screening (HHIE-S) for participants >60 years, Hearing Handicap Inventory for Adults (HHIA) for <60 years, WHODAS 2.0 questionnaire and PTA (0.5, 1, 2, 4 kHz) result. WHODAS 2.0 was measured as a total global score and specific domain scores for 6 domains: cognition, mobility, self-care, getting along, life activities and participation.

### Results:

The mean total WHODAS score was 42.3 (range, 32 to 96, SD: 14.5). Mean specific domain scores include: cognition at 8.9 (range, 6 to 19, SD: 3.6), mobility at 6.6 (range, 5 to 17, SD: 3.02), self-care at 4.4 (range, 5 to 12, SD: 1.53), getting along at 6.1 (range, 5 to 17, SD: 2.49), life activities at 5.14 (range, 4 to 14, SD: 2.54). There was no significant correlation found between total WHODAS score and PTA score of better ear ( $P = 0.322$ ) and between domain specific WHODAS score and PTA score, except for the getting along domain ( $r = 0.26$ ,  $P = 0.031$ ). There was also no significant correlation found between HHIA or HHIE and any WHODAS score (all  $P > 0.05$ ).

### Discussion & Conclusion:

WHODAS 2.0 may not be sensitive enough in detecting quality of life change in hearing-related disability. Future study with larger population may be required to better determine utility of WHODAS 2.0 in hearing disability.

## A 13-Year Review of First-time Hearing Aid Users from a Singapore Tertiary General Hospital

**MWW ONG<sup>1</sup>, HY ZHANG<sup>1</sup>, KX LI<sup>1</sup>, SVR MEDAPATI<sup>2</sup>, EC HO<sup>2</sup>**

<sup>1</sup>*National University of Singapore, Singapore,* <sup>2</sup>*Tan Tock Seng Hospital, Singapore*

### **Introduction:**

This study aims to describe the demographic characteristics of first-time hearing aid users from the Otorhinolaryngology Department of Tan Tock Seng Hospital from January 2001 to April 2013.

### **Methods:**

A retrospective study of 872 patients was carried out on existing audiometric records (ranging from 2001 to April 2013) from the Otorhinolaryngology Department, Tan Tock Seng Hospital. The data collected include patient's demographic, baseline average pure tone audiometry thresholds and hearing aid characteristics.

### **Results:**

The mean age of first fitting is 69.6 years (range, 10 to 109, SD: 13.7) and 50.9% were males and 49.1% were females. The majority were Chinese (86.5%), with 4.5% Malays, 6.7% Indians and 2.4% Others. With regards to hearing loss, 98.1% had gradual onset while 1.6% had sudden onset. For type of hearing loss, 0.3% was conductive, 75.3% was sensorineural, while 24.1% was mixed. The mean PTA score for the right was 64.7 (range, 4 to 120, SD: 19.2), while the mean PTA score for the left was 64.9 (range, 10 to 120, SD: 18.6); 5.4% had mild, 27.6% had moderate, 37.1% had moderate-severe, 20% had severe and 9.9% had profound hearing loss. For hearing aids, 69.8% used behind-the-ear type, 6.8% used in-the-ear type, 10.7% used in-the-canal type, 10.6% used completely-in-canal type, 0.5% used open fit type while 1.6% used canal-receiver-technology. Of the patients, 61.6% had fitted one ear while 15.3% had fitted both ears. The mean cost of hearing aids per person was \$2038.87.

### **Discussion & Conclusion:**

This review sheds light on the profile of hearing aid users in our hospital and needs of our patients.

## Utility of Self-Perception of Hearing Loss Questions in Predicting Hearing Impairment

**WMW ONG<sup>1</sup>, HY ZHANG<sup>1</sup>, KX LI<sup>1</sup>, Q ZHANG<sup>2</sup>, EC HO<sup>3</sup>**

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>University of New South Wales, Australia, <sup>3</sup>Tan Tock Seng Hospital, Singapore

### Introduction:

The objective of this study is to determine usefulness of self perception of hearing loss as a screening tool for hearing loss amongst the general population in Singapore.

### Methods:

A retrospective review of 56 participants recruited for hearing screening held in Tan Tock Seng Hospital from 29-30 May 2013 was done. Information recorded includes self perception of hearing, perception of hearing severity and PTA (0.5, 1, 2, 4kHz) done by an experienced audiologist.

### Results:

The mean PTA score for the better ear was 23 (range, 8 to 66, SD: 11). Thirty percent of participants perceived to have abnormal hearing, of which 18% perceived mild, 7% perceived moderate and 5% perceived severe impairment. There is no significant difference of mean PTA score between those who perceived to have normal hearing and those who perceived to have abnormal hearing ( $P = 0.129$ ). When comparing amongst perceived severity, those with perceived severe hearing impairment (mean PTA: 50) was found to have higher mean PTA score than those with perceived mild hearing impairment (mean PTA: 22) ( $P = 0.001$ ). If hearing loss is defined as  $>25\text{dB}$  in the better ear, self perception question has a sensitivity of 29% and specificity of 64%. If defined as  $>40\text{dB}$ , the sensitivity is 75% while the specificity is 72%.

### Discussion & Conclusion:

Questions on self perception of hearing loss may be helpful in screening for moderate to severe hearing loss due to its relatively high sensitivity. Whilst self perception of severity does give an indication of the degree of hearing loss, it does not replace the need for a formal PTA to confirm it.

## A 13-Year Review of First-Time Hearing Aid Users from a Singapore Tertiary General Hospital—Age and Gender Analysis

**HY ZHANG<sup>1</sup>, MWW ONG<sup>1</sup>, KX LI<sup>1</sup>, SVR MEDAPATI<sup>2</sup>, EC HO<sup>2</sup>**

<sup>1</sup>*National University of Singapore, Singapore*, <sup>2</sup>*Tan Tock Seng Hospital, Singapore*

### **Introduction:**

This study aims to study associations between age and gender with hearing loss, self reported hearing aid usage and hearing aid characteristics.

### **Methods:**

A retrospective study of 872 patients was carried out on existing audiometric records (ranging from 2001 to April 2013) from Tan Tock Seng Hospital. The following variables were also collected: demographic data (age, gender), pure tone audiometry (PTA) thresholds (0.5, 1, 2, 4 kHz), hearing loss information (onset, type, severity) and hearing aid characteristics (type, side, cost). Age was categorised into age groups: <30 years, 30 to 44 years, 45 to 59 years, 60 to 74 years and >75 years.

### **Results:**

In terms of gender, there was no statistically significant difference found for mean PTA score, type of hearing loss, degree of hearing loss between male and female ( $P > 0.05$ ). When stratified by age group, for those >75 years, females (mean: 58.3) had a higher mean PTA score than males (mean: 55.4) ( $P = 0.029$ ). Females are 1.36 times more likely to report regular usage than males ( $P = 0.028$ ). Age analysis correlation was found between age and mean PTA of the better ear ( $r = 0.203$ ,  $P = 0.000$ ). Variables showing statistically significant relationship with age groups include onset of hearing loss ( $P = 0.000$ ), type of hearing loss ( $P = 0.000$ ), degree of hearing loss ( $P = 0.000$ ), type of hearing aid ( $P = 0.000$ ), side of hearing aid fitted ( $P = 0.030$ ) and cost of hearing aid ( $P = 0.000$ ).

### **Discussion & Conclusion:**

Our results provide new insights on our patients to improve management of hearing. Efforts on improving hearing aid usage should be targeted more on male patients due to irregular usage.

## **“I Have Taught, but Have You Learnt?”—The Perceived Misalignment of Clinical and Educational Utility of Multidisciplinary Rounds**

**YH ONG<sup>1</sup>, I LIM<sup>1</sup>, KT TAN<sup>2</sup>, WS LIM<sup>2</sup>, M CHAN<sup>2</sup>**

<sup>1</sup>*National Healthcare Group HQ, Singapore*, <sup>2</sup>*Tan Tock Seng Hospital, Singapore*

### **Introduction:**

Multidisciplinary rounds (MDRs) provide a platform for the interprofessional team to establish treatment priorities, coordinate care and effect discharge planning. However, there is limited understanding of its perceived educational value among different members of the interprofessional team. We studied how different healthcare professionals perceive the clinical utility and the educational value of MDRs in an acute geriatrics ward.

### **Methods:**

We surveyed 78 members (34.6% doctors, 30.8% nurses, 33.3% allied health professionals). The questionnaire comprised demographic variables and satisfaction with the clinical utility and educational value of MDRs measured on a 5-point Likert scale (5 = very satisfied/important, 1 = not satisfied/important). To further elicit their views, we interviewed 55 members of MDRs. Quantitative and qualitative data were analysed using SPSS statistics programme and Nvivo respectively. A total of 235 pages of transcribed interview data were analysed thematically.

### **Results:**

There was a significant misalignment in perceived clinical utility compared to perceived educational value [mean (SD): 4.32 (SD =  $\pm 0.78$ ) vs 3.68 (SD =  $\pm 0.78$ ),  $P < 0.05$ ]. Analysis of qualitative data revealed distinct differences in perceptions of educational value across professional groups and level of seniority. When describing the perceived educational value of MDRs, allied health professionals expected to learn more cross-disciplinary knowledge; senior doctors and nurses emphasised acquisition of soft skills and teamwork skills; whereas junior doctors and nurses placed a premium on domain-specific learning.

### **Discussion & Conclusion:**

We noted an interesting dissociation between perceived educational values with clinical utility. This misalignment appears to be attributable to differences in perception of educational value across professional groups and seniority.

## **Deconstructing the General Medical Ward Rounds through Simulation—“SimRounds” —A Novel Initiative for Medical Students Designed to Enhance Clinical Transitions and Interprofessional Collaboration**

**R ACHARYA<sup>1</sup>, KY THAM<sup>1</sup>, E TAN<sup>1</sup>, KM AMICO<sup>2</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore,* <sup>2</sup>*Brigham & Women’s Hospital, Massachusetts General Hospital, United States*

### **Introduction:**

General medicine ward rounds are fundamental to patient care and physician training and comprise a complex set of exercises within interdisciplinary teams. Engaging medical students is important yet challenging, as their learning transitions from classroom to bedside. They may become passive observers, especially if patient care is prioritised over student teaching. With SimRounds, we sought to increase students’ comfort with ward rounds, enabling active learning and appreciation for inter-professional collaboration.

### **Methods:**

In the simulation centre, ward rounds including handover (“huddle”) between nurses and doctors (10 minutes), prerounds with standardised patients (one hour), and rounds with consultants (one hour) were simulated. Participants included 13 third year medical students, 15 nursing staff, 2 consultants and 10 standardised patients.

### **Results:**

Semi-standardised focus groups with participating consultants, medical students, nurses and nursing students were conducted. Discussion points centred on how simulation was helpful, achieved objectives, evaluation methods and areas for improvement. All participants concluded that SimRounds was overwhelmingly successful. Medical students indicated the experience provided stress-free wards introduction, cases met learning needs, and they appreciated “patient” feedback. Nurses found SimRounds a safe environment which built confidence in speaking up, enhanced communication, and improved their understanding of doctors’ expectations.

### **Discussion & Conclusion:**

Simulated ward rounds has the potential to address many goals and objectives for different learners in healthcare. Although initially targeting medical students, all participants achieved new learning, especially pertaining to inter-professional collaboration



## Educational “Engineering” to Improve Readiness for Interprofessional Learning in a Primary Care Setting

**K PREDEEBHA<sup>1</sup>, CC YAN<sup>2</sup>, MY NG<sup>2</sup>, YF SIM<sup>2</sup>, CS TOH<sup>2</sup>, LC CHNG<sup>3</sup>**

<sup>1</sup>National Healthcare Group, Singapore, <sup>2</sup>National Healthcare Group Polyclinics, Singapore,

<sup>3</sup>Assisi Hospice, Singapore

### Introduction:

This study aims to evaluate the utility of a blended interprofessional workshop (incorporating andragogy and interprofessional educational approach) on the readiness for interprofessional learning among diverse healthcare professionals within infection control teams in 9 polyclinics.

### Methods:

The blended infection control workshop tapped on participants’ prior learning and used a “flip” classroom concept. The seating arrangements, scenarios and infection control teaching approach were “engineered” to encourage learning with, from and about each other about the infection control best practices. Adapted validated pre- and post-workshop questionnaires evaluated participants’ receptiveness towards interprofessional learning.

### Results:

A total of 40 participants from 9 polyclinics attended the workshop. Wilcoxon signed-rank test was performed to evaluate the mean score differences pre and postworkshop. Overall there was improved readiness for interprofessional learning among all participants as evidenced by overall mean scores obtained i.e. 81.43 preworkshop (95% confidence interval (CI): 60 to 98) vs 84.44 postworkshop (95% CI, 68 to 97,  $P < 0.05$ ). This positive shift was seen in their interprofessional subdomains including: (i) teamwork and collaboration [mean scores 86.7 preworkshop (95% CI, 60 to 100) vs 90.29 postworkshop (95% CI, 79 to 100,  $P < 0.05$ )]; and (ii) patient-centredness [mean scores 74.62 preworkshop (95% CI, 20 to 98) vs 79.62 postworkshop (95% CI, 30 to 98,  $P < 0.001$ )].

### Discussion & Conclusion:

This study showed that engineering an educational infection control work-related workshop to incorporate andragogy and interprofessional competencies/approaches, can improve the readiness for interprofessional learning among teams of diverse healthcare professionals. This, we hope can translate to greater collaborative practice within team members in their work settings.

## **Burnout, Challenges and Supportive Factors in Hospital Doctors**

**L TEOH<sup>1</sup>, H RAHMAN<sup>1</sup>, NWM CHEW<sup>1</sup>, J SINGH<sup>1</sup>**

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

### **Introduction:**

Burnout is a multidimensional syndrome of “emotional exhaustion, depersonalisation and reduced personal accomplishment that can occur among individuals who do ‘people work’”. Clinically significant burnout occurs in 25% to 60% of doctors, impacting both wellbeing and career satisfaction. The Maslach Burnout Inventory (MBI) is the gold standard burnout measure which comprises these 3 subscales: (i) emotional exhaustion; (ii) depersonalisation; and (iii) personal accomplishment. Clinically significant burnout is indicated by high scores in the emotional exhaustion or depersonalisation subscales. The aims of this study are to: (i) identify the prevalence of clinically significant burnout in hospital doctors; and (ii) identify supportive factors and challenges experienced by doctors. We hypothesised that the prevalence of clinically significant burnout in our hospital is comparable to that found internationally (25% to 60%).

### **Methods:**

Questionnaires were distributed to doctors working at Tan Tock Seng Hospital, Singapore between September 2011 and June 2013. The questionnaire comprised: (i) sociodemographic and work related background questions; (ii) MBI-human services survey; and (iii) open-ended questions on their challenges faced and supportive factors.

### **Results:**

A total of 109 doctors responded to the survey. Of these, 55.05% of doctors had clinically significant burnout. Family networks, collegiality and religious faith were commonly cited supportive factors. Challenges raised included long working hours, medico-legal issues and multitasking of clinical with non-clinical roles.

### **Discussion & Conclusion:**

Our study findings underscore the need for primary and secondary prevention of burnout in doctors. Knowledge of job burnout, importance of self care, and ways of enhancing personal well-being should be addressed in both under- and post-graduate medical education. The information obtained will also assist the development of support programmes for our hospital doctors.

## **Collaboration Between Junior Doctors and Nurses in the General Wards Setting: A Call for Interprofessional Education and Organisational Support**

**C TANG<sup>1</sup>, SY LIAW<sup>1</sup>, S CHAN<sup>1</sup>, WT ZHOU<sup>1</sup>, N BARR<sup>2</sup>, SY LEE<sup>2</sup>**

*<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>National University Hospital, Singapore*

### **Introduction:**

Effective collaboration between doctors and nurses is of great importance to provide safe and quality patient care. However, little is known about collaboration among junior doctors and nurses in the general wards. This study aimed to explore the collaboration experiences of junior doctors and nurses in the general wards, and identify possible strategies to improve interprofessional collaboration.

### **Methods:**

A qualitative descriptive study was conducted. Eleven junior doctors and 8 junior nurses with 6 months to 3 years of working experience in the general wards participated in the study. Semi-structured interviews were conducted. Content analysis was used to analyse the data.

### **Results:**

Four themes emerged: working towards better patient care, struggling to cope, interpersonal relationships and nurses to step up. While working collaboratively, junior doctors and nurses experienced a lack of open and clear communication. Junior doctors appeared to have a lack of understanding on the nurses' professional roles. Both professions struggled to cope with heavy clinical workload and organisational constraints. Nurses frequently encountered doctors who were less willing to recognise their contributions towards patient care. Finally, nurses need to step up and be given more autonomy over patient care.

### **Discussion & Conclusion:**

Our findings call for an urgent need of interprofessional education and greater organisational support, to build closer collaboration between doctors and nurses. IPE should begin at the preregistration level and promote mutual understandings of both professions' roles in patient care. The organisation should focus on improving interprofessional communication and support nurses' participation in ward rounds.

## **Terra Firma Forme Dermatosis (TFFD) and the “Alcohol Wipe Sign”**

**CC OH<sup>1</sup>, WS CHONG<sup>1</sup>**

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

### **Introduction:**

This study aims to present a case series of 5 cases of terra firma forme dermatosis (TFFD), an under recognised skin condition, presenting to our dermatology centre between 2012 and 2013. This condition has yet to be reported in the Asian Chinese population.

### **Methods:**

All patients presented to the dermatologist for persistent reticulated brown patches on their skin. It was cosmetically unacceptable to the patients and the parents. They have tried various cleansing methods which were ineffective.

### **Results:**

Rubbing isopropyl alcohol swabs on the affected areas demonstrated clearance of the brown pigmented patches in all our cases.

### **Discussion & Conclusion:**

Because of the skin appearance, TFFD can be a cause for cosmetic concern, especially for the parents of the affected child. The diagnosis of TFFD is confirmed by forceful rubbing with a gauze pad immersed into 70% isopropyl alcohol or ethyl alcohol. Reappearance is unusual once the lesion is removed by alcohol wipe. Prophylactic weekly application of alcohol has been reported to be of use in resistant or recurrent cases. Recognition of this condition can assist physicians in making diagnosis and therapy with a simple alcohol wipe, preventing further unnecessary tests for patients.

## Exploring Stereotypes in Healthcare Professions

**K BATRA<sup>1</sup>, J THISTLETHWAITE<sup>2</sup>**

<sup>1</sup>National Healthcare Group HQ, Singapore, <sup>2</sup>The University of Queensland, Australia

### Introduction:

Stereotypes are beliefs in which groups of people (e.g. professional group) are associated with certain traits. Intergroup behaviours could be guided by established stereotypes and may serve as a means to deal with an outgroup efficiently by expending minimum energy. Stereotypes act as shortcuts for healthcare professionals to cope with the demands placed on them during their interactions with patients and other professionals. However, stereotypes may generate negative expectations of another group's attitudes and behaviours. Therefore, the aim of this pilot study was to understand both the negative and positive perceptions of doctors and nurses by healthcare professionals in Singapore.

### Methods:

Forty participants from different professional backgrounds (doctors, nurses, allied health professionals, administrators, social workers) were asked to choose 3 negative and 3 positive adjectives out of 10 options describing both nurses and doctors.

### Results:

The top 3 negative adjectives/phrases chosen to describe doctors were: arrogant, detached, not a team player; and to describe nurses were: lacks leadership, lacks initiative, low confidence. The top 3 positive adjectives/phrases chosen to describe doctors were: knowledgeable, confident, professional; and to describe nurses were: compassionate, dedicated, team player.

### Discussion & Conclusion:

This pilot study provided us with an understanding of the perceptions of doctors and nurses by healthcare professionals. The next step is to explore whether the healthcare professionals have an implicit bias towards their own professional group which may affect their interactions with others. We are currently in the process of furthering the research to investigate implicit attitudes among doctors and nurses using implicit association test.

## Health Sciences Virtual Hospital Game as a Learning Tool in Nursing Education

**GM KOH<sup>1</sup>, EC LIM<sup>1</sup>, WK CHUA<sup>1</sup>, SJ KWONG<sup>1</sup>, WC LAM<sup>1</sup>, CH PHANG<sup>1</sup>**

<sup>1</sup>*Ngee Ann Polytechnic, Singapore*

### **Introduction:**

A game-based, learner centred strategy named HS Virtual Hospital game was developed to enhance mastery of nursing sciences content for the students doing the Diploma in Health Sciences (Nursing) at Ngee Ann Polytechnic. The game involves a virtual hospital where student provides holistic nursing care of patients with 7 health conditions. The player gains points with the correct interventions. This time-sensitive game is a good revision tool and helps to consolidate students' learning. We hypothesised that HS Virtual Hospital game promotes students' learning of nursing knowledge and skills.

### **Methods:**

The game was successfully deployed to all year 2 and year 3 students. A cross-sectional survey was conducted to evaluate its effectiveness on students' learning.

### **Results:**

A total of 451 nursing students, mean age of  $20.3 \pm 2.1$  years old, participated in the survey. Majority were year 2 students. Responses toward the game have been favourable: 90.2% of the students agreed that the game helped them understand the topics covered. 92.5% agreed that the game helped to stretch their thinking, 81.4% agreed that the game motivated their interest in the module. There is a statistically significant strong correlations between visuals design and learning ( $r = 0.801$ ,  $P < 0.001$ ) and between activities and learning ( $r = 0.793$ ,  $P < 0.001$ ).

### **Discussion & Conclusion:**

The HS Virtual Hospital game helped to promote learning and replicate real life scenarios within a safe environment for students to learn. Healthcare games can be adopted as an innovative and effective tool to support learning in healthcare education.

## Facilitating Learning Online so the E-Patient Does Not Die!

**R ACHARYA<sup>1</sup>, NY KOH<sup>1</sup>, ZH CHEW<sup>1</sup>, NK KOH<sup>2</sup>**

<sup>1</sup>Tan Tock Seng Hospital, Singapore, <sup>2</sup>National Institute of Education, Singapore

### **Introduction:**

The ability to handle acute medical emergencies is a core curriculum all doctors must have. Ensuring this is well taught is important for all residents. Difficulty in attaining 100% attendance with the current didactic classroom teaching approach, due to exigencies of service and duty hour constraints motivated faculty to explore e-learning and investigating: Would an online e-learning module on core acute medicine lead to easy, universal access by residents, in a safe environment? Would blended learning improve educational outcomes?

### **Methods:**

An interactive and evaluative online module was designed and distributed via our learning management system. A total of 13 acute medicine interactive real life scenarios with multiple choice questions were created. Content was provided by content experts. Face-to-face sessions with dedicated faculty to clear further doubts followed. A total of 104 residents attempted this module within 1 month of joining the hospital.

### **Results:**

An improvement in the attendance of face-to-face sessions and high feedback scores on meeting learning objectives were seen. Focused group discussions revealed that the blended approach to learning was well received. They appreciated the face-to-face discussions following the e-learning for clarifications and reinforcement of their learning. Faculty appreciate that prediagnostic test of their entry level (pretest scores) helped in addressing the training gap.

### **Discussion & Conclusion:**

Better attendance, high feedback scores and focused group sessions suggest improved educational outcomes. Important questions remain; learner's preferred learning environment and attitudes towards e-learning and more importantly, whether this learning mode translates to improved patient outcomes warrants further study.

## Application of the RIME Framework for Education Administrators' Competencies

**Y NG<sup>1</sup>, WS LIM<sup>2</sup>**

<sup>1</sup>National Healthcare Group HQ, Singapore, <sup>2</sup>Tan Tock Seng Hospital, Singapore

### **Introduction:**

Before 2010, administration of medical educational programmes in Singapore has traditionally been the “part-time job” of departmental secretaries. However, with the introduction of postgraduate residency programmes and their ownership by each sponsoring institution, and with it the mammoth tasks of programme management and delivery, it was no longer reasonable or possible for the departmental secretaries to do it as a “part-time job”. To systematically engage in tasks such as resident tracking, assessment and programme evaluation as well as accreditation of programmes, fulltime programme coordinators (PCs) were hired by sponsoring institutions. The presentation will focus on how NHG Residency developed a process to evaluate the performance and progression of programme coordinators in a systematic way using best evidence practices.

### **Methods:**

The RIME framework was used to define the developmental stages of PCs as a reporter, interpreter, etc., mapped against the competencies expected of PCs in NHG Residency. The matrix developed defined the expectations for each competency at each stage and formed a framework for the development of the PCs.

### **Results:**

Programme directors (co-reporting officers (ROs) of the PCs), the PCs and the institutional coordinator (also RO of the PCs) have a common frame of reference for evaluating the performance of the PCs, reducing inter-rater differences and allowing meaningful feedback to be given to PCs for their development.

### **Discussion & Conclusion:**

The framework has thus far resulted in more objective evaluation of the programme coordinators in NHG Residency but more importantly, started meaningful discussions about the development of the programme coordinators as professionals for education administration.



## Factors Contributing to Acculturation of Migrant Nurses in Singapore—A Cross-Sectional Survey

**YS GOH<sup>1</sup>, MF CHAN<sup>1</sup>, SWC CHAN<sup>1</sup>**

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

### Introduction

Migration is a stressful situation with migrant nurses needing to work with a different expectation as a nurse, which may be different from their own country. Individual differences determine whether a person accepts new cultural values, as some cultures are more tolerant of multicultural differences than others. This study aims to explore the acculturation levels of migrant nurses in Singapore and to identify factors associated with their acculturation levels.

### Methods:

This cross-sectional descriptive survey was conducted on a stratified random sample of 814 migrant nurses (94% response rates) between June 2012 and December 2012 in 2 hospitals in Singapore. Demographic characteristics, level of acculturation and data on 6 variables were collected: job satisfaction, cultural values, ways of coping, work environment, perceived stress, and quality of life.

### Results:

A mean score of 33 (SD = 6.83, range, 12 to 60) for acculturation was found among migrant nurses which is considered average. Multiple regression showed that migrant nurses who are Malaysian ( $\beta = 0.173$ ,  $P < 0.001$ ), being older ( $\beta = 0.122$ ,  $P = 0.001$ ), with religious beliefs ( $\beta = 0.079$ ,  $P = 0.035$ ), good social support ( $P = 0.008$ ) and good working environment ( $P = 0.005$ ) reported a better acculturation score. Those who chose distancing ( $\beta = -0.142$ ,  $P = 0.001$ ), and seeks social support as a coping process ( $\beta = -0.134$ ,  $P = 0.001$ ), and those who are PRC Chinese ( $\beta = -0.286$ ,  $P < 0.001$ ), reported a poorer acculturation level.

### Discussion & Conclusion:

Many factors influenced acculturation of migrant nurses. Results from this study can help to design culturally sensitive orientation programmes for newly recruited migrant nurses.

## Bed Exit Alarm as a Novel Tool for Fall Prevention

**C LEONG<sup>1</sup>, WK NG<sup>1</sup>, I NG<sup>1</sup>, SY HOI<sup>1</sup>**

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

### Introduction:

Usage of bed exit alarm is endorsed by the Joint Commission on Accreditation of Healthcare Organization (JCAHO) as a valuable tool in fall prevention. This study aims to evaluate the accuracy of the Orion Fall Alert System (OFAS) to detect actions that suggest patients' attempts to egress from bed.

### Methods:

The study population consisted of inpatients at 3 general ward units at the Tan Tock Seng Hospital, Singapore. These patients were continuously monitored for alarm triggers and egress attempts by direct care nurses as well as placed on random observations by study investigators, for a period of 1 month. The sensitivity, specificity and negative likelihood ratio of OFAS were calculated to assess its utility and reliability in detecting patient's attempt to egress from bed.

### Results:

Thirty-three subjects were recruited for the study. A total of 231 out of 237 patient attempts at egressing from bed were detected by OFAS (sensitivity of 97.5%). There were 215 episodes of false alarms by OFAS and hence a calculated specificity of 35.5%. The calculated negative predictive value of OFAS was 95.1% illustrating the potential for this device to provide additional security for detection of patient egress from bed.

### Discussion & Conclusion:

OFAS is a reliable device with high sensitivity and negative predictive value and should be used as part of the efforts in fall prevention.

## Effectiveness of the Peer-Led Self-Management Programme for People with Schizophrenia: Preliminary Results

**Z LI<sup>1</sup>, WCS CHAN<sup>2</sup>, Y PIYANEE<sup>2</sup>**

<sup>1</sup>*Institute of Mental Health, Singapore,* <sup>2</sup>*National University of Singapore, Singapore*

### Introduction:

Peer-led self management programmes (PLSMP) have been developed to empower psychiatric patients in achieving recovery to maintain reasonable functional lives. However, there is a lack of credible research evidence with rigorous methodology. This study hypothesised that participants with schizophrenia who receive PLSMP will report significant improvements in their level of empowerment, perceived recovery, medication adherence, perceived social support and symptom severity after 6-month follow-up.

### Methods:

This study proposes a randomised controlled trial at 3 community psychiatric service centres. A sample of 122 for both control and intervention groups (power = 80% for between groups, effect size = 0.31, 2-tailed  $\alpha = 0.05$ , and estimated dropout rate of 30%) will be recruited. A PLSMP was developed and implemented in the intervention group. Self-rated and clinician-rated questionnaires were used to measure the outcomes of empowerment, medication adherence, perceived recovery, social support and symptom severity at pretest, post-test immediate, and post-test at 6-month follow-up.

### Results:

Preliminary analysis was conducted on 49 participants who have completed the study. Mean difference between immediate after intervention and baseline, and 6-month follow-up and baseline were computed. Repeated measure ANOVA was conducted. There are significant larger improvement in intervention group participants' level of empowerment [ $F(1, 47) = 22.47, P < 0.001$ ], perceived recovery [ $F(1, 47) = 21.95, P < 0.001$ ], social support [ $F(1, 47) = 9.01, P = 0.004$ ], and symptom severity [ $F(1, 47) = 42.67, P < 0.001$ ].

### Discussion & Conclusion:

The preliminary results showed positive outcomes of the PLSMP. Further results with larger sample size and qualitative report of the participants and trainers will provide more evidence on the PLSMP's effectiveness for mental health recovery.

## When Prolonged Preoperative Fasting is a Myth: A Survey Study on Elective Surgeries

**ING<sup>1</sup>, WLS TAI<sup>1</sup>**

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

### **Introduction:**

Prolonged preoperative fasting may do more harm than good such as insulin resistance postoperatively. Professional societies advocate for shorter fasting hours, supported by current evidence. This is, however, found not translated into practice. The study aims to describe the local fasting practice. We hypothesise patients are excessively fasted regardless of operating site.

### **Methods:**

Patients consecutively scheduled for orthopaedic and general surgery elective procedures between January and April 2013 were recruited for a face-to-face interview on operation day. Operation schedule, fasting instructions, fasting times and preference were collected preprocedure. Self-reported physiologic discomfort was assessed with a visual analogue scale pre and postprocedure. The study outcomes were difference in actual fasting duration and physiologic ratings between the disciplines. Analyses were performed with SPSS (Version 18.0) using Wilcoxon rank-sum test where applicable.

### **Results:**

The study involved 119 orthopaedic and 81 general surgery patients for elective procedures. The median age was 57.0 years and 65.5% classified with 'mild systemic disease'. Nearly 90% were instructed nil-per-os 12 midnight. Only 37% were advised appropriately on fasting requirement among those scheduled for afternoon operation. The median solids fasting was minimally 13 hours in both disciplines ( $P = 0.668$ ); liquids fasting 6 hours in orthopaedic and 7 hours in general surgery cases ( $P = 0.583$ ). Prepost differences in physiologic discomfort did not differ between disciplines. Only 32.5% preferred shorter fasting hours.

### **Discussion & Conclusion:**

The study showed patients were subjected to solids and clear-liquids fasting twice and thrice longer respectively regardless of operating site. A real-time scheduling information system is critical to implementing flexible fasting guidelines.

## **Efficacy of Nurse-Led Skills Training in Reducing Psychological Distress for Cancer Outpatients on Treatment in Singapore**

**CX PEH<sup>1</sup>, HA LIM<sup>1</sup>, R MAHENDRAN<sup>1</sup>, J CHUA<sup>1</sup>, ENK ANG<sup>1</sup>, EH KUA<sup>1</sup>, SE LIM<sup>2</sup>**

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>National University Health System, Singapore

### **Introduction:**

Psychological distress in cancer patients may interfere with recovery and increase patients' risk for psychiatric complications. Early intervention is therefore essential as a preventive measure. As nurses are frequently in contact with patients, nurse-led skills training may be timely in improving patients' wellbeing. The present study evaluated the outcome of nurse-led skills training in reducing distress of cancer outpatients.

### **Methods:**

Fifty-nine patients from the National University Cancer Institute, Singapore, were assessed for distress using the distress thermometer (DT) at baseline (T1) and at 1-month follow-up (T2). Patients were randomised into 2 groups: treatment with nurse-led skills training (n = 30) and treatment as usual (n = 29). Patients in the skills-training group were taught stress management and relaxation skills by nurses.

### **Results:**

We found a significant interaction between patients' distress and treatment group,  $F(1, 57) = 13.98$ ,  $Mse = 2.51$ ,  $P < 0.001$ . Patients in the skills-training group had significantly lowered mean DT scores at T2 (4.93 to 3.13),  $F(1, 29) = 17.10$ ,  $Mse = 2.84$ ,  $P < 0.001$ ,  $d = 0.069$ . Although there were no significant differences in mean DT scores at T2 for patients undergoing treatment as usual, a slight increase was observed (2.00 to 2.38).

### **Discussion & Conclusion:**

Nurse-led skills training appears to be effective in reducing distress in cancer patients after 1 month. We suggest that it may be helpful to incorporate similar services into nurses' routine practice as a preventive measure for potential psychiatric complications. Future studies with similar programmes, based on randomised controlled trials, are needed to replicate results.

## Functional Nursing Versus Primary Nursing: An Evaluation of their Impact on Patients' and Caregivers' Experience

**D. KALAIVANAN<sup>1</sup>, ABA HAMED<sup>1</sup>, BC ONG<sup>1</sup>, TL LUA<sup>1</sup>, H XIE<sup>1</sup>, YP WONG<sup>2</sup>, YH CHAN<sup>3</sup>**

<sup>1</sup>*Institute of Mental Health, Singapore,* <sup>2</sup>*Tan Tock Seng Hospital, Singapore,* <sup>3</sup>*National University of Singapore, Singapore*

### Introduction:

Nurses in the high dependency psychiatric care unit (HDPCU) played a key role in managing acutely disturbed patients in the psychiatric hospital. Nursing care may be delivered using functional nursing (FN) or primary nursing (PN). However, the impact of these 2 methods on the management of acutely disturbed patients has not been investigated. Thus, this study aimed to evaluate caregivers' and patients' experience after receiving FN and PN in the HDPCU.

### Methods:

In this comparative descriptive study, caregivers' and patients' received care at HDPCU either using FN (n = 40) or PN (n = 40). Their perception, experience and satisfaction with nursing care were assessed using Likert scale instruments. The mean differences in the scores between these 2 groups (FN vs. PN) were compared using independent samples t-tests.

### Results:

Patients who received PN had better perception and experience of nursing care than those who received FN. These differences were statistically significant,  $t(38) = 4.18$ ,  $P < 0.001$  and  $t(38) = 4.04$ ,  $P < 0.001$  respectively. Caregivers who received PN also had significantly higher satisfaction score ( $M = 18.86$ ,  $SD = 4.04$ ) as compared to patients who received FN ( $M = 26.60$ ,  $SD = 3.99$ ),  $t(38) = 7.49$ ,  $P < 0.001$ . There was no significant staffs, patients and caregivers demographic variability between the PN and FN groups.

### Discussion & Conclusion:

The results of this study indicated that outcomes of care for both caregivers and patients were more favourable in the PN than the FN group. Findings offered valuable evidence towards the utilisation of PN to deliver intensive nursing care for acutely disturbed patients with mental illnesses.

## Time-Motion Study for Nursing Aides Activities in a Psychiatric Hospital

**P YUAN<sup>1</sup>, HL CHIN<sup>1</sup>, SE KOH<sup>1</sup>, HT XIE<sup>1</sup>, R PARASURAM<sup>1</sup>**

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

### Introduction:

Nursing aides are valuable resources in the healthcare system. However, their work activities vary among organisations and have rarely been quantified and examined. This study investigates the time nursing aides spent in performing activities with the aim of understanding resource use in a tertiary psychiatric hospital.

### Methods:

A time and motion study methodology was utilised. In all, 83 observations were made on 25 nursing aides in 4 inpatient psychiatric wards. Time spent was recorded using a standardised data entry sheet and a stopwatch.

### Results:

On average, 193.15 minutes (42.62%) of nursing aides' time was dedicated to patient activities daily. The remaining time was spent on pantry, housekeeping and other activities. However, analysis by shift revealed that the majority of nursing aides' time allocated to patient care activities occurred at night. In the morning and afternoon shifts, most of the aides' time was spent on pantry activities. Independent samples t-tests revealed no significant differences between shifts. Their time spent on activities was also independent of their demographic characteristics, except for work experience. Longer experience was associated with shorter time spent on activities,  $r(81) = -0.25$ ,  $P = 0.02$ .

### Discussion & Conclusion:

Our findings showed that nursing aides' pace of work increased with experience. Currently, much of nursing aides' time was spent on pantry activities. Food preparation and washing of kitchenware could be performed by non-nursing personnel or using automation, allowing more time to be directed towards patient care. This could enhance the delivery of safe patient care and increase the efficiency of nursing aides' role.

## **Correlates of Resilience and Quality of Life of Family Caregivers of Adults with Serious Mental Illness**

**ME BIALA<sup>1</sup>, R ABUL<sup>2</sup>**

<sup>1</sup>*Philippine Nurses Association, Philippines,* <sup>2</sup>*St. Louis University, Philippines*

### **Introduction:**

The trend of deinstitutionalisation amongst mental institutions has given much of the responsibility of caregiving to family members, who carry the burden imposed by the caregiving process and could be “hidden” patients themselves. With this concern, we have determined the correlates between resilience and quality of life (QOL) of the family caregivers of adults with serious mental illness (SMI), which is structured on Betty Neuman’s theory.

### **Methods:**

This study specifically described the degree of resilience (21-item resilience scale), degree of QOL (54-item quality of life profile), and correlates of system characteristics with resilience and QOL, under a descriptive correlational research design participated by 169 family caregivers recruited through convenience sampling technique.

### **Results:**

Family caregivers of adults with SMI have remarkably high resilience (average = 56.76) and moderate QOL (average = 0.37). Correspondingly, the longer family caregivers take care of their relative, the better degree of resilience and level of QOL they experience. Nevertheless, the degree of resilience is highly correlated to the level of QOL ( $\psi = 0.664$ ). This clearly suggests that as family caregivers become more resilient, they experience better QOL.

### **Discussion & Conclusion:**

The caregiving situation can strengthen the resilience of family caregivers. Therefore, caregiving does not only have negative impacts but it also has positive effects. However, some aspects of the lives of the family caregivers have been compromised. This study calls for psychiatric institutions and mental health advocates in developing a more comprehensive mental healthcare delivery system not only for the patients but also for the family caregivers of clients with mental illnesses.



## Nurses Satisfaction with the Use of Health Information System in a Saudi Tertiary Care Centre

**A BAHNASSY<sup>1</sup>**

<sup>1</sup>*King Fahad Medical City, Saudi Arabia*

### **Introduction:**

Using health information system is increasing and there is substantial evidence suggesting that the successful implementation of health information system in hospitals is significantly related to nurses' satisfaction and attitudes. In Saudi Arabia, no such studies, according to the author's knowledge, have targeted this topic. The objectives of this study are: (i) explore nurses' attitudes and level of satisfaction in using the hospital information system; and (ii) determine the attitude of nurses towards ehealth in a Saudi tertiary care centre.

### **Methods:**

A cross-sectional study on 795 nurses working in a Saudi tertiary care hospital from February-June 2012 was carried out. A stratified random sample with proportional allocation was used. A questionnaire was used to collect data about attitudes, satisfaction and perceptions towards hospital information system usage. Descriptive and analytical statistics i.e. t-test or Mann-Whitney test, ANOVA or Kruskal-Wallis and correlation were used in the analysis. *P* value <0.05 was used as significant level throughout the study.

### **Results:**

The number of participants was 722 nurses. Females have more mean scores than males with respect to the use of health information system which makes them more efficient, effective at work, decreases paper work and allows them to spend more time with the patients (*P* <0.05). The results show that staff and charge nurses had the highest scores in their positive attitude than other nurses towards the use of health information system in their work than nurse managers.

### **Discussion & Conclusion:**

The results serve to guide health authorities to develop a health information system that suits the nurses' needs. It also showed that nurses' attitude towards the use of health information system is very high.

## **Nursing Care Preferences of Hearing-Impaired Children and Their Parents: Basis for Quality Care**

**I ALEJANDRO<sup>1</sup>, C TAN<sup>1</sup>**

<sup>1</sup>*University of Santo Tomas, Philippines*

### **Introduction:**

Nurses usually feel overwhelmed and unqualified in meeting the demands and needs of hearing-impaired children and their parents. This uncertainty in their own skills and abilities is exhibited as a professional and personal inadequacy. As much as nurses want to perfectly deliver the best nursing care to them, they struggle on how to give successfully what is expected of them because this area still remains incomprehensible. As a consequence, limited training and experiences have been established to their professional life. This results in the presence of gaps in the holistic approach of nursing care among hearing-impaired children. The purpose of this study is to present preferences for nursing care of both hearing-impaired children and their parents in 4 aspects: information transfer, health teachings explanation, understanding of health teachings and choice and to know if there are any differences between them.

### **Methods:**

A descriptive analysis was used to predict preferences of 85 hearing-impaired children and 75 parents using 2 survey questionnaires which include the 24 possible combinations/descriptions of nursing care.

### **Results:**

The results suggest that there is a significant difference on the preferences of parents and hearing-impaired children with the  $f$  value of 16.461.

### **Discussion & Conclusion:**

This concludes that nurses must consult both parents and hearing-impaired children when it comes to nursing care provision in 4 aspects of nursing care. Based from the findings, a programme was created as a basis of care among hearing-impaired children and their parents that can guide nurses in giving their preferred nursing care.

## **Circumstance Leading to Pregnancy and Problem Solving Process of Unwanted Teenage Pregnancy in the Phetchaburi Province, Thailand**

**R NARKBUBPHA<sup>1</sup>**

<sup>1</sup>*Ministry of Health (MOH), Thailand*

### **Introduction:**

This study aims to understand circumstance leading to pregnancy and the problem solving process of unwanted teenage pregnancy in the Phetchaburi province.

### **Methods:**

A qualitative research design was used. Participants were 15 unwanted pregnant teenagers, aged between 15 and 19 years. All participants were primiparous and interviewed at postpartum stage. A semi-structured in-depth interview was used and the data was analysed using the process of manifest content analysis.

### **Results:**

Five themes, 9 categories, 19 subcategories emerged from the analysis. The themes were: (i) circumstance leading to pregnancy was the failure of contraception and lack of knowledge regarding proper sexual education; (ii) negative emotional reactions were described by the unwanted pregnant teenagers; (iii) boyfriend's reaction to the news of the pregnancy had a strong impact on the teenage girl's feelings towards the situation. The majority of the teenagers' pregnancies were accepted as a child in the womb and the couples did not consider trying to abort the pregnancy; (iv) parents seeking a solution: the families try to follow traditions by organising wedding ceremonies and collaboratively plan for the future; and (v) life changes after the pregnancy were due to the strong concerns about being blamed by the community, not behaving according to social norms, and having to leave school.

### **Discussion & Conclusion:**

Findings from this study suggest that teenagers should participate in sexual education classes that are specific for teenagers to prevent becoming pregnant. Moreover, the educational programme specific for their needs should be established so that they can continue their pregnancy without quitting school.

## Impact of an Advanced Practice Nurse-Led Heart Failure Clinic in a Secondary Hospital in Singapore

**J WONG<sup>1</sup>, PSD YEO<sup>1</sup>**

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

### **Introduction:**

Chronic heart failure (HF) is a complex, debilitating syndrome with an adverse prognosis. Nurse-led clinics improve compliance, reduce readmissions and improve quality of life in heart failure patients. In January 2012, an advanced practice nurse (APN)-led HF clinic (HFC) was set up to ease the existing congested HFC in Tan Tock Seng Hospital (TTSH); it provides flexible consults for patients presenting with mild HF symptoms and manage chronic stable HF patients who cannot be rightsited to primary care.

### **Methods:**

We aimed to describe the impact of the APN-HFC in TTSH. We reviewed the electronic case notes of all patients who attended the APN-HFC from 5 January 2012 to 31 January 2013.

### **Results:**

The APN-HFC is available twice a week with 8 consult slots per clinic session. A total of 133 patients attended the APN-HFC: 45% (n = 60) of the patients were managed for mild HF symptoms, 21% (n = 28) were for drug titration and review of renal function while the remaining 34% (n = 45) were for follow-up care for their chronic HF condition. Of the 60 patients managed for HF symptoms, 56 HF admissions were avoided with a potential savings of S\$170,184.

### **Discussion & Conclusion:**

The APN-led HF clinic adds value to an established HF service in TTSH. There is increased flexibility for outpatient management of HF patients requiring closer monitoring. It relieves the congested HFC, allows the HF cardiologist more time for the acutely ill HF patients. It also results in a considerable cost saving to the healthcare system by reducing the number of admissions for HF.

## **Working with Psychiatric Patients Using a Needs-Based Approach—A Journey that Continues**

**A WONG**<sup>1</sup>

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

### **Introduction:**

Advanced practice nurses (APNs) defines a level of nursing practice that utilises extended and expanded skills, experience and knowledge in assessment, planning, implementation, diagnosis and evaluation of the care required. This paper highlights the role of a psychiatric APN working in a general hospital with the aim of identifying patient outcomes, using APN interventions for patients and their families in the community.

### **Methods:**

Over a period from 1 October 2012 to April 2013, using a needs-based approach, the following interventions were carried out for the 2 identified patients. They include APN telephone follow-up aimed at providing continuity of care which proved to be effective, safe, low-cost, and an easy to apply intervention. Needs-based psychosocial interventions e.g. problem solving techniques, cognitive-behavioural therapies and psychoeducation were given to patients and their families which led to greater improvements in mental health, insights into treatment and illness, and reduced hospitalisation. Strategies such as social skills training were also implemented to reintegrate patients back into the community which include activities engagement and vocational training.

### **Results:**

Patient outcomes include empowerment with medicines, effective stress management, and improved interpersonal relationship with people and reduction of hospitalisation rates. Family members who understood the illness were more supportive regarding the importance of treatment.

### **Discussion & Conclusion:**

The APNs work with patients by providing early psychiatric and needs-based psychosocial interventions. This also promotes better self-empowerment. Liaison with other mental health professionals is also fostered.

## **Improving Usage Rate of the Personal Digital Assistant (PDA) in the Administration of Medications to Patients in Ward 5C**

**AJ ZHOU**<sup>1</sup>

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

### **Introduction:**

In 2009, the usage of the personal digital assistant (PDA) in medication administration was implemented in Tan Tock Seng Hospital (TTSH). This is to increase safety during the medication administration process by an error-proof system. During the period of January to May 2012, it was found that the compliance rate to the usage of PDA was generally low at 33.8% to 58.9%. This study aims to increase PDA usage rate in the medication administration process to at least 80% by scanned count in the inpatient ward setting.

### **Methods:**

A root cause analysis on the problem was conducted. Results yielded key contributory factors such as people, hardware, process and software. Interventions were subsequently developed and were implemented by the research and quality and education team nurses. The former focused on behavioural improvements through audits and the latter focused on re-education and reinforcement to increase knowledge.

### **Results:**

The project started in June 2012. The team managed to achieve the desired target of >80% compliance in a period of 2 months. Compliance rate of PDA usage in medication administration was 65.6% in June and rose to 83.5% in July. Since the implementation of the project, compliance rate continued to maintain above >80% from August 2012 to April 2013.

### **Discussion & Conclusion:**

The use of PDA has been demonstrated to be an effective error-proof system against medication errors associated with wrong patient identification. Compliance to PDA usage is the key to medication safety and this can be achieved with team effort and garnering staff's commitment for change.

## Effective Discharge Planning with the Redesign of Nursing Role in Ward 5A—Role of a Discharge Planning Mentor (DPM)

**YL CHIANG<sup>1</sup>, PW HO<sup>1</sup>, SH HO<sup>1</sup>**

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

### Introduction:

Continuity of care in discharge is an important quality issue. Changes in processes of care and complexity of practices in the acute area have diverted nurses' priority in care management. Hence, ensuring continuity of care may not be prioritised among all other acute nursing activities. Ward 5A redesigned the nursing role to enhance effective discharge planning in the ward. The purpose was to address the influx of negative feedback from patients who were discharged from their ward. Feedback received from patients includes the lack of referrals for home care service, inadequate caregiver training and the lack of educational materials given upon discharge.

### Methods:

The workgroup revisited the nurses' task lists to better understand their routines. The nurse manager reviewed ward staff assignments and identified one dedicated nursing headcount from the current manpower establishments to perform the role of the 'discharge planning mentor' (DPM). The job scope was created, coupled with a training curriculum. Standard work was developed to ensure that staff who took up the role of the DPM is able to perform the role effectively.

### Results:

Since August 2012 till to-date, the ward has achieved a 50% reduction in the time spent to file an online referral to AIC. There was also a 15.3% reduction in inappropriate referrals to the care coordinator. Most importantly, the ward did not receive any negative feedback.

### Discussion & Conclusion:

To ensure that effective discharge planning is done, it is important to dedicate a nurse for the discharge planning role.

## Effectiveness of a Patient Education Intervention in Enhancing Patients' Self-efficacy to Recognise and Report Acute Deterioration: A Pilot Randomised Controlled Trial

**MTA SEE<sup>1</sup>, WCS CHAN<sup>1</sup>, SY LIAW<sup>1</sup>, PJ HUGGAN<sup>2</sup>, YK TAY<sup>2</sup>**

<sup>1</sup>*National University of Singapore, Singapore*, <sup>2</sup>*National University Hospital, Singapore*

### Introduction:

Acute deterioration in the general wards is an international health concern that requires urgent address. Effects of acute deterioration on mortality and morbidity were often consequences of patients' poor symptom recognition and failure to seek medical assistance. This study aims to develop, implement and test the effectiveness of a patient education intervention in enhancing patients' self-efficacy to recognise and report acute deterioration. Following the education intervention, the experimental group will report significant improvements in self-efficacy to recognise and report acute deterioration compared to the control group.

### Methods:

A cluster randomised controlled trial was conducted. Using convenience sampling, 67 adult patients (experimental group:  $n = 34$ , control group:  $n = 33$ ) were recruited from an acute hospital in Singapore. Participants in the experimental group received a 30-minute education intervention using the ABCDE (airway obstruction, breathlessness, cold, dizziness, extreme pain, and expel and excrete blood) mnemonics on recognition and reporting of acute deterioration while the control group received routine care only. Participants' self-efficacy was measured using a 10-item Self-Efficacy Response Scale (SERS) questionnaire at baseline and post-test on the third day of hospitalisation.

### Results:

Both groups showed significant improvements in their overall post-test mean scores compared to pretest. The experimental group however had a significant net improvement in its overall post-test mean score compared to the control group ( $P < 0.0001$ ) following the education intervention.

### Discussion & Conclusion:

A one-on-one education intervention that utilised the ABCDE mnemonics has enhanced patients' self-efficacy in recognising and reporting acute deterioration. This could be implemented as part of ward routine care to enhance patient safety.



## **Radiation Dose Exposure to Nurses Assisting in Endoscopy Procedures Requiring the Use of Fluoroscopy**

**M TONG<sup>1</sup>, PP CHIEW<sup>1</sup>, BH LIM<sup>1</sup>**

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

### **Introduction:**

Various procedures in gastroenterology employs the use of ionising radiation; most notably ERCP, luminal stent placement and dilatation. Nurses assisting endoscopists are exposed to scatter radiation from the patient. The study investigates the significance of the amount of radiation received by nurses in such settings.

### **Methods:**

TLD readings of nurses were recorded and analysed over a consecutive 12-month period and in accordance to ICRP recommendations, expressed as effective doses representative of dose equivalent in soft tissue at 10 mm depth. Readings were measured on a bimonthly basis and worn under the lead apron either at the chest or trunk region.

### **Results:**

The annual whole body effective dose equivalent received ranged between 1.66 mSv to 2.16 mSv, with a mean and standard deviation of  $1.90 \pm 0.19$  mSv. In perspective, the mean and maximum values represent approximately 9.5% and 10.8% respectively of both international and local annual radiation dose limit of 20 mSv.

### **Discussion & Conclusion:**

Radiation dose exposure to nurses depends on many factors, of which most cannot be controlled by them. These include equipment, procedure type, patient size and endoscopists' experiences. The recorded doses are well within the permissible occupational annual dose limits, but it should be noted that these values are above those deemed acceptable to the public and is accumulative. In addition, there may also be considerable doses to unshielded parts of the body. This study also reminds the need for adequate indication justifications as it indirectly plays a part in contributing to staff radiation burdens.

## Managing Individuals with Diabetes using the Diabetes Ambulatory Stabilisation Services (DASS)

**CL TEOH<sup>1</sup>, FY ONG<sup>1</sup>, J CHEN<sup>1</sup>, ST LIM<sup>1</sup>, JSM KALIP<sup>1</sup>, SM TONG<sup>1</sup>, CM ANG<sup>1</sup>, E KHOO<sup>1</sup>**

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

### Introduction:

Approximately 1 in 10 patients attending the diabetes clinics remain poorly controlled. Patients often receive piecemeal delivery of care from various healthcare professionals. To address this, we examined whether a structured nurse led-DASS programme could safely improve glycaemic control.

### Methods:

Patients with uncontrolled diabetes (HbA1c >10%), who were willing to perform blood glucose monitoring were managed by a multidisciplinary team of a diabetes care nurse (DCN), dietitian, social worker and endocrinologists. Patients were provided with the tools (on loan glucometers and test strips), knowledge (education on glucose monitoring, insulin injection techniques, dietary review and recommendations), support (motivational interviewing strategies, self care management and empowerment) and regular contacts (2 face-to-face contacts with DCNs and dietitians and feedback of blood glucose profiles) to manage their diabetes through a combination of dietary, physical activity and therapeutic adjustments of insulin doses.

### Results:

Of the 68 patients, 8 patients defaulted while the remaining 60 completed 3 months of follow-up. Of the 60, 72% (43) were male, mean age was 54 years, all were on insulin ± oral therapy, 55/60 (92%) had type 2 diabetes. HbA1c improved from 13.1±1.5% to 9.9±1.9 % ( $P < 0.001$ ) with 40/60 (73%) having greater than 1% drop. There were no episodes of severe hypoglycaemia.

### Discussion & Conclusion:

This structured, coordinated, multidisciplinary pilot programme was successful in significantly reducing HbA1C without hypoglycaemia. We are expanding the service to cover patients with uncontrolled diabetes in other disciplines. In addition, we are exploring using information technology such as Bluetooth devices to further improve communication and timely feedback.

**To Reduce the Non-adherence to Psychiatric Medications in APCATS Patients from 22.6% to 0% in 6 Months**

**A MOK<sup>1</sup>, CF NG<sup>1</sup>, LY KONG<sup>1</sup>, HT NG<sup>1</sup>, M TAN<sup>1</sup>, C TAN<sup>1</sup>, LC CHUA<sup>1</sup>**

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

**Introduction:**

The aim of this study is to reduce the non-adherence to psychiatric medications in APCATS patients from 22.6% to 0% in 6 months.

**Methods:**

The Plan-Do-Study-Action (PDSA) methodology was employed in this project. A baseline data collection was then conducted on the patients or their caregivers via telephonic contacts or during home visitations with a specially designed survey form. Root cause analysis was carried out and the root causes were represented on the cause and effect diagram. Initial voting on the root causes was identified and plotted on the Pareto chart. The team then developed 3 interventions and findings on patients' medical adherence were collated and illustrated on a Run chart.

**Results:**

Results showed that the non-adherence rate was reduced to 11.0% (from 22.6% in September 2012) in December 2012. Though the stretched goal of 0% was not achieved, it was evident that the interventions had proved to be effective in bringing about enhanced medication adherence.

**Discussion & Conclusion:**

Adherence to medications can be improved even in the most challenging psychiatric patients, reducing unplanned readmissions, improving their quality of life and those of the caregivers. Covert administration proved to be of a higher success rate. Due to the presence of ethical considerations, this intervention was executed as a last resort and only when there was potential risk of self-harm or harm towards others if the patient did not receive medication. Prior to implementation, it was also ensured that all other possible alternative solutions had been explored and discussed with the consultant psychiatrist and the entire multidisciplinary team.

## **A Cognitive Behavioural Approach towards Chronic Pain Education by a Nurse Clinician: An Audit Review**

**J CHEMAT<sup>1</sup>, SY YANG<sup>1</sup>, FL LOY<sup>1</sup>**

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

### **Introduction:**

Chronic pain can be a highly complex condition to manage, often requiring multidisciplinary-based programmes, patient education and/or cognitive behavioural (CBT) approaches. Nurses trained in CBT form an important part of such programmes in pain centres overseas. In a pain clinic in Singapore, this is run as a 12-hour programme. This audit review aims to survey the effectiveness of nursing education within this programme.

### **Methods:**

The patients surveyed, attended the CBT programme in Tan Tock Seng Hospital from 2011 to 2012. Feedback forms were administered at the end of the programme to survey usefulness of nursing education on communication, sleep and medication. Participants rated on a 5-point Likert scale from: 'not useful' to 'extremely useful'. The 5-point Likert scale was used to rate the different aspects of pain management, namely 'understanding', 'responsibility', 'control' and 'ability to manage'. Participants were also encouraged to comment on their main take home message.

### **Results:**

Seven participants were surveyed, 86% suffered spinal-related pains. The mean scores for the helpfulness of education were 4.1 (communication), 3.9 (sleep) and 4 (medication). Mean scores for pain management were 4.9 (understanding), 5 (responsibility), 5 (control) and 4 (management). Qualitatively, the participants reported better understanding in pain, and ways to improve moods and participation.

### **Discussion & Conclusion:**

The educational session had improved the participants' understanding of their pain and active management. Future studies should include bigger sample size and qualitative research on the main areas that are useful to the participants.

## Streamlining Process Flow for Maintenance of 12-lead ECG Machine in a Cardiology Ward

**TL TAN<sup>1</sup>, GG KALAICHELVI<sup>1</sup>, A SALBIAH<sup>1</sup>**

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

### **Introduction:**

Although every ward is equipped with a 12-lead ECG machine, sometimes it is sent for repair. When the machine is available, it might not be functioning optimally due to poor maintenance. Such instances might compromise patient's safety especially if a patient has an acute chest pain and staff has to search for the machine or deal with machines functioning suboptimally. For Ward 8C, the average time for 12-lead ECG machine breakdown is 6. Average downtime is 14 hours. The functional issues during usage include faulty leads (90%) and wrong paper used (10%). Average time taken to do ECG is 10 minutes. The objectives of this study are: (i) to eliminate breakdown of ECG machine and problems reported by nurses during usage; and (ii) to improve ECG procedure response time.

### **Methods:**

A gap analysis was conducted to identify root causes. Using the 80/20 rule, a solution approach was drawn out. Solutions include visual management using labeling and visual aids, developing a basic troubleshooting guide for users to troubleshoot on the common issues first before calling for repair and a standard work for maintenance.

### **Results:**

The findings are: (i) the number of times the ECG machine was sent for repair is 0 for year 2012; (ii) no issues were identified by ward staff during usage; (iii) average response time to perform a 12-lead ECG was cut down to 5 minutes from 10 minutes (improved by 50%); and (iv) average time savings per month is 900 minutes (average of 6 ECGs done daily).

### **Discussion & Conclusion:**

A standard work and a basic trouble shooting guide were developed and made available for use in all 52 wards. Instead of sending the ECG machine for repair in BME which takes up to a number of waiting days, make essential accessories like the patient trunk cable and the leads wire available for replacements at ward level to decrease waiting time.

## **Effectiveness of Using a Care Coordinator led Protocolised Management (Icontrol 2 Programme) in Patients with Stable Hypertension and Hyperlipidaemia**

**KB SINGH<sup>1</sup>, NSB HARON<sup>1</sup>, MY KOA<sup>1</sup>, YH NG<sup>1</sup>, HT LIM<sup>1</sup>, CWS CHONG<sup>1</sup>, LH ER<sup>1</sup>, KM WONG<sup>1</sup>, YC TUNG<sup>1</sup>, ESL TAN<sup>1</sup>, JDM MOLINA<sup>2</sup>**

<sup>1</sup>National Healthcare Group Polyclinic, Singapore, <sup>2</sup>National Healthcare Group HQ, Singapore

### **Introduction:**

The Icontrol 2 Programme (Ic2P) is a chronic disease management programme utilising care coordinator-led protocolised management plan to follow up patients with stable hypertension and/or hyperlipidaemia. Ic2P aims to reduce the number of consultations by doctors while keeping the patient's chronic condition stable.

### **Methods:**

Case control study design was used to determine the effects of the BP readings, LDL levels and number of consultations by doctors in 1 year for the chronic condition. Patients whose hypertension and/or hyperlipidaemia were stable for at least 6 months were enrolled in the IC2P between April 2011 and February 2013 and had completed at least a year of follow-up were compared with age and sex-matched controls who received standard care from other polyclinics.

### **Results:**

A total of 215 patients and 887 controls were enrolled. BP levels remained stable in both groups. Non-programme patients were more likely to have LDL >3.4 mmol/dl as compared to the programme patients by the end of 1 year (odds ratio = 1.785; 95% CI, 1.003 to 3.177). Patients enrolled in the programme had roughly 1.5 doctor visits per year for chronic conditions less than the controls.

### **Discussion & Conclusion:**

The findings suggest that care coordinator-led protocolised management plans can achieve comparable health outcomes for patients with stable hypertension and hyperlipidaemia as compared to usual care. This enables the clinicians in such settings to allocate more time to the management of complicated illnesses.

## Does Seeing the Same Doctor Lead to Better Glycaemic Control in Patients with Poorly Controlled Type 2 Diabetes Mellitus?

**D NG<sup>1</sup>, KH LEE<sup>1</sup>, YF SIM<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

### **Introduction:**

Continuity of care is a key tenet of family medicine. It is unclear whether continuity of care leads to better clinical outcomes in patients with poorly controlled type 2 diabetes mellitus. The aim of the study was to determine the effect of continuity of care on glycaemic control in patients with poorly controlled type 2 diabetes mellitus.

### **Methods:**

A total of 176 patients with poorly controlled type 2 diabetes mellitus at the end of 2009 who saw the same primary care physician (PCP) more than 65% of the time in 2010 to 2011 were compared against 176 matched controls who did not see the same PCP in the same time period. The primary outcome was the mean HbA1c level between both cohorts at the end of 2 years.

### **Results:**

One-hundred-seventy-six cases saw the same PCP 87% of the time and the matched controls saw the same PCP 25% of the time. The mean HbA1c level was 9.23% in both groups at baseline. After 2 years, there was no significant significance in mean HbA1c in patients who saw their PCP more than 65% of the time compared to patients in the control group ( $8.85 \pm 0.11$  vs  $8.67 \pm 0.11$ ,  $P = 0.265$ ). The decrease in HbA1c level was larger in the control group, but did not reach statistical significance. ( $0.37 \pm 0.14$  vs  $0.58 \pm 0.14$ ,  $P = 0.294$ ).

### **Discussion & Conclusion:**

Seeing the same primary care physician does not improve glycaemic control in patients with poorly controlled type 2 diabetes mellitus. The reasons for this outcome need to be further explored.

## **Patients' Perception of the Physician Patient Interaction and its Impact on Satisfaction with Treatment Outcome**

**V MUNSHI<sup>1</sup>, M MAKKAD<sup>2</sup>**

<sup>1</sup>*Birla Institute of Technology, India*

### **Introduction:**

Doctors competency can be based on 2 dimensions, namely the diagnostic competency and the human skill competency. This exploratory study attempts to research which skills a doctor has that would impact health outcomes and thereby influencing patients' satisfaction and referral.

### **Methods:**

A random sample of 500 patients in India completed an email survey containing 33 items relating to different aspects of the physician-patient interaction. The responses of 143 respondents collected over a 2-month period was analysed using statistical tools like factor analysis, ANOVA and Pearsons correlation coefficient (PCC).

### **Results:**

A factor analysis of the independent variables grouped the skills of the doctor as 'human', 'knowledge sharing', 'waiting' and 'convenience'. The outcome variable of 'recommending the physician to others' was dependent on the 'human' and 'knowledge sharing' skills of the physician determined by ANOVA. The PCC was found to be  $>0.5$  for the outcome variable and independent variables determining the physician's ability to give time, listen without interruption, ability to make the patient feel at ease and clarify the problem simply. The coefficient of correlation was found to be  $<0.5$  for variables related to the ability to diagnose and prescribe the appropriate therapy.

### **Discussion & Conclusion:**

The finding of this study indicate that the ability of a physician to give time and attention to the patient seem to play a more critical role in recommendation rather than the diagnostic capability of the physician. Therefore, physicians should focus on improving their human skills if they want to impact the outcome.



## Factors of Rehabilitation Outcomes in Primary Care Physiotherapy

**J ABRAHAM<sup>1</sup>, BC KWOK<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

### Introduction:

Traditionally, musculoskeletal physiotherapy clinic has been well established in the hospital settings. With the establishment of physiotherapy services in primary care, it is important to identify potential factors that affect the outcome.

### Methods:

New visits from February 2012 to March 2012 were traced retrospectively in 2 primary care physiotherapy centres. A total of 341 patients, 14 to 86 years old, were traced through the electronic documentation system. Data from each centre were compared for any baseline differences. All variables available from the data extraction that might influence discharge outcome after 6 sessions of physiotherapy were analysed with multivariable regression modelling. The independent variables were centre location (population geographic), age, gender, ethnic group, history of reported problem, waiting time to physiotherapy appointment, presence of chronic diseases and initial reported pain score.

### Results:

There were 170 patients who were discharged by 6 sessions of physiotherapy whereas 171 did not. Centre A has significantly more Chinese population while Centre B has more Malay population ( $P = 0.001$ ). The centre where patients attend physiotherapy was the strongest factor associated with discharge outcome (OR = 2.39; 95% CI, 1.48 to 3.86;  $P < 0.001$ ). Higher initial pain was associated with decreased odds of discharge by 6th session.

### Discussion & Conclusion:

This retrospective pilot study found that the demographic location of patients and initial pain of patients had an impact on discharge outcomes. Prospectively, a study that looks into the behaviour of the patient such as exercise compliance might help identify more factors associated with rehabilitation outcomes.

## **Nephrology Evaluation, Management and Optimisation (NEMO) of Care for Early Diabetic Nephropathy in Primary Care**

**SH ONG<sup>1</sup>, P T LOH<sup>1</sup>, A VATHSALA<sup>1</sup>, CK LIM<sup>2</sup>**

*<sup>1</sup>National University Hospital, Singapore, <sup>2</sup>National Healthcare Group Polyclinics, Singapore*

### **Introduction:**

Diabetic nephropathy (DN) as the aetiology of end-stage renal disease (ESRD) is ever-increasing. An integrated programme for better renal protection for early DN in the primary care was implemented as a collaborative effort between nephrologists at National University Hospital and general physicians at National Healthcare Group Polyclinics.

### **Methods:**

Eligible DN patients [glomerular filtration rate >60mL/min with 2 abnormal albuminuria results, not on maximal angiotensin converting enzyme inhibitor (ACEi)/angiotensin receptor blocker (ARB) therapy] were identified by information technology (IT) system. Patients were channeled into the programme and educated about DN by the NEMO coordinators. Patients' ACEi/ARB therapy were titrated up by physicians until the maximum dose, maximum tolerated dose or normoalbuminuria achieved. Adverse effects were closely monitored by coordinators.

### **Results:**

A total of 5811 eligible DN patients were identified over 1 year. Of the 2961 (51%) enrolled patients, 71% had microalbuminuria (MI) and 29% had macroalbuminuria (MA) at baseline. Of the 874 (30%) who completed cycles of ACEi/ARB dose increment, 82% had either achieved maximal ACEi/ARB dose or maximal tolerated dose or normoalbuminuria; 3.2% had progressed from MI to MA. MI at baseline was the only significant factor associated with achievement of normoalbuminuria; 96% of enrolled patients reported increased awareness about DN with education.

### **Discussion & Conclusion:**

Management of DN is most effective when treated early. A reliability centred disease management programme utilising IT and coordinators to evaluate, manage and optimise therapy for DN patients in primary care could potentially stem the rising incidence of DN leading to ESRD.

## Moderate Renal Impairment: What are the Ultrasound Findings on Chronic Kidney Disease Stage 3 Patients?

**J SIA-UMALI<sup>1</sup>**

<sup>1</sup>*National Healthcare Group HQ, Singapore*

### Introduction:

Chronic kidney disease is a major public health problem and its adverse outcome can be prevented through early detection and treatment. National Healthcare Group Polyclinic (NHGP) aims to provide seamless, comprehensive and cost-effective care for management of patients with chronic kidney disease in the primary care setting. The purpose of this study is to identify the sonographic features of urological pathology between CKD3A and CKD3B patients and the prevalence of moderate renal impairment between genders.

### Methods:

NHGP patients with moderate reduction on GRF (glomerular filtration rate, 30 to 59 mL/min/1.73m<sup>2</sup>) result were referred to NHG Diagnostics (NHGD) for ultrasound renal scan to rule out any abnormalities. Study subjects were identified through British guideline GRF. Patients with GRF45 to 59 mL/min/1.73m<sup>2</sup> are classified as CKD3A patients with GRF30 to 44 mL/min/1.73m<sup>2</sup> are classified as CKD3B.

### Results:

A total of 1318 subjects were examined sonographically, 760 (57.7%) were male and 558 (42.3%) were female. By GRF result, 56.6% were identified as CKD3A and 43.3% were CKD3B. Ultrasound findings were: 43.3% has cortical cyst, 5.31% was diagnosed with renal calculi, 21.1% has evidence of increase echogenicity in the kidneys and 1.7% was diagnosed with small kidney; 1.7% was diagnosed with small kidney. The prevalence of cortical cyst, renal calculi, renal impairment and small kidney in CKD3A patients were 54.7%, 60%, 42.8%, 36.4% respectively and CKD3B patients were 45.3%, 40%, 57.2% and 63.6% respectively.

### Discussion & Conclusion:

CKD3A has higher evidence of presence of cortical cystrenal stone. CKD3B has higher evidence of small kidney diagnosis and renal impairment kidney disease. Male patients have a higher prevalence of moderate chronic kidney disease, evidence of cortical cystrenal calculi and small kidney.

## Dietary Intake of Wholegrains of Healthcare Workers in National Healthcare Group Polyclinics

**L GOH<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

### Introduction:

Many studies show that a diet rich in wholegrains has many health benefits. These include weight management and reducing the risks of chronic diseases such as diabetes and heart disease. However, close to 90% of Singaporeans did not meet recommendations (2 to 3 servings daily) (National Nutrition Survey 2010). Our last health screening results in 2012 showed 52.9% of staff had unhealthy elevated BMI of 23kg/m<sup>2</sup> and above, indicating a possible role for wholegrains in our staff's diet. This study investigated wholegrain intake amongst healthcare workers and identified groups who consumed more wholegrains.

### Methods:

A self-administered questionnaire was carried out at NHGP headquarters and all 9 NHG Polyclinics over a 1-week period. A total of 1077 survey forms were collected and included in the analysis. Pearson's chi-square test was performed to study the association between daily wholegrain intake and demographic characteristics. Spearman's correlation coefficient was computed to study the strength of correlation between daily intake, age and education.

### Results:

Of the participants, 21.6% met recommendations for wholegrain intake of 2 or more servings daily. The most common types of wholegrains eaten were wholegrain breads (71.4%), followed by oats (42.2%). Ethnicity and occupation were associated with daily wholegrain intake ( $P < 0.001$ ,  $P = 0.003$  respectively). Age association with daily wholegrain intake was weak although statistically significant (spearman's rho = 0.166,  $P < 0.001$ ). Higher proportion of non-Chinese and staff aged 40 years and above consumed 1 or more servings of wholegrains daily. Higher proportion of medical staff (doctors and nurses) consumed 1 or more servings of wholegrains daily compared to the administrative staff.

### Discussion & Conclusion:

Wholegrain intake is beneficial. This study showed that consumption of wholegrains amongst healthcare workers was slightly higher than the national average, but also fell well below the recommended level. Hence, more efforts are needed to encourage consumption of wholegrains.

## Management of Patients with Diabetes in Two Primary Care Podiatry Clinics

**LS TAN<sup>1</sup>, YF SIM<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

### **Introduction:**

This study aims to evaluate the differences between diabetic patients seen at an onsite podiatry clinic X in a polyclinic and those seen at an offsite podiatry clinic Y.

### **Methods:**

Diabetic patients, seen by a podiatrist between 3 January 2012 and 31 December 2012, were identified. The demographics, physical measurements and laboratory test results were obtained from an electronic database and analysed using Stata version 12.0.

### **Results:**

A total of 703 diabetic patients were seen at the podiatry clinics over the 12-month period, accounting for 1678 attendances. Overall, 52.9% of the patients were female and 60.6% were Chinese. The mean age was 64.8 (SD = 11.61). The mean duration of diabetes was 7.7 years. When comparing the 2 clinics, there was a significant difference in the race profile ( $P = 0.017$ ). The patients at Clinic Y tend to be older ( $P = 0.006$ ), with a longer duration of diabetes ( $P < 0.001$ ). Additionally, the patients at Clinic Y saw the podiatrist more frequently than patients at Clinic X ( $P < 0.001$ ). After adjusting for differences in age, gender, race and duration of diabetes, there was no significant difference in outcomes of glycaemic control (HbA1c), lipid control (LDL-c), blood pressure and body mass index.

### **Discussion & Conclusion:**

The difference in age and race profile may be attributed to the different geographical location. The results suggest that both clinics maintained similar clinical outcomes regardless of offsite or onsite in a polyclinic. Further study will be needed to determine if there is any difference in occurrence of diabetic foot complications such as peripheral vascular disease, peripheral neuropathy, ulceration, etc.

## **Preliminary Model of Human Assets and Stressors in Mental Health Recovery: A Path Analysis**

**HT XIE**<sup>1</sup>

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

### **Introduction:**

Community studies reveal that human assets such as strengths self-efficacy (SSES) and resourcefulness lead to positive outcomes. In mental health studies, human assets have rarely been investigated. Stigma is a known stressor impeding recovery. A model of assets and stressors is unavailable and the directions of influence among these variables in mental health are unknown. This study aims to build a preliminary model on the relationships and mediation among assets and stressors for people with mental illnesses living in the community.

### **Methods:**

A cross-sectional study was conducted on a convenience sample of 102 community-dwelling adults with serious mental illnesses. Path analysis was used to model the relationships among SSES, resourcefulness, stigma and recovery.

### **Results:**

This study found that stigma hindered recovery. However, the effect of stigma on recovery was mediated by SSES ( $\beta = 0.53$ ,  $P < 0.001$ ). The reverse was also true. Recovery affected the experience of stigma and this effect was mediated by SSES. Even though resourcefulness correlated with recovery ( $r = 0.74$ ,  $P < 0.001$ ), the path of recovery predicting resourcefulness ( $\beta = 0.74$ ,  $P < 0.001$ ) was stronger than that of resourcefulness predicting recovery ( $\beta = 0.42$ ,  $P < 0.001$ ).

### **Discussion & Conclusion:**

Findings indicated that human assets such as SSES and resourcefulness were either directly impacting recovery or acted as mediators of recovery. Similarly, human assets were enhanced as the person with mental illness recovered. Findings have expanded the knowledge base for positive concepts in the field of psychiatry, paving the way towards a theory of human assets and stressors in mental health recovery.

## Preliminary Evaluation of Shoulder Conditions in Primary Care Physiotherapy

**V RAJESH<sup>1</sup>, S DAYAL<sup>1</sup>, BC KWOK<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

### Introduction:

In primary care musculoskeletal physiotherapy clinics, patients with shoulder problems account for 23% of patients attended to on the first visit. Shoulder impairments affect the daily activities of patients either at work or at home. Therefore, this study aims to investigate the differences between 3 different categories of impairments – adhesive capsulitis, rotator cuff tendinopathy with or without muscle strain (muscle impairment), and joint dysfunction. The secondary objectives include identifying trends of demographics among each condition.

### Methods:

In February 2012 to March 2012, 78 patients (15 to 86 years old) with shoulder impairments were continuously traced retrospectively in 2 primary care physiotherapy centres. Continuous variables of interest (age and initial pain score) were analysed with ANOVA and Bonferroni adjustment. Categorical variables (gender, ethnic and various chronic disease conditions) were analysed with multinomial logistic regression.

### Results:

Generally, adhesive capsulitis patients tend to be overweight (70.4%). Majority of patients with shoulder condition have 1 chronic disease or are overweight (77%). The mean initial pain score was similar between adhesive capsulitis and muscle impairment (4.2 vs 4.3;  $P > 0.05$ ), but not when both were compared to joint dysfunction, (0.7;  $P < 0.001$ ). No statistical differences were found between the 3 groups for age, gender, ethnic and medical history ( $P > 0.05$ ).

### Discussion & Conclusion:

Joint dysfunction patients experienced lesser pain as compared to adhesive capsulitis and muscle impairment patients. Patients with shoulder condition tend to have a chronic disease or are overweight. This study found that muscle impairments did not occur predominantly in female.

## Quantity Versus Quality Patient Care in Primary Care Physiotherapy (The QQ Study)

**BC KWOK<sup>1</sup>, J ABRAHAM<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

### **Introduction:**

Large patient load (quantity) can affect the quality of patient care. This study aims to identify potential factors of quality patient care.

### **Methods:**

Retrospectively, 39 patients in March 2012 and 40 patients in October 2012 were traced from Bukit Batok Polyclinic physiotherapy centre. The new template has slightly fewer patients but increased contact time with each patient (quality) as compared to the old template (quantity). The outcomes of interest pain improvement and length of management were analysed with student's t-test or Welch t-test while the success of discharge by 3 sessions was analysed with chi-square test. Initial multivariable regression modelling was used to identify factors that predicted patient discharge in 3 sessions.

### **Results:**

Statistical significance was found for all outcomes of interest (new vs. old respectively) – mean (SD) for pain improvement (/10) was 3.8(1.9) vs 2.6(2.1) out of 10,  $P = 0.009$ ; length of management (weeks) was 6(3) vs 12(11) weeks,  $P = 0.002$ ; discharged by 3 sessions (yes) was 82.5% vs 59%,  $P = 0.027$ . Factors in the final regression model were age, templates, presence of additional problem and initial pain score. The factor with the strongest odds of predicting discharge was the type of template (OR = 3.82; 95% CI, 1.28 to 11.4;  $P = 0.016$ ). Presence of additional problem but was statistically non-significant (OR = 2.28; 95% CI, 0.42 to 12.3;  $P = 0.34$ ).

### **Discussion & Conclusion:**

The study found that quality time spent with patient was important in determining patient discharge outcomes. Future study will explore the cost-benefit of the new appointment template.



## Prevalence of Alcohol Problems Among Elderly in Singapore

**E ABDIN<sup>1</sup>, M SUBRAMANIAM<sup>1</sup>, L PICCO<sup>1</sup>, JA VAINGANKAR<sup>1</sup>, SA CHONG<sup>1</sup>**

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

### **Introduction:**

Alcohol problems are common but often under-reported among elderly people. A number of factors have been reported to lead to heavy drinking among the elderly: bereavement, physical ill health, loneliness and isolation, and loss of occupation, income. This study aims to estimate the prevalence and correlates of alcohol problems in the Singapore elderly population using a screening instrument – the CAGE questionnaire.

### **Methods:**

The Well-being of the Singapore Elderly (WISE) study is a cross-sectional epidemiological survey that is currently ongoing. It involves face-to-face interviews with older people (citizens and permanent residents) aged 60 years and above. Information on alcohol consumption and alcohol problems was assessed using the CAGE questionnaire. Sociodemographic information was also collected.

### **Results:**

Among the 1091 respondents, 23% have a lifetime history of alcohol use (at least 12 drinks in a year). The lifetime prevalence of “alcohol problems” (defined as CAGE score > 2) was 5.3%. Those with “alcohol problems” were more likely to be males and of Indian ethnicity and less likely to be older (age 85 and above) and widowed (vs. single). After adjusting for sociodemographic factors, we found that “alcohol problems” were significantly associated with stroke and transient ischaemic attack.

### **Discussion & Conclusion:**

Our study shows that at least 5 out of 100 elderly residents have alcohol problems and that only a mere fraction has sought help. The identification of associated factors will also enable a more targeted approach to screening and treating those at risk.

## **Recipients' Feelings About Living Donor Transplantation and the Possibility of Restored Kidney Transplantation in Japan**

**M TAKAGI<sup>1</sup>**

<sup>1</sup>*Nihon University, Japan*

### **Introduction:**

Thousands of patients in Japan are waiting for renal transplantations from donors who are brain dead or clinically dead. However, only 174 such operations were performed in this nation in 2012. Patients with renal failure must therefore depend on a living donor for transplantation.

### **Methods:**

Between January 2012 and March 2013, we obtained the answers to questionnaire from 152 recipients receiving kidneys from their spouses concerning their physical and psychological condition after transplantation and their perceptions of living donor kidney transplantation. Afterwards, we asked recipients' opinions about transplantation of previously cancerous donor kidneys that have been restored after nephrectomy as a new source for donor.

### **Results:**

In response to questions regarding the psychological condition of recipients after kidney transplantation, 69.1% recipients reported feeling good or very good, and 3.9% recipients felt normal or less than normal. A total of 86.6% recipients recognised living donor transplantation as ongoing medical care, and 7.2% recipients perceived it as only temporary medical care. In response to question regarding restored kidney transplantation, 81.6% recipients recognised it as medical care, and this result can be favourably compared with that of the survey questions regarding living donor transplantation (86.6%), nevertheless this practice is currently disallowed in Japan. In answering to the question, "If restored kidney transplantation had been possible when you underwent transplantation, what would you have chosen?", 33.6% recipients wanted to choose restored kidney transplantation.

### **Discussion & Conclusion:**

Restored kidneys may be added to the donor pool to relieve the pressure on families and recipients.

## Prevalence and Predictors of Tobacco Use in Elderly Singaporeans

**S PANG<sup>1</sup>, E ABDIN<sup>1</sup>, L PICCO<sup>1</sup>, JA VAINGANKAR<sup>1</sup>, M SUBRAMANIAM<sup>1</sup>,  
SA CHONG<sup>1</sup>**

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

### **Introduction:**

Smoking is a well-established public health issue which has not been examined previously among the elderly in Singapore. This paper describes the current prevalence of tobacco use and identifies the associated factors of tobacco use among the elderly resident population.

### **Methods:**

Data for this study were derived from the Well-being of the Elderly (WiSE), a cross-sectional epidemiological study of Singapore's elderly population. Socio-demographic data from 1091 Singaporeans aged 60 years and above was collected through face-to-face interviews. Binomial logistic regression was used to analyse the data.

### **Results:**

A total of 104 respondents were current tobacco users (9.5%) of whom 88.5% smoked cigarettes, 1% cigars, 1.9% pipes, 1% beedi, 1.9% chewed tobacco, 1.9% used snuff and 3.8% used other forms of tobacco. The majority were males (90.4%). Tobacco use was most prevalent among Malays (49%), followed by Indians (27.9%) and Chinese (22.1%). Significant predictors were male gender, younger age, frequent alcohol use, economic inactivity compared to full-time work and tertiary education compared to no education (inverse correlation).

### **Discussion & Conclusion:**

Smoking prevalence among the elderly was lower than that found in the Singapore general adult population (16%). However, the rate is still high, and is of concern given that a higher rate of physical disorders could be worsened with tobacco use. Those at risk can be identified and targeted for smoking cessation programmes/other interventions. Association of frequent alcohol use with smoking which increases the risk of aero-digestive cancers must be given particular attention in this population.

## Use of Hospital Anxiety and Depression Scale (HADS) in Patients with Chronic Obstructive Pulmonary Disease (COPD)

**AKJ TEOH<sup>1</sup>, EWH LIM<sup>1</sup>, K PANCHANATHAN<sup>1</sup>, AWK NG<sup>1</sup>**

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

### **Introduction:**

The Hospital Anxiety and Depression Scale (HADS) have been used to detect anxiety and depression in patients with various conditions. Patients with chronic obstructive pulmonary disease (COPD) may have unrecognised anxiety and depression which might have an impact on the disease.

### **Methods:**

This study aims to investigate the use of HADS as a tool for the detection of anxiety and depression in COPD patients attending the hospital. Patients admitted for exacerbation, or attending the outpatient clinic, were given the HADS questionnaire to complete.

### **Results:**

A total of 52 patients (16 inpatients, 36 outpatients) had the HADS administered. The results show many patients had anxiety and/or depression which were previously unrecognised. The prevalence of anxiety and depression was 30.8% and 32.7% respectively. A higher proportion of patients with advanced disease (FEV1 < 50%) were found to have anxiety and depression as compared to those with a milder disease (36.4% vs 15.8% for anxiety; 39.4% vs 21.1% for depression). In all, 58.3% of patients with COPD Assessment Test (CAT) score more than 10/40 had anxiety or depression symptoms. Among those who were frequently admitted ( $\geq 5$  admissions in the past 12 months), 71.4% had anxiety and 57.1% had depression, compared to only 29.6% (anxiety) and 25.9% (depression) who were not admitted.

### **Discussion & Conclusion:**

The HADS is a good instrument for identifying anxiety and depression in patients with COPD; it provides opportunities for patients to receive appropriate assessment, behavioural management and treatment so that they are better able to cope with their disease and improve outcomes.

## Mortality Predictors for Operative Hip Fracture Patients

**E SEET<sup>1</sup>, PF TEOH<sup>1</sup>, V SEAH<sup>1</sup>, CM KUMAR<sup>1</sup>, S SELVARAJ<sup>2</sup>**

<sup>1</sup>*Khoo Teck Puat Hospital, Singapore,* <sup>2</sup>*Ministry of Health Holdings, Singapore*

### Introduction:

The Nottingham Hip Fracture Score (NHFS) was developed and validated in a cohort of 7290 operative hip fracture patients in the UK. The NHFS was reported to be a robust predictor of 30-day mortality in the Caucasian population. Mortality predictors include 7-dichotomised variables: age, gender, haemoglobin, mini-mental test score, institutionalised status, multiple comorbidities, and malignancy. We conducted an audit to validate the NHFS in the Singapore context.

### Methods:

The audit was endorsed by departmental audit steering committee. Data pertaining to the 7 variables from all operative hip fracture patients were collected retrospectively during June to December 2012. Direction comparison of local risk predictors was made with the published NHFS data.

### Results:

A total of 102 operative hip fracture patients were included. Median NHFS of the Singapore population was 5 (IQR 4 to 6). This was similar to the published hip fracture population from the UK with NHFS 5 (IQR 3 to 7). In Singapore, the NHFS of 4, 5, 6 was associated with a mortality rate of 4%, 4% and 11% respectively. This corresponded closely to the UK published data where NHFS of 4, 5, 6 was associated with an overall mortality rate of 4%, 7% and 11% respectively. The 30-day mortality rate in Singapore was 3.7%, compared to 6.6% in the UK.

### Discussion & Conclusion:

The operative hip fracture patients in Singapore have similar mortality risk profile compared to the published and validated UK NHFS study. Our 30-day mortality rate was lower than in the UK. The NHFS may be a useful guide to predict mortality, even in the Singapore population.

## Investigating the Awareness of the Symptoms, Risk Factors and Management of Acute Myocardial Infarction in the General Singaporean Population

**N NASHI<sup>1</sup>, SM THAM<sup>1</sup>, MHW MAK<sup>1</sup>, JH GOH<sup>1</sup>, CH KONG<sup>1</sup>, KS LEE<sup>1</sup>, MW NG<sup>1</sup>, HW CHOI<sup>1</sup>, N X H WEE<sup>1</sup>**

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

### Introduction:

Acute myocardial infarction (AMI) is a leading cause of death in Singapore. A lack of knowledge increases pre-hospital delay, leading to poorer patient outcome. We aim to investigate the public awareness of AMI symptoms, risk factors and management, and to identify characteristics associated with greater awareness.

### Methods:

A cross-sectional study conducted with 507 participants in the Toa Payoh estate using an interviewer-administered questionnaire modified from the validated Response to Symptoms questionnaire.

### Results:

The median number of correct symptoms reported was 2 (SD 1.20), with 57.4% of participants reporting chest pain as a symptom. The median number of risk factors correctly reported was 1 (SD 1.25). If symptoms of an AMI were experienced, 39.3% of participants would call an ambulance, and 52.7% identified the correct number to call. Only 12.6% of participants identified at least one form of definitive treatment. On multivariate analysis, higher education ( $P < 0.001$ ), personal history of AMI ( $P = 0.004$ ) and family history of AMI ( $P = 0.001$ ) were significantly associated with a greater awareness of AMI symptoms. A greater awareness of risk factors was significantly associated with younger age ( $P < 0.001$ ), higher education ( $P < 0.001$ ) and family history of AMI ( $P = 0.002$ ). Indian ethnicity ( $P = 0.007$ ), higher education ( $P = 0.024$ ), personal history of AMI ( $P < 0.001$ ) and family history of AMI ( $P < 0.001$ ) were associated with increased awareness of definitive treatment, while Malay ethnicity was associated with decreased awareness ( $P = 0.030$ ).

### Discussion & Conclusion:

Public awareness of AMI knowledge is poor. There is a need to design educational interventions targeted towards the elderly, the less educated and the Malay community to increase AMI knowledge in Singapore.

## A Risk Index to Predict 30 Days Emergency Hospital Readmission

**CX WU<sup>1</sup>, TK LIM<sup>2</sup>, J CHIA<sup>2</sup>, CH HWANG<sup>2</sup>**

<sup>1</sup>*Alexandra Hospital, Singapore*, <sup>2</sup>*Jurong Health, Singapore*

### Introduction:

Emergency hospital readmissions are costly to the healthcare system. Identifying high-risk patients and targeting intensive post-discharge interventions may help reduce readmissions. This study aims to develop and validate a predictive model to score patients' risk of emergency hospital readmission in an acute hospital in Singapore.

### Methods:

In a retrospective cohort study, data were collected for medical patients discharged from Alexandra Hospital. We identified potential risk factors based on the variables used in the "LACE" index and "HARRPE" model. We constructed logistic regression models to predict readmission or death within 30 days and developed a risk index, using the methods described by Sullivan et al to score the readmission. C-statistics was used to measure discriminative ability and the Hosmer–Lemeshow goodness-of-fit test was used for calibration.

### Results:

Of 3175 patient discharges, 20.3% were readmitted to hospital or died within 30 days of discharge. The variables independently associated with the outcome included admissions in previous 1 year, number of comorbidities, emergency department visits in previous 6 months and length of stay. The risk score was discriminative (c-statistics 0.763, 95% CI, 0.737 to 0.788) and accurate (Hosmer–Lemeshow statistic 11.46,  $P = 0.177$ ) at predicting outcome risk. The optimal cut-off score that maximises sensitivity and specificity was 6. High-risk patients (score  $\geq 6$ ) accounted for 32.0% of the sample, and had 4 times the risk of readmission or death within 30 days compared with other patients.

### Discussion & Conclusion:

Our findings provide a validated tool to enable the identification of high-risk patients by clinicians for intensive post-discharge intervention in Singapore.

## Compliance of Preoperative Chest X-Rays in Anaesthesia Clinic

**YL LEE<sup>1</sup>, PF TEOH<sup>1</sup>, E SEET<sup>1</sup>**

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

### Background/Hypothesis:

Chest x-rays (CXR) are performed as part of preoperative assessment of patients. We performed a retrospective audit of current practices in preoperative CXR ordering in elective patients seen in the Anaesthesia clinic, with the aim of highlighting the indications for CXR ordering in this hospital, compliance rates, and explore the reasons for non-compliance. Absence of a preoperative CXR may result in cancellation or postponement of cases with an impact on operating theatre productivity.

### Methods:

A total 371 patients were audited over 2 weeks (1 to 14 March 2013). All patients undergoing general or regional anaesthesia (GA/RA), and monitored anaesthesia care (MAC) electively, and were reviewed in the anaesthesia clinic were included.

### Results:

Of them, 18% of patients had an indication for a preoperative CXR. There was a 56% compliance rate to the department policy of CXR ordering. The top indications for CXR were (i) low MET (used as a surrogate measure for breathlessness on climbing >2 flights of stairs): 46%, (ii) smoking: 27%, and (iii) BMI  $\geq 35$ : 7%. Amongst the 44% of patients in whom CXR was indicated but not performed, 43% were cases under GA, minor eye RA (43%), non-eye RA (10%) and MAC (3%). The indications for non-compliance were low MET (47%), smoking history (33%), and obesity (7%).

### Discussion & Conclusion:

It is worthwhile to review our department's policy with regards to the need for CXR ordering in patients undergoing minor RA cases and to audit the conversion rate of RA to GA. This would minimise the number of unnecessary CXR ordering in this group of patients.



## **Well-being of the Singapore Elderly (WiSE) Survey: Real-time Computer Assisted Personal Interviewing (CAPI) Data Collection Using iPad**

**BY CHUA<sup>1</sup>, E ABDIN<sup>1</sup>, M SUBRAMANIAM<sup>1</sup>, J VAINGANKAR<sup>1</sup>, L PICCO<sup>1</sup>, SA CHONG<sup>1</sup>**

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

### **Introduction:**

This study describes here what we believe is the first use of an online CAPI in psychiatric epidemiological survey for real-time data collection in the field.

### **Methods:**

In total, 1091 participant records (aged over 60 years) were collected using a web-based application running on iPad. The application is available in dual language-English together with Chinese, Malay or Tamil. Add-on applications included training-videos, voice memo and Global Positioning System (GPS) tracking. Each function was evaluated through data review, field observations and interviewers' feedback.

### **Results:**

The ease of handling, compact dimension and lightweight of iPad improved rapport building with the elderly participants. Dual language interface aided standardisation across languages and interviewers found it easier to rephrase obscure questions. Going paperless is environmentally friendlier. Interviewers avoided lugging thick and heavy questionnaires booklets. Real-time data capture protected confidential content against loss and theft. Data are available for analysis instantaneously. This facilitated the second level validation which has to occur within the month of interview. Minimal (<1%) key-punch errors were observed. iPad's GPS helped interviewers locate addresses, aided supervisor's site tracking and ensured case authenticity. Some limitations observed were disruption or delay in interviewing due to network connectivity problems, and the difficulty of using iPad's touch-screen keypad for open ended questions.

### **Discussion & Conclusion:**

Using iPad improved CAPI real-time data collection during the WiSE survey and simplified downstream activities such as quality control, case management, reporting and record maintenance. The advantages outweigh the limitations and we believe our experience will help pave the future deployment of technology in large scale epidemiology studies.

## Prevalence of Inappropriate Proton Pump Inhibitors (PPI) Prescription Identified at Time of Hospital Discharge in Geriatric Population

**Y HUANG<sup>1</sup>, V LIM<sup>2</sup>, F AKRAM<sup>3</sup>, RM AZIZ<sup>3</sup>**

<sup>1</sup>National University Hospital, Singapore, <sup>2</sup>National University Singapore, Singapore,

<sup>3</sup>National University Health System, Singapore

### Introduction:

Inappropriate PPI prescription remains prevalent in hospitals across Europe and USA despite many publications reporting the harms of PPI. In Singapore tertiary care, the extent of PPI prescription not aligned with recommended guidelines remains unclear. We aimed to study the prevalence of non-evidence based PPI prescriptions for elderly patients at hospital discharges.

### Methods:

Data on clinical characteristics, demographics, and concurrent use of ulcerogenic medications were retrospectively collected in consecutive series of 150 elderly patients (age  $78 \pm 5$  years), admitted to two Internal Medicine wards between 25 May 2011 and 28 June 2011. Pre-admission medication list and discharge prescriptions were compared to determine baseline and new PPI prescriptions, types of PPIs. Indications were noted through review of clinical notes and validated against widely adopted recommendations for PPI prescription.

### Results:

Of the 80 PPI prescriptions, 65 (81%) were inappropriate and had non-validated indications. 10 (12.50%) were appropriate with valid indications, and 5 (6.25%) had no indication identified. The most common non-validated indication was presumed Gastrointestinal bleeding prophylaxis (GIP). Among them, 28 patients (35% of the PPI prescriptions) were concomitantly on low-dose aspirin while 20 patients (25% of the PPI prescriptions) had no documented history or presentation of GI disorders. Of the 10 (12.50%) validated indications, Gastrointestinal prophylaxis for double anti-platelets and symptomatic Gastro-esophageal reflux disease (GERD) were the most common.

### Discussion & Conclusion:

Prevalence of inappropriate and non-evidence based PPI prescriptions is significantly high among elderly hospitalised patients in our practice and more cautious use is recommended.

**The Twenty-Three Hour Observation Unit Admissions within the Emergency Service at a National Tertiary Psychiatric Hospital: Linking Healthcare Utilisation, Clinical Profiles, Functional Outcomes and Predictors of Subsequent Hospitalisation**

**SS THINN<sup>1</sup>, K SIM<sup>1</sup>, C XU<sup>1</sup>, A SU<sup>1</sup>, DSH KOH<sup>1</sup>, CN KUSWANTO<sup>1</sup>**

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

**Introduction:**

While psychiatric crises can be resolved within the psychiatric emergency observation unit without admission, data are scanty especially with respect to service utilisation, clinical profiles, psychosocial functioning and outcome factors within such embedded subunits. Since 2007, a first in Asia 23-hour, 6-bedded observation unit (OU) within the emergency service was started at the Institute of Mental Health (IMH) to provide stabilisation and crisis intervention of acute psychiatric presentations. We examined the healthcare utilisation, clinical profiles of patients and hypothesised that lower psychosocial functioning and specific clinical profile predicted consequent hospitalisation.

**Methods:**

All patients admitted to the OU from 2007 to 2012 (n = 2158 out of 71,420 emergency attendances) were assessed using hospital records for relevant data. Clinical severity and psychosocial functioning were assessed using Clinical Global Impression Severity (CGI-S) and Global Assessment of Functioning (GAF) respectively.

**Results:**

Patients admitted to OU over the 5 year period were preponderantly Chinese male patients over 35 years old with diagnoses of stress related, anxiety and affective spectrum conditions. CGI-S score significantly improved upon discharge from OU ( $t_{(1, 1848)} = 23.316$ ,  $P < 0.001$ ). Self-referred, older patients with past psychiatric history, lower GAF and CGI-S scores, were more likely to be hospitalised after their 23-hour stay in OU (all  $P < 0.001$ ).

**Discussion & Conclusion:**

Our findings support the effectiveness of OU in improving overall clinical status. Psychiatric healthcare providers should focus attention on individuals who are older, with past psychiatric history, poorer psychosocial functioning to optimise outpatient management and rehabilitation to reduce hospitalisation and unnecessary healthcare cost and burden on the sufferer and caregivers.

## Does Universal Screening of MRSA in the Emergency Department Affect Bed Waiting Time?

**E KAN<sup>1</sup>, PR KANNAPIRAN<sup>1</sup>, SY TAY<sup>2</sup>, CKK SOH<sup>2</sup>, BSP ANG<sup>2</sup>, SST TIANG<sup>2</sup>, PK ONG<sup>2</sup>**

*<sup>1</sup>National Healthcare Group HQ, Singapore, <sup>2</sup>Tan Tock Seng Hospital, Singapore*

### Introduction:

Introduction Methicillin-resistant *Staphylococcus Aureus* (MRSA) infection is associated with significant morbidity and mortality. Universal screening of MRSA before admission to hospital is a step in reducing subsequent MRSA transmission, length of stay and economic burden. This will inevitably affect bed waiting time of patients in ED. Objective to ascertain if universal screening of MRSA using polymerase chain reaction (PCR) technique affect bed waiting time of admitted patients from emergency department (ED).

### Methods:

A retrospective before-and-after cohort study was performed. In Phase I of the study, the average bed waiting time between the period of May to July 2011 ('before' cohort) and May to July 2012 ('after' cohort) were compared using 2-sample independent t-test.

### Results:

A total of 26,902 cases were included in the study. The average waiting time for the period May to July 2011 and May to July 2012 were 2.73 hours and 3.88 hours respectively. The difference in the average waiting time was statistically significant (95% CI, 1.09 to 1.22,  $P < 0.05$ ). Patients with Patient Acuity Scale of 2 (PAC2) had the largest difference in average waiting time (2.82 vs 4.16 hours, 95% CI, 1.26 to 1.41,  $P < 0.05$ ).

### Discussion & Conclusion:

Preliminary analysis showed that MRSA screening prior to admission may affect bed waiting time in ED. Subsequent Phase II of the study will consider confounding factors that may contribute to bed waiting time, such as bed occupancy rate, average length of stay and usable ward space in a multiple linear regression analysis.

## Evaluation of Patient Waiting Time in Emergency Department Governed by a Generic Maximum Waiting Time Policy

**F MENG<sup>1</sup>, BH HENG<sup>1</sup>, KL TEOW<sup>1</sup>, SY TAY<sup>2</sup>, CK OOI<sup>2</sup>**

<sup>1</sup>National Healthcare Group HQ, Singapore, <sup>2</sup>Tan Tock Seng Hospital, Singapore

### Introduction:

Waiting time can affect patient satisfaction and quality of care. In particular, analysis has shown that waiting time in emergency department (ED) accounted for more than 50% of total patient turn-around time. The objective of this study is to evaluate new mean waiting time and its variance governed by a generic maximum waiting time policy such that patients who waited beyond a threshold had their wait shortened. Patient waiting time referred to patient consult waiting time and was assumed to follow a general phase-type distribution.

### Methods:

A retrospective study was carried out using PAC3 (patient acuity category) patient data of a local emergency department. Descriptive statistics and modeling were performed. Under the maximum waiting time policy, original waiting time distribution was transformed to a piecewise distribution, of which mean and its variance were estimated using the established formulae.

### Results:

When the threshold was set from median to 95th percentile of the waiting time data (range, 40 to 128 minutes), the new mean waiting time ranged from 26 to 48 minutes, resulting in 6% to 48% reduction in the original mean waiting time. And, its variance ranged from 83 to 1069 attaining 30% to 95% reduction. To achieve an expected waiting time from 25 to 45 minutes, the threshold needed to be from 33 to 102 minutes.

### Discussion & Conclusion:

The proposed quantitative model helps to estimate expected waiting time and its variance when there is a process to clear long-waiting patients within certain period. Managers can use this information to plan for capacity, such as space and manpower.

## Screening for Methicillin-Resistant Staphylococcus Aureus (MRSA) Colonisation at Hospital Admission: Universal vs Selective Screening

**Y SUN<sup>1</sup>, P KANNAPIRAN<sup>1</sup>, K TEO<sup>1</sup>, BH HENG<sup>1</sup>, B ANG<sup>2</sup>**

<sup>1</sup>National Healthcare Group HQ, Singapore, <sup>2</sup>Tan Tock Seng Hospital, Singapore

### Introduction:

Methicillin-Resistant Staphylococcus Aureus (MRSA) is one of the most common sources of nosocomial infections and it significantly contributes to poorer clinical outcomes and higher utilisation. Screening for MRSA colonisation upon admission and isolation of identified MRSA carriers has been proposed as a strategy to prevent nosocomial spread of MRSA. The goal of this study is to identify the most cost effective screening strategy.

### Methods:

All admitted patients to Tan Tock Seng Hospital (TTSH) in 2012 were included. A risk prediction model was developed and validated to select high-risk patients for screening, using logistic regression and Bayesian Information Criteria. Markov decision analysis was applied to identify the cost-effective screening strategy. The 3 strategies were compared in terms of the cost per infection prevented: polymerase chain reaction (PCR) screening for all; PCR screening for selected high-risk patients; no screening.

### Results:

In the risk prediction model, the important predictors identified were patients with kidney diseases, cardiovascular diseases, chronic obstructive pulmonary disease (COPD), diabetes, or stroke, elder age, history of hospitalisation. The c-statistics of the ROC of the prediction model was 0.78 (95% CI, 0.77 to 0.79). Considering the cost of infection treatment, MRSA prevalence rate, the incidence rate of hospital infection, the sensitivity and specificity of predicting the high-risk patients, the most cost effective screening strategy was selective screening, which cost about \$15.8K (95% CI, \$7.8K to \$21.9K) per infection prevented.

### Discussion & Conclusion:

The study provides an evidence-based decision tool for policy makers to standardise care and set guidelines on cost effective infectious disease control in hospitals.

## **Prevalence of Medication Discrepancies and Adequacy of Documented Medication Changes in Physician Discharge Summaries for Elderly Patient Discharged from a Tertiary Hospital**

**Y LIM<sup>1</sup>, Y HUANG<sup>2</sup>, F AKRAM<sup>3</sup>, RM AZIZ<sup>3</sup>**

<sup>1</sup>*National University Hospital, Singapore,* <sup>2</sup>*National University of Singapore, Singapore,*

<sup>3</sup>*National University Health System, Singapore*

### **Introduction:**

Physician discharge summaries are often the only hospital records accessible to community healthcare providers. Medication discrepancies and poor documentation of medication changes in discharge summaries can result in preventable medication errors and adverse outcomes. This study aimed to identify and characterise medication discrepancies between pre-admission and discharge medication lists; assess associated risk factors and determine the comprehensiveness of medication changes documentation.

### **Methods:**

A retrospectively review of consecutive 150 elderly patients (age  $78 \pm 5$  years), admitted to 2 Internal Medicine wards between 25 May 2011 and 28 June 2011 was done. Pre-admission and discharge medication lists were compared for discrepancies such as addition, omission, duplication and change in dosage, frequency or formulation. Discrepancies were classified as intentional or unintentional upon reviewing clinical records and discharge summaries. Documented reasons for intentional medication changes in discharge summaries were noted.

### **Results:**

Forty-two unintentional medication discrepancies were identified; of which 35 (23.3 %) were related to addition/omission of a medication and 7 were related to changes in dose or frequency. Omission of baseline medication was the most common. Of the 237 documented intentional discrepancies, 5 (2.1 %) were intentional with conflict. In 54 (22.8%) cases, there were no reasons provided in physician discharge summaries. Incidence of unintentional or conflicting discrepancy was found to be associated with the number of discrepancies per patient on discharge (OR = 1.29, 95% CI, 1.06 to 1.56).

### **Discussion & Conclusion:**

Unintentional medication discrepancies are common and discharge summaries are often inadequate in documenting reasons for medication changes. Recommendations are for medication reconciliation.

## Predictors of Mortality in Patients with Chronic Kidney Disease: A 5-year Retrospective Cohort Study

**Y ANG<sup>1</sup>, BH HENG<sup>1</sup>, KY CHOW<sup>2</sup>, ST LIEW<sup>3</sup>, PN CHONG<sup>4</sup>**

<sup>1</sup>National Healthcare Group HQ, Singapore, <sup>2</sup>Health Promotion Board, Singapore, <sup>3</sup>Tan Tock Seng Hospital, Singapore, <sup>4</sup>National Healthcare Group Polyclinics, Singapore

### Introduction:

The prognosis of chronic kidney disease (CKD) patients is guarded as epidemiological studies have shown that all-cause mortality increases as kidney function decreases. The aims of the study are to estimate the mortality rate of CKD patients by stages and to identify predictors of mortality.

### Methods:

This is a retrospective cohort study of stage 3A and above CKD patients (estimated glomerular filtration rate [egfr] less than 60 mL/min per 1.73m<sup>2</sup> from the National Healthcare Group Renal Registry from 1 January to 31 December 2007. Deidentified death data were obtained from the National Registry of Disease Office. The patients were followed up till 26 April 2013 and the outcome of interest was death from all causes. Univariate followed by multivariate Cox's proportional hazards regression was used to assess associations, measured as hazard ratios (HR), between predictors and all-cause deaths.

### Results:

Over a mean follow-up period of 5.1 (SD 1.0) years, 638 out of 2759 (23.1%) patients died. The annual mortality rate is 4.6% (95% confidence interval [CI] 4.2 to 4.9%) and the mortality rate increases progressively with severity of disease [Stage 3A (2.7%), Stage 3B (4.3%), Stage 4 (8.0%) and Stage 5 (12.0%)]. Predictors associated with 5-year mortality are (i) lower egfr (HR 1.04, 95% CI, 1.03 to 1.04), (ii) increasing age (HR 1.06, 95% CI, 1.05 to 1.07), (iii) male gender (HR 1.40, 95% CI, 1.20 to 1.64) and (iv) co-existing diabetes mellitus (HR 1.44, 95% CI, 1.20 to 1.71).

### Discussion & Conclusion:

This study affirms the guarded prognosis of CKD patients in Singapore; evidence-based interventions to retard progression are imperative.



## A Community-based Haze Clinic Initiative in Singapore: Clinical Experience and Impact

**B YEO<sup>1</sup>, HH OON<sup>1</sup>, CF LIEW<sup>2</sup>, VTW LEE<sup>3</sup>, KS HO<sup>4</sup>, CCY KEW<sup>5</sup>, SBL TEO<sup>5</sup>**

*<sup>1</sup>National Skin Centre, Singapore, <sup>2</sup>Raffles Hospital, Singapore, <sup>3</sup>Singapore General Hospital, Singapore, <sup>4</sup>Oral & Maxillo-Facial Surgery, Specialist Dental Group, Singapore, <sup>5</sup>KK Women's and Children's Hospital, Singapore*

### Introduction:

Haze levels in Singapore hit record levels in June 2013. Particulate matter from haze is associated with eye, nose, throat and skin irritation, as well as exacerbation of pre-existing disorders such as asthma and chronic obstructive lung disease. Community-led projects such as voluntary clinics provide convenient free healthcare access to local residents, especially the needy, and can play an important role in alleviating health concerns in the community.

### Methods:

Grassroots leaders of the Ulu Pandan Constituency started the first free community Haze Clinic on 25 June 2013 after haze levels reached record highs. The clinic was staffed by a team of volunteer doctors and allied health professionals. This free clinic service was held every Tuesday and Thursday evenings from 25 June 2013 to 11 July 2013 and was open to all residents of the Ulu Pandan Constituency.

### Results:

Over a hundred patients were seen in the community Haze Clinic. Diagnoses include non-specific haze-related symptoms like conjunctivitis, cough, sore throat and upper respiratory tract infection, as well as exacerbation of allergic rhinitis and eczema. A number of patients also presented with non-haze related medical conditions such as scalds, hypertension and diarrhoea.

### Discussion & Conclusion:

Community-based Haze Clinics provide a readily accessible avenue for local residents to seek free medical consultation, allay their anxieties and address health concerns about the poor air quality. They also help to reduce non-emergency patient load at emergency departments. The large number of consultations with non-haze related ailments points at an unmet need for more free clinics in the community.

## **A Randomised Controlled Study to Explore the Effect of Life-story Review on Depression in Older Adults in Singapore**

**MF CHAN<sup>1</sup>, A TIEN<sup>1</sup>, SBAL KHAN<sup>1</sup>, RCM HO<sup>1</sup>, J THAYALA<sup>2</sup>**

<sup>1</sup>*National University of Singapore, Singapore,* <sup>2</sup>*Institute of Mental Health, Singapore*

### **Introduction:**

There is little evidence to support the efficacy of the life-story review in mediating depressive symptoms. This study aims to examine the effects of the life-story review on depression levels amongst older community-dwelling adults in Singapore.

### **Methods:**

A randomised controlled trial was conducted from January 2011 to March 2013. One hundred and two older adults aged 60 years and above with mild to severe depression were randomly allocated to either the life-story review (intervention) group (n = 52) or the non life-story review (control) group (n = 50). Subjects in the intervention group were shared their life-story with the interviewer on a one to one basis on 5 sessions over 8 weeks. Depressive symptoms were measured by the Geriatric Depression Scale. Generalised estimating equations (GEE) were used to examine the effects of the intervention on the elders' depression level.

### **Results:**

Significant reductions in depression scores were found in the intervention group from baseline (Mean=6.9 [SD=2.5]) to week 8 (1.9 [1.3],  $X^2=23.21$ ,  $P < 0.001$ ). At week 8, the intervention group showed a lower level of depression than the control (Control: 5.6 [1.8],  $X^2=28.45$ ,  $P < 0.001$ ).

### **Discussion & Conclusion:**

This study supports the life-story review process as an effective intervention for depressed older adults. The findings suggest that this intervention may enhance the quality of care provided by healthcare providers as the therapeutic relationship between the provider and client is being established.

## **Continuity of Care Issues in the Singapore Health System: An In-depth Interview Study of Patients with Liver Cirrhosis**

**HZ TEO<sup>1</sup>, GE SKLAR<sup>1</sup>, KTH SIAH<sup>2</sup>, LG GOH<sup>2</sup>**

*<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>National University Health System, Singapore*

### **Background/Hypothesis:**

Continuity of care occurs when a patient experiences coherent and linked care over time. As patients transition from hospital to home and ambulatory care, gaps in care can arise. Continuity of care in the Singapore healthcare system for patients with liver cirrhosis is unexplored. The primary aim of this study is to identify issues of continuity of care in patients with liver cirrhosis complicated by advanced disease, liver transplant or malignant change. The secondary aim is to propose solutions to issues identified.

### **Methods:**

In-depth, semi-structured interviews were conducted with 17 individuals (16 patients and one caregiver). Responses were analysed thematically.

### **Results:**

Patients valued appointment reminders, frequent and consistent medical advice, concern and willingness to help by healthcare professionals, and access to hospital care when needed. Gaps in continuity with General Practitioners (GPs) exist. The National Electronic Health Record (NEHR) database was welcomed by patients. Patients generally felt that doctors should maintain their medical records, and that medical records access should be unrestricted to all care providers.

### **Discussion & Conclusion:**

Patients with liver cirrhosis interviewed were generally satisfied with their continuity of care. Clear instructions are valued. Gaps in cross-boundary continuity with GPs and medication-related discontinuity exist and remain to be improved. For patients with liver cirrhosis complicated by advanced disease, liver transplant or malignant change, clear instructions, education about their condition and medications, and appointment reminders are recommended. Partnerships between primary care sites and hospitals should be further developed and the NEHR database adopted by every care setting will facilitate this.

## **Vital Signs Monitoring to Detect Deteriorating Patients: How General Ward Nurses View this Fundamental Nursing Care?**

**WQ MOK<sup>1</sup>, SY LIAW<sup>1</sup>, WR WANG<sup>1</sup>, EANG<sup>2</sup>**

*<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>National University Health System, Singapore*

### **Introduction:**

Being in most frequent contact with patients and holding the responsibility of vital signs monitoring, nurses are ideally positioned to detect and report deterioration. The study aims to determine the level of nurses' attitude towards vital signs monitoring in detecting and reporting deterioration, and the most influential factor in predicting nurses' attitude.

### **Methods:**

An exploratory descriptive study using self-administered questionnaires was employed during December 2012. The attitude of 380 general ward nurses was measured using a newly-developed 16-item VITALS scale categorised under 5 subscales: key indicators, knowledge, workload, technology, and communication. Responses to each item and subscale were presented using descriptive statistics. Multiple linear regression analysis was used to determine the most influential factor that predicts nurses' attitude.

### **Results:**

The overall mean attitude score (Mean = 3.45; SD = 0.46) on a 5-point scale demonstrated a satisfactory attitude among nurses towards vital signs monitoring. The subscale for key indicators received the lowest mean score (Mean = 2.89; SD = 0.68), highlighting limited understanding of key deterioration indicators among the nurses. Level of nursing education was found to be the most significant factor in predicting a good attitude towards vital signs monitoring.

### **Discussion & Conclusion:**

Nurses held misconception about respiratory rate as the least important indicator of deterioration. An over-reliance on pulse oximeter could have caused the neglect of respiratory rate monitoring. Vital signs monitoring tend to be regarded as a routine task which some nurses face difficulty coping with it. A structured educational programme focusing on measurement and interpretation of vital signs is needed to improve nurses' attitude towards vital signs monitoring.

## Health-Seeking Behaviour of Migrant Workers Living in a Single Dormitory in Singapore

**W LEE<sup>1</sup>, A NEO<sup>1</sup>, E WONG<sup>1</sup>, M CHEN<sup>2</sup>, C HO<sup>1</sup>**

<sup>1</sup>*National University of Singapore, Singapore,* <sup>2</sup>*Tan Tock Seng Hospital, Singapore,*

### Introduction:

Foreign workers' migrant status places them at a disadvantage to seek help from health services. This study aims to understand the health-seeking behaviour, accessibility, and beliefs of migrant workers in Singapore and barriers to accessing primary healthcare.

### Methods:

A cross-sectional study of 525 male migrant workers,  $\geq 21$  years old and of Indian, Bangladeshi or Burmese nationality, was conducted via self-administered questionnaires at a commercial dormitory in Jurong. Data collected included demographics, prevalence of medical conditions and health-seeking behaviours through scenarios and personal experience. Results were analysed using SPSS; chi-square test to determine associations between demographics and health-seeking beliefs, and Mantel-Haenszel formula to analyse confounders.

### Results:

A total of 70.8% of participants did not have or were not aware if they had insurance. Among them, 62.6% of participants have fallen sick before, of which 87.1% saw a doctor. Number of rest days was significantly associated with higher number of doctors' visits for last illness episode ( $P = 0.031$ ). A total of 84.4% of those who saw a doctor responded that improvements in work ability was among their reasons for doing so, and 37.6% listed taking ownership of their own health as the most important reason. Most responded appropriately according to severity of the hypothetical scenarios. However, in an example, a significant number of 75 participants would continue to work even with conditions that caused functional impairment.

### Discussion & Conclusion:

More research is required to explore responses to worksite injury and other common ailments. Migrant policies, including education, insurance and health assistance, should be looked into, and feasible measures taken to ensure equity in healthcare access.

## **Implementation of a Chronic Obstructive Pulmonary Disease (COPD) Integrated Care Pathway (ICP) Programme to Improve Outcomes of COPD Patients**

**GSW CHUA<sup>1</sup>, SL KWEK<sup>1</sup>, CK SEE<sup>1</sup>, TG CHEE<sup>1</sup>, CX WU<sup>1</sup>, YM CHOO<sup>1</sup>**

*<sup>1</sup>Jurong Health Services, Singapore*

### **Introduction:**

In JurongHealth, we implemented a chronic obstructive pulmonary disease (COPD) Integrated Care Pathway (ICP) programme in April 2012, involving primary, hospital-based, community-based and palliative care, to provide comprehensive care for COPD patients at different stages of the disease. We have succeeded in reducing the 30-day hospital readmission rates of COPD patients and improved their perceived quality of life within the first year of enrolment into the programme.

### **Methods:**

For patients enrolled into the programme, case managers initiate “high touch” case management, contacting the patients admitted for exacerbations within 48 hours of discharge. They act as liaison between patients and their primary care and specialist physicians, social services, home visit services and palliative care. The ICP team holds monthly inter-disciplinary meetings to discuss possible gaps in clinical care and unmet social needs of patients who re-admit in the preceding month. The quality of life of the patients is measured using the COPD assessment tool (CAT) at baseline and during their follow-up visits.

### **Results:**

In total, 123 patients were enrolled between April 2012 and March 2013. The overall COPD 30-day readmission rate has improved from 39.8% in FY2011 to 31.5% in FY2012. Among them, 70.2% of Group B and D patients with baseline line score >10 showed >10% improvement in CAT score from their baseline.

### **Discussion & Conclusion:**

Our programme has shown improvement in the overall 30-day readmission rate and quality of life for the COPD patients.

-

## Factors Associated with Admission to Medical Intensive Care Unit High Dependency Unit from Emergency Department or Death Within 24hours

**MM THET<sup>1</sup>, WF CHONG<sup>1</sup>, SY TAY<sup>2</sup>, E SEOW<sup>2</sup>, SS LOH<sup>2</sup>, BHC HENG<sup>2</sup>**

<sup>1</sup>National Healthcare Group HQ, Singapore, <sup>2</sup>Tan Tock Seng Hospital, Singapore

### Introduction:

This study aims to identify factors associated with medical intensive care unit (MICU) or high dependency unit (HDU) admission within 24 hours from the emergency department (ED) of a tertiary hospital or death within 24hours. This is part of a larger study to generate a composite score to be used alongside the clinical decision for MICU/HDU transfer.

### Methods:

A retrospective observational cohort study was conducted. Information on demographics, pre-admission functional status, comorbidities, clinical and laboratory parameters on arrival at ED and treatment initiated at ED were collected. The outcome of interest was a combined endpoint of admission to MICU/HDU or death within 24hours.

### Results:

We excluded 142 patients from the analysis since they were intubated or had cardiopulmonary resuscitation performed at ED and accepted by MICU without any exception. Of the remaining 3795 patients, 373 (9.8%) had the primary endpoint which were transfer to MICU/HDU or death within 24 hours. From the multivariate analyses, treatment with inotropes (OR: 5.63; 95% CI, range, 3.94 to 8.06), respiratory distress (OR: 2.16; 95% CI, range, 1.52 to 3.06), heart rate (OR:1.46; 95% CI, range, 1.15 to 1.86), respiratory rate (OR: 5.82; 95% CI, range, 2.80 to 12.1), mean arterial pressure (OR: 1.38; 95% CI, range, 1.08 to 1.77), hyperkalemia (OR: 2.09; 95% CI, range, 1.54 to 2.84), oxygen saturation (OR: 1.98 95% CI, range, 1.14 to 3.45), creatinine (OR:1.63; 95% CI, range, 1.18 to 2.24), urea (OR:1.89; 95% CI, range, 1.47 to 2.44), total white cell count (OR:1.53; 95% CI, range, 1.18 to 1.97), assisted (OR: 0.26; 95%, range, CI 0.16 to 0.42) and dependent activities of daily living (OR: 0.12; 95% CI, range, 0.05 to 0.26) were factors found to be associated with the combined outcome.

### Discussion & Conclusion:

Our study supported the need to use a scoring system to identify ED patients at high risk for poor outcomes.

## Factors Influencing Patients Adherence to Follow-Up Post Bariatric Surgery: An Asian Experience

**A TOH<sup>1</sup>, KAVITA<sup>1</sup>, Z SU<sup>1</sup>, A KOURA<sup>1</sup>, J RAO<sup>1</sup>**

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

### Introduction:

High-default rate for post-surgery at outpatient bariatric surgery clinic is a drain on resources. Specifically, economic cost of unutilised equipment and manpower, secondly, increased wait time – that other patients must wait longer to see the hospital specialists and thirdly, lack of follow-up increases complications and lowers chances of sustained weight-loss. This study sought to examine factors influencing patient's adherence to attending the psychologist's and dietician's appointments.

### Methods:

Patients, who have undergone bariatric surgery in Tan Tock Seng Hospital, between 2011 and 2012, and were keen to participate in the study were sent an email of an online questionnaire.

### Results:

Among 47 study participants, 21 responded. Total response rate: 44.68%. Results suggested that factors influencing patient's adherence to attending psychologist appointment were "patient's perception of excess benefit of care" (28.57%), "lacking cues to attend the appointment" (26.98%), "financial cost of attending the appointment" (16.67%) and "appointment-related barriers to care" (13.1%). Factors influencing patient's adherence to attending dietician's appointment were "appointment-related barriers to care" (20.24%), "perception of excess benefit of care" (19.05%), "financial cost of attending the appointment" (14.29%), and "lacking cues to attend the appointment" (6.35%).

### Discussion & Conclusion:

Results suggested that the reason for non-adherence to post-surgery follow-up appointments is multi-factorial, with factors differing between the psychologist and dietician's appointments. Patient's lack of information and beliefs regarding post-surgery follow-up may possibly influence their motivation to remember and keep appointments. These factors shed light on potential interventions to improve adherence to post-surgery follow-up appointments. Validity remains to be verified in studies with larger sample size.



## A Snapshot of Audits in the Phototherapy Unit

**B LIM<sup>1</sup>, B LIM<sup>2</sup>, YC TAN<sup>2</sup>, WS CHONG<sup>2</sup>**

<sup>1</sup>National Healthcare Group HQ, Singapore, <sup>2</sup>National Skin Centre, Singapore

### Introduction:

Ultraviolet phototherapy and photochemotherapy is used to treat a variety of skin disorder, including psoriasis, eczema, mycosis fungoides and others. The adverse effects of treatment include erythema and burns. It is important that the patients requiring phototherapy and photochemotherapy are provided with safe, appropriate and effective treatment. The aim of this project was to assess the degree to which a phototherapy unit met established standards for providing the treatment.

### Methods:

The audit was conducted from 5 to 9 November 2012 at the Phototherapy Clinic in National Skin Centre, Singapore. The elements on patient access and assessment, patient care and continuity of care, patient rights and responsibilities, patient record and information flow, patient and family education, infection control and facility safety and human resource management were measured. Permission to access patients' medical records, on-site surveys of staff and clinic were sought with approval of director of NSC. Measurable elements evident in the clinical documentation were rated as either "Fully Met", "Partially Met" or "Not Met".

### Results:

On-site survey revealed that there was no clear administrative procedures on criteria of referrals to the Phototherapy Unit and, inadequate regular staff training in monitoring of operational efficiency of medical equipment. In all, 75% of the clinical records audited had fully met the measurable elements of clinical governance and standards.

### Discussion & Conclusion:

A well-coordinated process with the collaborative effort of inter-department professionals is critical in ensuring policies and procedures that guide the provision of high-risk services are adhered to.

## Understanding the Complexity of Patient Movements in Emergency Department for Patient Care Management

**F MENG<sup>1</sup>, BH HENG<sup>1</sup>, KL TEOW<sup>1</sup>, P KANNAPIRAN<sup>1</sup>, CK OOI<sup>2</sup>, SY TAY<sup>2</sup>**

<sup>1</sup>National Healthcare Group HQ, Singapore, <sup>2</sup>Tan Tock Seng Hospital, Singapore

### Introduction:

Emergency department (ED) patient flow is poorly understood with few studies having been published. This lack of information has limited the application of system-wide quality improvement measures related to patient satisfaction and health care quality. The objective of this study is to evaluate patient flow patterns by identifying patient movements at different areas in ED.

### Methods:

A retrospective study was carried out using patient data of a local emergency department. For each patient, individual movements within ED were identified using the notion of touch points and location change information in the data, from which all possible patient flow patterns were derived. Descriptive statistics were performed.

### Results:

A total of 41,231 patients of 3-month patient data were reviewed with approximately 448.2 daily patient visits. In total, 270 different flow patterns were identified, where there are 204 patterns for PAC2 (patient acuity category) patients, 134 patterns for PAC3 patients, 88 patterns for PAC1, and 16 patterns for PAC4 patients. We ascertained the overall top 15 patient patterns which accounts for 91.8% of patients with patient visit ranging from 2.5 to 117.1 per day. Main patient flow patterns with respect to each PAC were also studied. In particular, for PAC2 patients, 13 patient patterns account for at least 90% of its pool while there are 7 patient patterns for the case of PAC3 patients.

### Discussion & Conclusion:

Our study helps clinicians and managers to better understand the complexity of ED patient flows, which could be further applied to improve emergency medical care, especially nursing efficiency and diagnosis.

## **An Audit of Chronic Obstructive Pulmonary Disease (COPD) Management in an Outpatient Setting**

**KJA TEOH<sup>1</sup>, WHE LIM<sup>1</sup>, K PANCHANATHAN<sup>1</sup>, AWK NG<sup>1</sup>**

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

### **Introduction:**

Patients with chronic obstructive pulmonary disease (COPD) require long-term follow-up because of debilitating lung disease characterised by irreversible airflow obstruction and progressive decline of lung function.

### **Methods:**

Case note review of patients attending the Respiratory Medicine Outpatient Clinic in January 2013.

### **Results:**

Of 2348 scheduled clinic attendances, 242 were attributed to COPD; 197 (81.4%) patients turned up; 55 attended the COPD clinic where they were also attended to by case managers. In all, 188 clinical notes were available for review. Diagnosis was confirmed by spirometry in 154 (81.9%) patients; most patients had advanced disease, 74 (48.1%) stage 3, 22 (14.3%) stage 4. Diagnosis was clinical in 34. A total of 123 (65.4%) patients had quit smoking and 36 (19%) had recent hospitalisation for an exacerbation. CAT (COPD Assessment Test) score was <10 (low impact) in 37 (75.5%) patients, and 10 to 20 (medium impact) 12 (24.5%) patients; mean MMRC score was 1.86. All except one were on bronchodilators; 78 had long acting bronchodilators. Inhaled corticosteroids or combination inhalers were prescribed for 151 (80.3%) patients, including 36 patients with Stage 1, 2 COPD. Thirty (16.0%) patients without airflow obstruction were given prescriptions for COPD, suggesting inappropriate treatment. Compliance to influenza vaccination was noted to be better in patients seen at the COPD clinic (92% vs 70%).

### **Discussion & Conclusion:**

Areas for improvement identified are: (i) Confirmation of diagnosis to be performed where possible to avoid inappropriate treatment. (ii) Overtreatment can be avoided by adhering to treatment guidelines. (iii) Compliance to annual influenza vaccination.

## Setting Appropriate Elective Operating Theatre Utilisation Targets for Surgical Departments

**P KANNAPIRAN<sup>1</sup>, T ANG<sup>2</sup>, H RAFMAN<sup>2</sup>**

<sup>1</sup>National Healthcare Group HQ, Singapore, <sup>2</sup>National University Health System, Singapore

### Introduction:

Different surgical departments should have different target Operating Theatre utilisation targets considering variations. We propose a custom target based on aggregate statistics ensuring fairness in overtime measures across departments.

### Methods:

We use the central limit theorem to approximate total duration of all surgeries, done in a day with a capacity of 8.5 hours, as normal distribution. Assuming a 35% ( $\alpha$ ) chance of overtime (computed iteratively), we derive the daily number of surgeries to be planned and appropriate utilisation. Surgical duration data from NUH elective surgeries were used. We derive the utilisation level as  $1 + x/2 - \sqrt{x + x^2/4}$  where  $x = (k \cdot sd)^2 / (\text{average duration} \cdot \text{capacity})$  and  $k$  is the cut off for 35% chance of overtime. We also compute the expected overtime.

### Results:

Using the above equation, a surgical department with ( $m = 4.3$  h,  $s = 2.3$  h) should operate at 86% utilisation and one with ( $m = 3.3$  h,  $s = 1.5$  h) at 90%. Also the key statistic to monitor is approximately  $sd/\sqrt{\text{mean}}$  and not the Coefficient of Variation ( $sd/\text{mean}$ ) because of the addition of several random variables.

### Discussion & Conclusion:

Intuitively, we know that departments with a low variation will be able to operate at higher utilisation. We show a quantitative approach for hospitals to set targets using retrospective routine data, for the same degree of overtime. If little overtime is allowed, the utilisation will be very low. Also either 'chance of overtime' or 'average overtime' can be set as target, not both.

## Health Screening Perceptions in Singapore—A Grounded Theory Study

**R LI<sup>1</sup>, BH HENG<sup>1</sup>, E SEOW<sup>2</sup>**

<sup>1</sup>*National Healthcare Group HQ, Singapore*, <sup>2</sup>*Tan Tock Seng Hospital, Singapore*

### **Introduction:**

Routine health screening has been increasingly used as a way to detect various diseases. Given its increasing importance in public health, a firm knowledge on the perceptions towards health screening would provide insights into possible effective strategies to encourage people to undertake regular health screening. The aim of this study is to understand the health screening perceptions of residents of Singapore.

### **Methods:**

A total of 16 respondents were recruited from a local hospital. Grounded theory was used to guide the design, analysis and interpretation of the study. Semi-structured interviews were administered to the respondents and the Model of Human Occupation (MOHO) provided the theoretical framework to guide the development of the interviews.

### **Results:**

This study uncovered 6 main themes: “value of screening”, “price considerations”, perception of health screening”, “and motivation to screen”, “barriers to screen and attitudes towards health”. These themes were analysed using the MOHO constructs environment, volition and habituation. The results showed that the respondent’s value system, their external environment and daily routine have a heavy influence on their willingness to undergo health screening.

### **Discussion & Conclusion:**

From the results, we found that there were many interactions that takes place between a person’s value system and his/her external environment. Interventional strategies must consider the modifiable aspects of the value system and/or environment in order to be effective. The study also proposed some possible interventional strategies to better appeal to the general population to take up routine health screening.

## Does Computerised Decision Support System at Emergency Department Reduce Inpatient Inter-disciplinary Transfer?—A Preliminary Report

**HS LIM<sup>1</sup>, CK OOI<sup>1</sup>**

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

### Introduction:

Clinical Decision Support System (CDSS) has the potential to improve efficiency and reduce cognitive load in a busy emergency department (ED). CDSS was introduced in Tan Tock Seng Hospital ED in October 2011 to assist with disposition decisions to compare the proportions of inpatient inter-disciplinary transfer before and after the introduction of CDSS in ED.

### Methods:

Retrospective case review for all ED admissions was done for January 2011 (pre-introduction of CDSS) and January 2013 (post-introduction). The following variables were collected: (i) Admission discipline at ED; (ii) Discharge discipline at ward. The proportion of inpatient inter-disciplinary transfer between the two periods were compared using chi-square statistics.

### Results:

The total number of ED admissions for January 2011 and January 2013 were 3963 and 3938 cases respectively. The overall percentage of cases that were transferred to another inpatient discipline after admission before and after the introduction of CDSS were 5.70% and 8.43% respectively. The difference in the proportions were statistically significant (chi-square = 22.981,  $P < 0.05$ ). Before the introduction of CDSS, patients admitted to Neurosurgery has the highest transfer rate at 18.12%, whereas after the introduction of CDSS, patients admitted to Neurology has the highest transfer rate at 12.69%.

### Discussion & Conclusion:

In this pilot study, CDSS did not change the inpatient inter-disciplinary transfer rate. Further analysis is required to assess potential confounding factors such as ED admission diagnoses and new diagnoses made inpatient.

## Informal Caregivers' Unmet Needs for Dementia Care Resources and Services

**JA VAINGANKAR<sup>1</sup>, M SUBRAMANIAM<sup>1</sup>, L PICCO<sup>1</sup>, E ABDIN<sup>1</sup>, BY CHUA<sup>1</sup>,  
SA CHONG<sup>1</sup>**

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

### Introduction:

An increasing number of elderly with dementia are cared for at home by informal caregivers. We evaluated caregivers' unmet needs for information, support, healthcare resources and services for dementia.

### Methods:

The study population comprised adult informal caregivers (n = 53) of people with dementia in Singapore. Unmet needs were assessed using a newly developed 26-item Caregivers' Needs Checklist for Dementia where statements on adequacy of resources and services were listed, for example 'The hospitals that are available for my relative/friend with dementia are adequate'; with a 6-point response scale (Ranging from 'Strongly agree' to 'This does not apply to me'). Unmet need was assessed by determining the proportion of caregivers who disagreed with the respective statements. Descriptive statistics were computed.

### Results:

The mean age of the caregivers was 55.5 (SD 10.4) years, majority were women (63.2%), employed (56.0%) and children (76.8%) of the person with dementia. Caregivers included 42.4% Indians, 32.2% Chinese and 25.4% Malays. The highest unmet need was for financially affordable professional services: 55.4% of the caregivers disagreed that these were adequate, followed by financial support (51.9% disagreed). The least unmet need reported was for emotional support and information on recognising the early signs of dementia with 66.1% and 58.9%, respectively, agreeing these were adequate.

### Discussion & Conclusion:

Financial resource barrier is associated with disparity in access and utilisation of services. In order to improve the access to resources and services for dementia, it is important to conduct regular needs' assessments among caregivers and establish the determinants of their unmet needs.

## **Satisfaction and Helpfulness of Health Service Providers: Results from the Singapore Mental Health Study**

**YJ ZHANG<sup>1</sup>, EB ABDIN<sup>1</sup>, M SUBRAMANIAM<sup>1</sup>, JA VAINGANKAR<sup>1</sup>, SA CHONG<sup>1</sup>**

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

### **Introduction:**

With the rise of consumers' expectations, consumer satisfaction and perceived services effectiveness have assumed importance in service evaluation. This study explored the perception of those who sought help for mental health problems from the various care providers in Singapore.

### **Methods:**

This study is part of the Singapore Mental Health Study where a representative sample (6616 respondents) aged 18 years and above was assessed for the prevalence of 12-month mental disorders and services sought using the Composite International Diagnostic Interview (CIDI). Data on "satisfaction" and "helpfulness" of services was collected using question in the "Services" module.

### **Results:**

Majority of service users with a 12-month mental disorder were satisfied (64%) with the help received and reported the services to be useful (67%). Of those who sought help from religious or spiritual advisor/healers, 88% reported that they were satisfied and 84% found the service helpful. Those who sought help from social support setting professionals (OR: 10.1) were more likely to be satisfied while those seeking help from religious and spiritual advisor/healers (OR: 44.0) were more likely to report it to be helpful as compared to those seeking help from mental health professionals.

### **Discussion & Conclusion:**

Results suggested that the majority of the respondents with 12 month mental disorders were satisfied with any services and found it helpful. Those seeking help from social support setting were more likely to be satisfied, while those seeking help from religious and spiritual advisor/healers reported it to be more helpful as compared to those who sought help from mental health professionals.



## Interactive Dashboard for Monitoring Operating Theatre Operational Efficiency

**A ONG<sup>1</sup>, L SU<sup>1</sup>, KF KOH<sup>1</sup>, C YEO<sup>1</sup>, D WU<sup>1</sup>**

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

### Introduction:

The operating theater (OT) is a scarce and expensive resource in any hospital. Our project aims to enhance operational efficiency in the OT by improving information visibility and analytic capabilities using an interactive management dashboard.

### Methods:

Patient data collected from Khoo Teck Puat Hospital OT systems from July to December 2012 were used in our interactive management dashboard created with QlikView. The dashboard displays graphical representations of 7 efficiency Key Performance Indicators (KPIs): utilisation rate, workload, cancellation, turnover time (including prolonged turnover), start time tardiness, prediction bias, and overrun cases and duration, presenting a cross-sectional and longitudinal view of the OT's operational efficiency at a glance. The dashboard's interactive nature enables slicing and dicing, drilling down and rolling up of operational data for exploratory data analysis.

### Results:

Time taken to process the 7 KPIs has been reduced by 64.3% (from 15.4 man-hours/month to 5.5 man-hours/month), and frequency of KPI updates is now possible on a day-minus-one basis as opposed to monthly. We found that underprediction of surgery duration led to higher probability of over-run surgeries. The average turnover is also positively correlated to prolonged turnovers. Dental and general surgeries had the highest cancellation rates, while spine and hepatic surgeries had the least number of overrun cases.

### Discussion & Conclusion:

Our interactive dashboard provides clear, concise and direct expressions of OT performance measures. With such information, we will be able to optimise OT utilisation by improved scheduling of surgery and reduction of cancellation. This will increase patient throughput and reduce waiting time for surgery.

## Functional Outcomes of a Structured Day Programme for Elders with Dementia

**E TAN<sup>1</sup>, NP FONG<sup>2</sup>, LK YAP<sup>3</sup>**

<sup>1</sup>*Alzheimer's Disease Association, Singapore,* <sup>2</sup>*National University of Singapore, Singapore,*  
<sup>3</sup>*Khoo Teck Puat Hospital, Singapore*

### Introduction:

As the incidence of persons with dementia (PWD) is projected to rise exponentially in the next 2 decades in Singapore, there is an urgent need to identify effective programmes that will improve functional outcomes in PWDs. This pilot study seeks to explore the benefits of engaging older PWDs in a combination of socio-recreational and physical maintenance programme in a Social Day Care Centre for the Elderly that runs its programme using a structured care model.

### Methods:

Six newly admitted clients, aged 65 to 92 years, who had been diagnosed with dementia were enrolled into the 6-week structured day programme from July to November 2012. Standardised face-to-face and self-administered questionnaires were administered at point of admission and 6 weeks after admission. Data were analysed using Wilcoxon Signed-Rank Test to detect differences in outcomes measures pre and post intervention.

### Results:

The most significant benefits after 6 weeks of structured programme were improvement in clients' cognitive function, mood and emotion. The mean Abbreviated Mental Test (AMT) score improved from 3.3 to 6.0 ( $P = 0.023$ ); mean Revised Memory Behaviour Programme Checklist (RMBPC) - memory score improved from 19.8 to 12.7 ( $P = 0.046$ ); mean RMBPC - depression improved from 18.5 to 7.0 ( $P = 0.043$ ).

### Discussion & Conclusion:

Our study demonstrates the importance of engaging PWDs with structured programme and the crucial role service providers of day care centres can play in improving their overall cognition, daily function and mood.

## **Knowledge, Attitudes and Practice Patterns of Patients with Diabetes Mellitus and Diabetic Retinopathy in an Urban Eye Clinic in Singapore**

**E LEE<sup>1</sup>, S TIAKUMZUK<sup>2</sup>, S SANJAY<sup>2</sup>**

<sup>1</sup>*National Healthcare Group HQ, Singapore, <sup>2</sup>Khoo Teck Puat Hospital, Singapore*

### **Introduction:**

Diabetes mellitus (DM) is a global health concern, which is likely to escalate with the increasing affluence. Consequently, the prevalence of diabetic retinopathy (DR) is expected to rise. Therefore, identifying knowledge, attitudes and practice patterns (KAPPa) of patients to address knowledge gaps and provide preventive education about DM and DR could reduce sight-threatening complications. Our primary objectives are assessing KAPPa, factors influencing KAPPa and impact of education on KAPPa among diabetic patients with or without DR. The secondary objective includes assessing influence of improved knowledge on KAPPa. Hypothesis: Poor KAPPa on DM and DR were postulated to exist with rising prevalence of DM and DR.

### **Methods:**

An interviewer-administered questionnaire survey in an eye clinic in Singapore was conducted. Participants responded to the same two sets of questions about KAPPa on DM and DR before and after educating them, about DR.

### **Results:**

Knowledge of DM and DR was noted in 57.0% and 29.0% of participants respectively. Higher educational level and longer duration of DM influenced KAPPa. Total knowledge score significantly correlated with total attitude and total practice pattern scores. Impact of education on pre- and post- KAPPa levels was also significant ( $P < 0.05$ ).

### **Discussion & Conclusion:**

Low proportions of knowledge of DM and DR were noted. Knowledge of DM and DR was associated with better attitudes and practice patterns. Education significantly improved KAPPa. Educating patients on DM and DR to bring about better attitudes and practice patterns, for prevention of DR and its complications is an important and a shared responsibility.

## **Relationship Among Nurse Manager Nurse Clinician Leadership Style, Span of Control, Safety Climate, Staff Nurse Practice Environment, and Nurse-Sensitive Patient Outcomes**

**HCA CHUA<sup>1</sup>, S RAJARAM<sup>2</sup>**

<sup>1</sup>*Alexandra Health, Singapore,* <sup>2</sup>*Khoo Teck Puat Hospital, Singapore*

### **Introduction:**

Despite the compelling need for strong nursing leaders who establish vision and create an evidence-based environment that fosters quality and safety, many hospitals have increased responsibilities of nurse managers, potentially compromising leadership at the bedside. The aim of this study was to elucidate relationships among safety climate, staffing, education level, manager leadership styles, practice environment, span of control and patient outcomes. This study also compared 2 methods to measure nurse manager span of control.

### **Methods:**

Correlational study was conducted in 4 hospitals in the Singapore healthcare system. The instruments—Unit Safety Climate Survey, Practice Environment Scale, Multifactor Leadership Questionnaire, and a demographic survey—distributed electronically to 500 registered nurses working in adult inpatient departments. Nurse-sensitive patient outcomes, staffing measures, and department demographics were obtained from hospital databases. Managers completed the Ottawa Hospital Clinical Management Span of Control Tool, a 17-item instrument resulting in a total department complexity score. Data analysis was conducted at the unit level. Questionnaires were received from 448 nurses and 52 nurse managers /clinicians. Nurses reported a moderate to high unit safety climate. Nurses' perceptions of safety climate did not predict nurse-sensitive patient outcomes, leadership style and practice environment.

### **Results:**

These findings suggest efforts to promote transformational leadership in nurse managers/clinicians and minimise laissez-faire leadership may impact patient safety climate in hospitals. More research was needed for nurse managers/ nurse clinicians on span of control.

### **Discussion & Conclusion:**

More research was needed for nurse managers/ nurse clinicians on the span of control.

## **Improving Compliance to Symptom Monitoring Using the Edmonton Symptom Assessment System in a Multicultural Tertiary Setting**

**J OEI<sup>1</sup>, A HUM<sup>1</sup>, SC CHIA<sup>1</sup>**

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

### **Introduction:**

An audit of 470 patient episodes in which the Edmonton Symptom Assessment System (ESAS) was used revealed that less than 80% of patients self-rated symptoms, with a lack of standardisation amongst surrogate raters in the assessment and record of patient's symptoms. Depression, anxiety and nausea were found to be most difficult to describe. Compliance to ESAS recording may be improved by studying challenges faced by patients, healthcare providers (HCP) and surrogate raters, and implementing targeted changes.

### **Methods:**

A focus group of 10 healthcare providers with at least one year of palliative care experience gathered to share challenges faced. Transcribed results were analysed and solutions based on the results were offered and implemented.

### **Results:**

Patient challenges cited included difficulty in understanding the numerical rating scale (NRS) in relation to symptom intensity, with some preferring qualitative descriptors i.e. 'mild', 'moderate', 'severe' over the NRS. HCP identified a lack of understanding of the purpose of the ESAS as a tool to screen and to chart symptom response, and language differences between patients and HCPs in a multicultural setting made translation of symptoms, particularly those of the qualitative nature e.g. depression particularly challenging. A lack of standardisation in the way the symptoms are understood poses difficulty from both patient and HCP perspectives.

### **Discussion & Conclusion:**

Clarifying the purpose of the ESAS, standardising the use of the ESAS amongst HCPs with training in the administration of questions, and integration of the ESAS into routine workflow for the orientation of new doctors and nurses were identified to overcome the challenges.

## Reducing Violence Through The Use of Structured Therapies

**J SARKAR<sup>1</sup>**

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

### **Introduction:**

Violence by psychiatric in-patients is known to be a consequence of lack of structured therapies and safety and poor nursing morale and skills. The aim of this study was to reduce monthly average rate of Disturbed, Aggressive, Violent (DAV) patients' disruptive behaviours. A cause and effect analysis followed by Pareto-charting revealed that the top 3 interventions to prove the hypothesis correct were likely to be the provision of (i) meeting clinical needs of patients, (ii) structured therapeutic activities, and (iii) staff training and support.

### **Methods:**

Multiple Plan-Do-Study-Act cycles running in parallel or sequentially were undertaken. A total of 17 cycles of PDSAs were carried out; 6 for meeting needs of patients, 7 for developing and providing structured therapeutic interventions and 4 for training nurses.

### **Results:**

The average monthly rate of assaults on others reduced from 2.61 to 1.16 (>50% reduction) and the rate of self-harm reduced from 0.87 to 0.67 (<50%). There was reduction of average monthly restraint rate from 8.37 to 2.16 (>50%) as a proxy measure of reduction in violence. There was no significant increase in use of rapid tranquilisation to manage disruptive behaviours.

### **Discussion & Conclusion:**

DAV behaviours can be reduced by identifying the right patients, and meeting their clinical needs using a structured therapeutic approach. Staff requires training and ongoing support and supervision in order to provide the input. Patients attended the structured therapeutic programme and expressed satisfaction with the approach. In order to sustain and spread the benefits of this pilot project, organisational support, time and resources would be required.

## Underaged Smoking in Singapore: Cross-Sectional Study Examining Prevalence and Risk Factors

**WMW ONG<sup>1</sup>, MCW YEOW<sup>1</sup>, AXY ANG<sup>1</sup>, EWL SOON<sup>1</sup>, TW YEOW<sup>1</sup>,  
NA MOHD SIDIK<sup>1</sup>, SE GOH<sup>1</sup>, N RAJARAMAN<sup>1</sup>, M HARTMAN<sup>1</sup>**

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

### Introduction:

Local prevalence of cigarette smoking has risen to an alarming number amongst youths. The study aims to determine the prevalence of cigarette smoking amongst Secondary School students, and the factors associated with initiation of smoking.

### Methods:

A cross-sectional study was conducted on 1148 Secondary School Students between 13 and 17 years old in 5 regions around Singapore, using a self-administered questionnaire.

### Results:

The prevalence of cigarette smoking in our sample population was 9.1%. The typical profile of an underaged smoker was an upper secondary student of the Malay race in the Normal Academic/Technical stream who faces significant peer pressure to smoke. Demographic factors: Malays were 2.6 times (95% CI, 1.6 to 4.0) and Indians 2.3 times (95% CI, 1.2 to 4.7) more likely than Chinese to initiate smoking. Upper-secondary students were 3.7 times (95% CI, 2.3 to 5.9) more likely than lower secondary. Other less significant associations include housing type, family structure, parental marital status and educational level. Non-demographic factors: Secondary school students who had peer-pressure to smoke were 30.2 times (95% CI, 17.8 to 51.1) more likely to initiate smoking. The exposure to peers smoker carries 20.1 times (95% CI, 10.9 to 37.0) association with smoking, compared to 4.9 times (95% CI, 3.1 to 7.5) for presence of family member who smoke. Other significant factors include perceived difficulty in quitting and barriers against obtaining cigarettes.

### Discussion & Conclusion:

Cigarette smoking amongst underage youths remains a concern. This study identified factors associated with the initiation of smoking today and offers insight on possible future intervention strategies.

## **To Express or Not to Express?—Relationship Between Satisfaction with Life, Ambivalence over Emotional Expression and Social Relationships**

**J L LIM<sup>1</sup>, G TAN<sup>1</sup>**

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

### **Introduction:**

Emotions and the ways they are expressed are central to social interactions and reciprocity. Yet, how emotions are expressed differ widely among individuals. Ambivalence over emotional expression (AEE) refers to “the desire to express one’s emotions, yet fear the consequences of doing so” (Lumley, 2011). Prior research has provided substantial evidence on the detrimental effects of emotional suppression (e.g. Gross & Levenson, 1993; Richards & Gross, 1999), a form of emotional avoidance often targeted by cognitive behavioural therapies (Barlow and colleagues (2004). The current study seeks to investigate how AEE affects social relationships and life satisfaction.

### **Methods:**

Participants were 166 NUS psychology undergraduates who completed a set of questionnaires measuring AEE, social relations (relationship quality, social isolation and social support) and life satisfaction. Pearson product-moment correlations were obtained to examine the associations between the 3 variables. To test for mediation, bootstrapping method was used to test the indirect effects of AEE (Independent Variable) via social relationships (mediator) on satisfaction with life.

### **Results:**

Results showed that AEE is associated with poorer social relations (i.e. social isolation, social support etc.) and perceived lower satisfaction with life. Quality of social relationship, AEE and life satisfaction varied across type of relationships (i.e. family, friends and intimate partners). Social isolation was found to mediate the relationship between AEE and life satisfaction where high AEE resulted in greater social isolation which in turn led to lower life satisfaction.

### **Discussion & Conclusion:**

An implication of the findings of this study is that cognitive behaviour therapy should consider targeting AEE, especially among Asians.



## Attention Deficit Hyperactivity Disorder Symptomatology in Patients with Autism Spectrum Disorders

**WW LAI<sup>1</sup>, SG ROZEN<sup>1</sup>, M SUNG<sup>2</sup>, CG LIM<sup>2</sup>, TJ GOH<sup>2</sup>, SJ WENG<sup>2</sup>, A LIEW<sup>2</sup>**

<sup>1</sup>*Duke-NUS Graduate Medical School, Singapore,* <sup>2</sup>*Institute of Mental Health, Singapore*

### Introduction:

Past studies have commonly observed attention/hyperactivity problems in children/ adolescents with autism spectrum disorders (ASD). In this study, we explored the presence of AD/HD symptomatology in child/adolescent Asian individuals with ASD and hypothesised that they similarly have a high degree of AD/HD symptoms.

### Methods:

Parents of 60 individuals (6 to 18 years of age) diagnosed with ASD at a child and adolescent psychiatric clinic in Singapore completed the Conners 3rd Edition—Parent Form. The standardised symptomatology T-scores (age and gender specific) and the AD/HD Probability Score was computed.

### Results:

The mean age (SD) was 11.8 (3.5) years old. Among them, 88% were males and 12% were females. Diagnoses include Autistic Disorder (42%), PDD-NOS (31%), and Asperger's Disorder (27%). The mean AD/HD Probability Score is 65. Sixty-two percent of the study sample had High Average T-scores (>60) for inattention symptomatology and 57% had High Average T-score for hyperactivity/impulsivity symptomatology. Age or gender did not have significant effects on AD/HD symptomatology.

### Discussion & Conclusion:

Our findings are consistent with worldwide studies that reported high degree of AD/HD symptoms in individuals with ASD, with possibly about half of them meeting diagnostic criteria for AD/HD. In our ASD sample, they presented with high degree of both inattention and hyperactivity/impulsivity symptoms. These significant symptoms may approximate a diagnosis of AD/HD, although current DSM-IV-TR diagnostic criteria preclude a comorbid diagnosis of AD/HD in patients with ASD. This study highlights the importance of considering comorbid conditions such as AD/HD in the diagnosis and management of ASD, especially in light of DSM-V, which allows for comorbid diagnoses.

## **Osteoporosis Health Belief Among Singapore Adults in National Healthcare Group Polyclinics (NHGP) Settings**

**WL CHIANG<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

### **Introduction:**

Osteoporosis is a serious public health issue where studies have shown that 1 in 5 adults with osteoporotic hip fracture died within a year in Singapore. This study was to investigate the osteoporosis health belief among patients seen in NHGP.

### **Methods:**

A cross-sectional anonymous survey was administered to patients visited NHGP from 1 March to 31 May 2013. Patients (n = 511) aged 21 to 69 years were randomly selected. The questions were divided into 5 domains and the data were analysed using STATA SE Version 12.0.

### **Results:**

A total of 482 patients (213 male, 269 female) completed the questionnaire. The perceived susceptibility and seriousness to osteoporosis score was  $63.3 \pm 13.1$  (mean  $\pm$  SD) and perceived benefits of dietary calcium score was  $74.8 \pm 11.5$  (mean  $\pm$  SD). Age group of 50 to 59 years had highest scores for perceived susceptibility and seriousness to osteoporosis, perceived benefits of dietary calcium and health motivation ( $P < 0.05$ ). Above secondary education level group had lowest perceived barrier to calcium score, followed by secondary and primary education group ( $52.3 \pm 12.5$  vs  $55.6 \pm 13.1$  vs  $56.8 \pm 12.6$ ;  $P < 0.05$ ). At the same time, above secondary education level group had highest health motivation score, followed by secondary and primary education group ( $79.4 \pm 10.2$  vs  $78.6 \pm 10.6$  vs  $74.5 \pm 10.8$ ;  $P < 0.05$ ). Working group had higher perceived barrier to exercise score ( $57.3 \pm 15.7$  vs  $52.6 \pm 16.4$ ;  $P < 0.05$ ).

### **Discussion & Conclusion:**

Participants perceived moderate susceptibility and seriousness to osteoporosis and believed that dietary calcium helps to prevent osteoporosis. Higher education level group was more motivated and perceived lesser barriers to dietary calcium. Participants aged 50 to 59 were the most motivated group. Osteoporosis educational programmes should address barriers to dietary calcium and exercise.

## Early Home Visits by Care Coordinators Help to Reduce Hospital Readmission Rate

**T TEO<sup>1</sup>, HQ KAN<sup>2</sup>, A LIM<sup>2</sup>, LH LIM<sup>2</sup>, R HARON<sup>2</sup>, JH LEE<sup>2</sup>**

<sup>1</sup>*National University Hospital, Singapore,* <sup>2</sup>*National University Health System, Singapore*

### **Introduction:**

The purpose of this study is to explore whether early home visits by Care Coordinators (CCs) help to reduce hospital readmission rate. The Hypothesis is early home visits by Care Coordinator reduce hospital readmission rate.

### **Methods:**

This is a retrospective study, using data collected by our NUHS CCs from January 2012 to October 2012. The patients recruited are 65 years old and above Singaporean/ Singapore Permanent Resident with home visit done within 7 days and within 8 to 30 days post discharge and who fulfill our home visit criteria. A total of 587 patients were recruited for this study.

### **Results:**

In all, 216 patients (females: 136; males: 80) were visited within 7 days. For the remaining 371 patients (females: 229; males: 142), initial home visit was done within 8 to 30 days post discharge. Of the 216 patients with first home visit done within 7 days, 8.33% (n = 18) of these patients were readmitted within 15 days. On the other hand, out of the 371 patients with initial home visit done within 8 to 30 days, 9.7% (n = 36) of these patients were readmitted within this time frame. Quantitative results showed the readmission rate within 30 days of 15.28% (n = 33) and 15.9% (n = 59) for patients with initial home visit carried out within 7 days and 8 to 30 days post discharge respectively.

### **Discussion & Conclusion:**

Despite early home visits to prevent readmission to hospital, Excel data analysis, however, revealed an insignificant *P* value = 0.19. The above results showed that early home visits showed insignificant impact on hospital readmission rate.

## Evaluation of a Workplace Nutrition Programme at a Hospital

**K HENG<sup>1</sup>, YP LIM<sup>1</sup>**

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

### Introduction:

With the increase of chronic diseases as a result of lifestyle choices, strategies to modify behavioural risk factors should be considered in various settings. Workplace has been identified as it can reach out to a considerable number of staff. This study aimed to evaluate the effectiveness of a workplace nutrition programme developed from a comprehensive 3-component framework.

### Methods:

A nutrition programme was developed from the results of an online survey based on (i) organisation policies; (ii) creating supportive environments; and (iii) awareness raising and building personal skills, completed by staff. Programme evaluation by staff was completed using a 5-point Likert item questionnaire.

### Results:

‘Live Healthy Life. Eat Smart’ programme which introduced healthier featured dishes and ‘Traffic Light Labelling’ for beverages were implemented at the workplace food court. The 5-point Likert items showed responses (strongly agree/agree vs. strongly disagree/disagree) for usefulness of information (49% vs 17%); effectiveness of programme (46% vs 15%); and willingness to purchase healthier alternatives (73% vs 6%). The drink sales increased ( $P < 0.05$ ) in 50% and 57% of the drinks from the green and yellow category, respectively; and decreased ( $P < 0.05$ ) in 18% of that from the red category.

### Discussion & Conclusion:

Featured dishes were only implemented at 40% stalls due to readiness of stall owners. For higher take-up, nutrition-related training to stall owners is imperative. Sales of featured dishes can be monitored to evaluate programme impact. This study demonstrated that a nutrition programme designed based on a 3-component framework was effective.

## **Are Healthcare Consumers Satisfied with Singapore's Current Healthcare Financing Framework?—A Community-Based Study amongst Residents Living in a Public Housing Estate in Singapore**

**HF TIONG<sup>1</sup>, EL SOON<sup>1</sup>, MYL LEE<sup>1</sup>, CHC WU<sup>1</sup>, CS TAN<sup>1</sup>, NP FONG<sup>1</sup>**

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

### **Introduction:**

This study aims to assess the level of satisfaction towards the adequacy of Singapore's current healthcare financing framework, and factors correlated with these satisfaction levels. Singapore's healthcare costs have risen considerably in recent years. Consequently, the government has revised their healthcare financing policies to ensure greater affordability and ease of usage of these policies amongst the populace, so as to give the citizens a peace of mind as described in the Ministry of Health Mission Statement. Exploring satisfaction levels from the healthcare consumers' perspective could serve as a surrogate measure of the effectiveness of these healthcare policies aimed at ensuring affordability for all. We hypothesise that: Considerable dissatisfaction towards healthcare policies in Singapore exists.

### **Methods:**

Interviewer-administered questionnaires were conducted among randomly selected Singaporeans and Permanent Residents aged 21 years old and above, living in Geylang Serai public flats in February 2013. Respondents were asked to report their satisfaction towards Singapore's healthcare framework as Satisfied or Dissatisfied. Factors found to be correlated with satisfaction were identified and analysed using SPSS Software.

### **Results:**

A total of 725 questionnaires were completed (61.4% response rate). Of the respondents, 61.1% of them were satisfied with Singapore's current healthcare financing framework, while 38.9% were dissatisfied. Significant factors associated with increased satisfaction levels ( $P < 0.05$ ) include: Younger age, Female gender, Self-perceived improved understanding of Medisave/Medishield after usage, and Usage of Other's Medisave.

### **Discussion & Conclusion:**

Almost 2 in 5 respondents are dissatisfied with the adequacy of Singapore's current healthcare financing policies. Demographic factors and Medisave usage patterns are implicated. Future healthcare policies could be targeted at addressing these factors.

## Clinical Outcomes of Pharmacist-led Clinics in Chronic Disease Management at a Primary Care Setting

**CS MAH<sup>1</sup>, JYC LEE<sup>1</sup>, ESJ BEK<sup>1</sup>, XK MENG<sup>1</sup>, SJL XU<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Pharmacy, Singapore*

### Introduction:

Diabetes mellitus (DM), hypertension and dyslipidemia are the 3 most common chronic disease conditions seen at polyclinics. At National Healthcare Group (NHG) Polyclinics, pharmacist-led clinics provide a team-based approach, with pharmacists providing optimisation of drug therapy.

### Methods:

A retrospective, controlled study was conducted from August 2012 to January 2013. Patients, aged 21 years and above, with Type II DM, hypertension and dyslipidaemia were included. In all, 272 patients, seen at pharmacist-led clinics (intervention arm) or physician-only clinics (control arm), were enrolled. Clinical outcomes analysed include glycosylated haemoglobin (HbA1c), systolic blood pressure (SBP), diastolic blood pressure (DBP), low-density lipoprotein (LDL) and triglycerides (TG). Gender, age, educational background and race data were collected. Demographics and clinical outcomes from both arms were compared.

### Results:

Baseline characteristics like gender and HbA1c were found to be statistically different. No significant differences were found in the improvement of DBP ( $P = 0.214$ ), LDL ( $P = 0.224$ ) and TG ( $P = 0.440$ ). One way ANCOVA was conducted for improvement in HbA1c ( $P = 0.105$ ) and SBP ( $P = 0.103$ ) to resolve the baseline difference. No significant difference was found. There was a clinical improvement of mean HbA1c in the intervention arm (decrease of 0.27%) as compared to the control arm (increase of 0.16%).

### Discussion & Conclusion:

There was no significant difference in clinical parameters for both arms. A clinically significant improvement of HbA1c in the intervention arm was seen. Pharmacists in a team-based model are able to provide improve clinical outcomes compared to a physician-alone model.

## Retrospective Study on Febrile Neutropenia in Patients with Solid Tumors in Tan Tock Seng Hospital for Year 2011

**CY TAN<sup>1</sup>, PQ LIM<sup>1</sup>**

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

### Introduction:

Febrile neutropenia (FN) is one of the major causes of morbidity and mortality in patients receiving chemotherapy. FN can result in chemotherapy regimen modifications, leading to inferior treatment outcomes. This study aimed to compare survival rates of patients with solid tumors using the Tan Tock Seng Hospital (TTSH) Antimicrobial Stewardship Programme (ASP) recommendation (piptazo/vancomycin/amikacin) against other antibiotic treatment. The decisions made by physicians to subsequent cycles of chemotherapy post-FN, chemotherapy regimen causing FN and micro-organisms isolated will be collated.

### Methods:

This is a retrospective study on 28 cases of chemotherapy-induced FN. Patients were admitted over a 1-year period from January to December 2011. Data collected include demographics, use of antibiotics and FN severity. Descriptive statistics were presented as means, median, or proportions with subsequent statistical test of significance using Fischer's exact test.

### Results:

Majority of the patients (71%) received non-ASP antibiotic treatment recommended by the IDSA, amongst which 25% was treated using piperacillin-tazocin/ amoxicillin-clavulanic as monotherapy. Overall survival (95%) and mortality rate (5%) were significantly higher and lower respectively in this group of patients, while the ASP group had a mortality rate of 63%. In patients who survived, dose reduction of subsequent chemotherapy was most common. Irinotecan was most commonly implicated drug (32.1%), while *Klebsiella pneumoniae* and *Staphylococcus aureus* were the 2 most common microorganisms isolated.

### Discussion & Conclusion:

Overall clinical outcomes of patients treated according to ASP empiric guideline in comparison to other guidelines could not be concluded due to insufficient sample size and confounders like severity of neutropenia. The study should be extended to include more patients.

## Evaluating the Effectiveness of a Pilot Nutrition Programme in Singapore Elder Day Care Centres

**SC CHONG<sup>1</sup>, YP LIM<sup>1</sup>**

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

### **Introduction:**

With the ageing population in Singapore and the increased emphasis in community-based care, it is essential that good nutrition care is integrated within the care centres. Currently, there is no known structured nutrition programme available at elder day care centres. This study aimed to evaluate the newly developed nutrition programme targeted at increasing nutrition knowledge and ability in providing better care in the centres.

### **Methods:**

This programme, comprised 2 nutrition activities for the elderly and a nutrition workshop for the staff, was piloted at 2 centres. After implementation, semi-structured interviews were carried out to evaluate staff nutrition knowledge and ability in providing better nutrition care.

### **Results:**

Seven staff at the pilot centres provided feedback on the nutrition programme. Based on a 5-point rating, all staff (n=6) rated 4 and 5 for their level of understanding on nutrition and improvement in their nutrition knowledge after attending the workshop. Five staff stated that they had a better understanding on how to advise elderly to eat healthily and one knew how to plan for healthier meals. All staff agreed that both the nutrition workshop and games were helpful in improving the current nutrition care in the centres.

### **Discussion & Conclusion:**

The proposed nutrition programme resulted in positive feedback from staff on the gain in nutrition knowledge and ability to provide better nutrition care. It will be worthwhile to implement the nutrition programme to other care centres. Future studies are essential to investigate the impact of the programme on the nutritional health of the elderly.



## **Study on Myths Related to Stopping Smoking: A Prospective Multi-Centre Study on Patients in Smoking Cessation Programme**

**CY TAN<sup>1</sup>, KLONG<sup>1</sup>, SL TAN<sup>2</sup>, LH CHUA<sup>2</sup>, ET ONG<sup>3</sup>, CK LIM<sup>4</sup>**

<sup>1</sup>Tan Tock Seng Hospital, Singapore, <sup>2</sup>National Healthcare Group HQ, Singapore, <sup>3</sup>Watson's Personal Care Stores Pte Ltd, Singapore, <sup>4</sup>National Healthcare Group Polyclinics, Singapore

### **Introduction:**

There is a myth among long-time smokers that a person will die immediately after quitting smoking. Some smokers fear this myth and this prevents them from quitting. The study aims to prove the hypothesis that there are no adverse events (heart attack, stroke, death) after quitting smoking.

### **Methods:**

Patients were recruited by smoking cessation counselors from Tan Tock Seng Hospital (TTSH) and National Healthcare Group Polyclinics (NHGP). They were surveyed on whether they heard of the myth and if the myth prevented them from quitting. Phone call follow up was done at 3 months and 6 months from the first visit to detect adverse effects after stopping smoking.

### **Results:**

There were 292 patients recruited for the study over 2 years 2009 to 2011. Ninety percent of the smokers were males with 35 years of smoking. Majority of patients had multiple medical conditions. Sixty-eight percent of the patients surveyed heard of the myth, 70% had feared that the myth may come true for them. However, 80% of smokers do not fear quitting smoking. At 3 months, 25% of the patients quit smoking and at 6 months 11% still stayed smoke free. Two patients developed adverse events (heart attack and heart failure) at 3 months and 6 months after quitting. There were no deaths as a result of quitting smoking. Thirty-four percent of the patients were uncontactable for follow up.

### **Discussion & Conclusion:**

The myth that people die after quitting smoking is not true. The results can be used to encourage smokers to quit.

## Assessing Clinical Progression in Alzheimer's Disease (AD) Subjects: An Alternative Pre-Progression Rate in a Singapore Memory Clinic Population

**A YEO<sup>1</sup>, MS CHONG<sup>1</sup>, L TAY<sup>1</sup>, J YAP<sup>1</sup>, M CHAN<sup>1</sup>**

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

### Introduction:

Reliable clinical measures for progression in AD are crucial for biomarker verification and care planning. We aimed to characterise a suitable pre-progression rate (PPR) measure in a memory clinic cohort.

### Methods:

A total of 101 subjects fulfilling criteria for mild/moderate probable AD were reviewed for demographic, vascular comorbidities, behavioural and psychometric measures, ApoE genotype and medial temporal lobe atrophy (MTA) scores. PPR-CMMSE [Chinese Mini Mental State Examination] and PPR-CDR [Clinical Dementia Rating sum of boxes] were tabulated as the difference between initial test score and expected population values, divided by the duration of cognitive symptoms. Association of PPR rates with baseline factors was compared. The cohort was subsequently categorised into tertiles of slow, intermediate and rapid PPRs for further analyses.

### Results:

Compared to PPR-CMMSE, PPR-CDR had better correlations with AD progression measures at baseline (Spearman's Rho, CMMSE = -0.47 vs 0.39, delayed memory = -0.39 vs -0.23, neuropsychiatric inventory scores = 0.36 vs -0.26, all  $P < 0.05$ ). Based on PPR-CDR, slow pre-progressors were younger at symptom onset (mean onset age = 69.0 vs 76.1,  $P < 0.01$ ) and better educated (mean = 7.6 vs 4.0 years,  $P < 0.01$ ). A non-significant trend towards increasing vascular comorbidities [Hypertension (50.0% vs 72.7%), hyperlipidaemia (52.9% vs 75.8%) and ischaemic heart disease (5.9% vs 15.2%)], increasing MTA (mean = 1.9 vs 2.2) and incidence of ApoE4(+) genotype (29.4% vs 36.4%) were observed for slow vs rapid pre-progressors.

### Discussion & Conclusion:

PPR-CDR is a valid measure of AD disease manifestation in our memory clinic population. It may be influenced by vascular conditions, observed brain atrophy and genetic predisposition.

## **A Review of the Use of Electroencephalography in Autism Spectrum Disorder in the Past Decade**

**WJ SOH<sup>1</sup>, KC CHEUNG<sup>1</sup>, TJ GOH<sup>1</sup>**

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

### **Introduction:**

Current diagnosis of Autism Spectrum Disorder (ASD) relies on clinical observations and judgments which is dependent subjectively on the experience and skills of the clinician. Electroencephalogram (EEG) may be an objective measure of ASD by means of abnormal neural frequencies and functional alterations in cerebral hemispheres. This review summarises key EEG findings applied to the ASD population over the past decade.

### **Methods:**

Literature searches were conducted on scientific databases PubMed and OvidSP, using the following keywords: EEG, Quantitative Electroencephalograph (qEEG), Autism, ASD, PDD-NOS, and Asperger. Search terms were limited to publication dates ranging from 2003 to 2013 (inclusive).

### **Results:**

A total 121 publications were identified and 91 studies (75%) were experimental in nature with only 55 non-ASD control sample comparisons. The remaining includes reviews and case-studies. Several brain abnormalities were highlighted. Aberrant neural activities such as abnormal beta waves, excessive theta power in posterior regions and cerebral hemispheres asymmetries were identified. Out of the 121 articles, 17 examined the role of EEG in therapy.

### **Discussion & Conclusion:**

The review underscores cautions in comparing experimental results across studies, given the varying sampling sizes, different outcome measurements used and the lack of control in most of the studies. While EEG is a potential diagnostic tool in identifying neurological features associated with ASD and other psychiatric conditions, consistent validation is necessary. Future research employing consistent methodologies and techniques is recommended. The efficacy of using EEG techniques in therapy to address ASD-related difficulties need to be further demonstrated with more randomised control trials.

## Do Early Onset Mental Health Problems Predict Chronic Physical Conditions Later in Life?

**S SHAZANA<sup>1</sup>, E ABDIN<sup>1</sup>, M SUBRAMANIAM<sup>1</sup>, JA VAINGANKAR<sup>1</sup>, SA CHONG<sup>1</sup>**  
*<sup>1</sup>Institute of Mental Health, Singapore*

### Introduction:

While comorbid mental and physical disorders are not uncommon, limited studies have examined the association between early-onset mental disorders (EOMDs) and chronic physical conditions (CPCs) in adulthood. We hypothesise that EOMDs could place an allostatic load, thereby inflating the risk of developing CPCs. The aim of this study was to explore the association between EOMDs and four common CPCs among Singaporeans.

### Methods:

Data from the Singapore Mental Health Study (n = 6616; Mean age = 43 years) was utilised. The Composite International Diagnostic Interview (CIDI) provided data on EOMDs (before 21 years) and a modified CIDI CPC checklist provided self-reported prevalence of diabetes, hypertension, chronic pain and cardiovascular disease.

### Results:

The rates of diabetes, hypertension, chronic pain and cardiovascular disease in the sample were 9.0%, 19.7%, 15.3%, and 3.6% respectively. Significant associations were found between chronic pain and attention-deficit/hyperactivity disorder, oppositional defiant disorder, conduct disorder, early-onset alcohol problems and early-onset depression, after controlling for socio-demographic factors [Odds ratio (95% Confidence Interval): 2.0 (1.3 to 2.9), 1.5 (1.0 to 2.1), 1.8 (1.4 to 2.3), 3.1 (1.6 to 6.0), 2.2 (1.2 to 3.9) respectively]. No other significant associations were found.

### Discussion & Conclusion:

Results of the study lent some support to our hypothesis that there is an association between EOMDs and CPCs. In particular, a substantial proportion of individuals who had EOMDs subsequently developed chronic pain. Chronic pain if untreated is wearisome and impacts immensely on one's quality of life. Our finding warrants confirmation in a prospectively designed study.

## Factors Influencing Engagement in Advanced Care Planning in Elders with Cognitive Impairment

**PLK YAP<sup>1</sup>, SY TAY<sup>2</sup>, J DAVISON<sup>2</sup>**

<sup>1</sup>*Khoo Teck Puat Hospital, Singapore,* <sup>2</sup>*National University of Singapore, Singapore*

### Introduction:

Advanced care planning (ACP) in elders with dementia/cognitive impairment (ECI) is pertinent as they generally continue to live for several years after the loss of mental capacity. There are currently no studies examining the perspective of this group of individuals on ACP or on the recently established “lasting power of attorney” (LPA). This study explores the willingness of Singaporean ECI to engage in the ACP process and how their beliefs and attitudes might affect this.

### Methods:

Forty-eight patients diagnosed with mild cognitive impairment or early dementia was assessed on their willingness in planning for their welfare, property and assets and their willingness to complete LPA. Following education on ACP, they were administered an adapted version of the Perceived Barriers and Benefits Scale (Ko, 2008) to assess for their beliefs and attitudes towards ACP engagement.

### Results:

While 56.3% of the participants were planning to or completed ACP, only 20.8% were willing to complete the LPA process. The participants’ perceived barriers ( $\beta = -0.346$ ,  $P = 0.02$ ) played a significant role in affecting engagement in LPA, while benefits had no significant influence. Willingness to engage in advanced care planning was predicted by marital status ( $\beta = -0.651$ ,  $P = 0.002$ ) and number of children ( $\beta = 0.141$ ,  $P = 0.015$ ).

### Discussion & Conclusion:

Similar to several Asian studies, most patients are more receptive of making informal advanced care plans than undergoing the formal legal process. Family structure plays a major influencing role for ACP engagement. The implications of these results will be discussed within the local context.

## Comparison of Autism Diagnostic Interview-Revised in Different Languages: Sensitivity and Specificity

**TJ GOH<sup>1</sup>, JS CHAN<sup>1</sup>, BLJ TAN<sup>1</sup>, WW LAI<sup>1</sup>**

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

### Introduction:

The Autism Diagnostic Interview-Revised (ADI-R; Rutter, LeCouteur, & Lord, 2003) is a diagnostic instrument for Autism Spectrum Disorders (ASD) which encompasses an individual's early developmental history and current behaviours. By virtue of its nature, the ADI-R relies heavily on language use in its administration. Although 17 official translations have emerged, there is a need for the validation of these translated versions applied in different cultural and ethnic environments. This study reviews the evidence for the validity of the translated versions.

### Methods:

Using the keyword "Autism Diagnostic Interview-Revised (ADI-R)", 1090 articles (1994 to 2013) were identified from PsycINFO, PubMed, and SpringerLink.

### Results:

Twelve articles were included in the final analysis with the following inclusion criteria: the use of ADI-R compared to clinical diagnosis, and accuracy in differentiating ASD from non-ASD subjects. Sensitivity and specificity values are either reported or calculated based on information provided in the study. The sensitivity values ranged between 0.33 and 0.90 for the English version and between 0.62 and 1.00 for the translated versions. The specificity values ranged between 0.54 and 1.00 for the English version and between 0.33 and 1.00 for the translated versions.

### Discussion & Conclusion:

The broad range of values suggests that the applicability of the translated ADI-Rs for use in different population needs further validation. This review experienced constraints in article inclusion as some articles were published in different languages or not available from peer-reviewed journals. Future studies should rigorously establish the empirical evidence of the ADI-R and use of the instrument in different population samples.

## **Providing Patients with Knowledge of Illness Management, Support and Motivation to Promote Treatment Adherence and Improved Clinical Outcomes**

**R POO<sup>1</sup>, C LEE<sup>1</sup>, M HENDRIKS<sup>1</sup>**

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

### **Introduction:**

Providing patients with knowledge and management of their illness, supports and motivation will assist them to cope effectively with their illness, improve their treatment adherence, minimise their illness relapses and enjoy better quality of life in the community. This paper highlights these strategies a Case Manager at the outpatient clinic enlists and its clinical impact.

### **Methods:**

Patients with poor compliance with medications and attendance were referred to case manager for psycho-education, support and motivation. These were conducted with patients and family at the clinic, and through telephonic case management. Data mining was done on the referrals and results analysed using Microsoft excel programmes.

### **Results:**

A total of 536 patients were referred for case management at the psychiatric outpatient for Psycho education, support and motivation from January 2010 to December 2012. Demographic data revealed 288 females and 248 males with the majority of patients having Schizophrenia. They were aged 18 to 90 years old. Strategies included 1499 face – face psycho education, motivation and supportive sessions for patients and 729 sessions with family. These sessions were enhanced with 1298 telephonic case management sessions Clinical outcomes revealed a 2.7% default rate to treatment and only 3.9% readmissions.

### **Discussion & Conclusion:**

Patient and family psycho education, motivation and support are essentials to reduce illness relapses and hospital readmissions. The Case manager will continue to support these strategies and monitor their clinical outcomes.

## **Engaging Patients Who Default Treatment in a Psychiatric Out-Patient Clinic: An Outcome Perspective**

**SE TAY<sup>1</sup>, MM HENDRIKS<sup>1</sup>, J HARRIRAM<sup>1</sup>, C LEE<sup>1</sup>**

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

### **Introduction:**

Cochrane systematic reviews have found that with case management, the numbers of patients who remained in contact with mental health services increases (Marshall et al, 1998). This paper examines the profile of patients who defaulted treatment in a psychiatric outpatient clinic and the case management strategies taken to overcome the default issue.

### **Methods:**

Data mining of patients who were case managed in an outpatient clinic in the year 2012 was done. The results were analysed with the use of the Microsoft Excel programme.

### **Results:**

Among 257 referrals, 120 patients were referred to the case manager as they had defaulted their treatment. Case management interventions included 655 telephone calls to the patient and their family, writing 34 contact letters, conducting 43 family and 80 patient education/counselling sessions. Following the interventions, 100 (83.3%) of patients came for follow-up, 11 (9.2%) were admitted to the ward, and 6 (5%) patients remain defaulters. Among the 6 defaulters, two patients have no phone and did not response to the letters sent, 3 patients were reported to be manageable at home and one patient felt less stressed and did not feel the need to come for further treatment. However these patients will still be contacted by the case manager to monitor their outcome.

### **Discussion & Conclusion:**

Default in chronic disease management is a frequent occurrence. However, it is important to implement case management to maximise the continuity of care to ensure patients maintain a good quality of life in the community



## Effects of Differences in Tube Voltage, Filter Thickness and Iodine Concentrations on Contrast-to-Noise Ratio of Micro-CT Images

**SMS SAID RAHMAT<sup>1</sup>, HR ABDUL RAZAK<sup>1</sup>, WM MD SAAD<sup>1</sup>**

<sup>1</sup>*University Technology MARA (UiTM), Malaysia*

### Introduction:

Optimum scanning parameters are important to be determined for micro-CT ( $\mu$ CT) imaging. This phantom investigation aimed to assess the effects of differences in tube voltage (kVp), filter thickness and concentrations of iodinated contrast media (CM) on contrast-to-noise ratio (CNR) of  $\mu$ CT images.

### Methods:

Four tubes were filled with 2 mL of iodinated CM at different concentrations; 5 M, 10 M, 15 M, and 20 M, respectively and one control tube contained of 2 ml deionised water. All these 5 tubes were then immersed in a water-filled container and scanned using a  $\mu$ CT machine (SkyScan 1176) with various kVps; 40, 50, 60, 70, 80, & 90, and a fixed tube current setting of 500  $\mu$ A. The sequential  $\mu$ CT scans were performed by utilising 0.2 and 0.5 mm aluminium (Al) filters. The CNRs of all images (acquired at different kVps, filter thickness and iodine concentrations) had been calculated, and the CNR curves were plotted and analysed.

### Results:

Across all iodine concentrations (5 – 20 M), CNRs peaked at 80 kVp for 0.2 mm Al filter. However at 90 kVp, these values had been slightly decreased which might be due to higher production of image noise caused by scattered radiation. For 0.5 mm Al filter, CNR curves showed a steady pattern from 40 to 80 kVp but then drastically increased at 90 kVp.

### Discussion & Conclusion:

The selection of kVp and filter thickness could play a major role in producing a good diagnostic quality of contrast-enhanced  $\mu$ CT images; without CNR degradation.

## **Real Time Study on Locked Nucleic Acid Oligonucleotides Based High Sensitivity PCR Detection of Rare KRAS Mutations in Colorectal Carcinoma**

**MC HUANG<sup>1</sup>, L CHIU<sup>1</sup>, SM LEONG<sup>1</sup>, HW CHUA<sup>1</sup>, ESC KOAY<sup>1</sup>, WC CHEONG<sup>2</sup>, MH LI<sup>2</sup>, N NEO<sup>3</sup>, A MOH<sup>3</sup>**

<sup>1</sup>National University Hospital, Singapore, <sup>2</sup>Cell Sievo Pte Ltd, Singapore, <sup>3</sup>Ngee Ann Polytechnic, Singapore

### **Background/Hypothesis:**

Colorectal carcinoma (CRC) is one of the most prevalent cancers in Singapore, ranking third worldwide. Among patients with metastasis colorectal cancer (mCRC), KRAS mutations were reported to occur in 30% to 51% of all cases. Many clinical trials on CRC patients with KRAS mutations were reported to be non-responsive to anti-EGFR monoclonal antibodies (MoAbs) treatment. Hence, accurate detection of KRAS mutations would be critical to the clinical applications of antiEGFR MoAbs therapies in mCRC. Currently, the most commonly used somatic KRAS mutation detection method – polymerase chain reaction (PCR) with Sanger sequencing, only provides ~10% detection sensitivity.

### **Methods:**

In this study, a real-time wild-type blocking PCR method (WTB-PCR) was developed to improve the sensitivity of KRAS mutation detection. A locked nucleic acid blocker was used to suppress the amplification of wild-type alleles, while allowing only mutant alleles to be amplified. Fifty CRC paraffin embedded tissue samples were tested using both WTB-PCR and conventional methods.

### **Results:**

The developed WTB-PCR method, with its improved detection sensitivity of 0.1%, enabled the detection of ultralow abundance mutant alleles, identifying a single copy of mutant KRAS gene from amongst 1000 or more copies of wild-type KRAS gene. KRAS mutations were detected in 4 patient samples which were previously classified as KRAS wild-type using the “conventional” method, with Ct values significantly higher than those registered using the conventional method (Ct<sub>WTB-PCR</sub> - Ct<sub>con</sub> >10).

### **Discussion & Conclusion:**

Taken together, the WTB-PCR method is a simple, robust and accurate detection method, providing clinicians with more timely and precise diagnostic and prognostic information.

## Establishment of Transient Receptor Potential Cation Channel 6 (TRPC6) Knockout Conditionally Immortalised Podocyte Cell Line

**YC ZHANG<sup>1</sup>, ZJ SUN<sup>2</sup>, JL NG<sup>2</sup>, TW SOONG<sup>2</sup>, HK YAP<sup>2</sup>, KH NG<sup>2</sup>, HY CHAN<sup>3</sup>, P LIAO<sup>4</sup>**

<sup>1</sup>National University Hospital, Singapore, <sup>2</sup>National University Health System, Singapore, <sup>3</sup>Nanyang Technological University, Singapore, <sup>4</sup>National Neuroscience Institute, Singapore

### Introduction:

Focal segmental glomerulosclerosis (FSGS), manifesting as steroid-resistant nephrotic syndrome, is the second commonest cause of renal failure in children. Injury to podocytes, which are specialised glomerular cells, is the hallmark in FSGS and nephrotic syndrome. Transient Receptor Potential Cation Channel 6 (TRPC6) is a calcium channel expressed in podocytes. Mutations in TRPC6 have been implicated in genetic FSGS but the pathomechanism is poorly understood. Researches using heterologous expression systems in HEK cells have proven the gain-of-function nature of these mutations. However, their functions in podocytes have not been reported. TRPC6 knockout (TRPC6<sup>-/-</sup>) podocytes are necessary to study these gain-of-function mutations. As primary podocyte cultures are difficult to propagate, we aimed to establish a TRPC6<sup>-/-</sup> conditionally immortalised podocyte cell line.

### Methods:

TRPC6<sup>-/-</sup> mouse was crossed with Immortomouse to introduce the H-2kb-tsA58 gene which encodes a temperature sensitive variant of the SV40 tumour antigen, facilitating proliferation at 33°C and differentiation at 37°C. The TRPC6 heterozygous F1 animal was back-crossed with TRPC6<sup>-/-</sup> mouse to obtain a TRPC6<sup>-/-</sup> Immortomouse. Glomeruli were isolated from this mouse with magnetic dynabeads and cultured at 33°C. Islets of cobblestone-shaped podocyte outgrowths from glomeruli were isolated using cloning cylinders and re-plated to generate cell lines under growth-permissive conditions at 33°C. They were then allowed to differentiate at 37°C.

### Results:

We confirmed the expression of podocyte-specific markers such as CD2AP, ezrin, nephrin and synaptopodin via RT-PCR and western blot analysis in these differentiated podocytes.

### Discussion & Conclusion:

In conclusion, we have successfully established TRPC6<sup>-/-</sup> conditionally immortalised podocytes that retained the potential to proliferate and differentiate.

## High Normal Urinary Albumin-to-Creatinine Ratio Is Independently Associated with Aorta Stiffness in Type 2 Diabetes

JJ LIU<sup>1</sup>, CF SUM<sup>1</sup>, S TAVINTHARAN<sup>1</sup>, LY YEOH<sup>1</sup>, XW NG<sup>1</sup>, LTS PEK<sup>1</sup>, SC LIM<sup>1</sup>, BMS LEE<sup>2</sup>, WE TANG<sup>2</sup>

<sup>1</sup>*Khoo Teck Puat Hospital, Singapore, Singapore,* <sup>2</sup>*National Healthcare Group Polyclinics, Singapore*

### Introduction:

High normal albuminuria is associated with high cardiovascular and all-cause mortality in diabetes. Increased aortic stiffness is an established risk factor of vascular events. We hypothesise that high normal albuminuria is associated with increased aortic stiffness in type 2 diabetic (T2DM) patients. This study aims to study the relationship between aortic stiffness and high normal albuminuria in T2DM patients with normal renal filtration function.

### Methods:

A total of 614 normoalbuminuric T2DM with spot urinary albumin-to-creatinine ratio (ACR) below 30 mg/g and estimated glomerular filtration rate (eGFR) above 60 ml/min/1.73m<sup>2</sup> were included in the study. Aortic stiffness was assessed by carotid-femoral pulse wave velocity (PWV).

### Results:

PWV was correlated with ACR ( $r = 0.171$ ,  $P < 0.0001$ ) and increased progressively with the increase of ACR within the 0 to 30 mg/g range ( $8.4 \pm 2.0$  m/s in subjects in lowest ACR quartile to  $9.6 \pm 2.4$  m/s in subjects in highest ACR quartile,  $P < 0.0001$ ). Logistic regression model revealed that, with subjects in the lowest ACR quartile (0 to 3.5 mg/g) as reference, the odds ratio of aortic stiffness (PWV<sup>3</sup> 12 m/s) was 4.26 (95% CI, 1.35 to 13.40,  $P = 0.013$ ), 3.50 (95% CI, 1.10 to 11.15,  $P = 0.034$ ) and 4.46 (95% CI, 1.40 to 14.14,  $P = 0.011$ ) for subjects in ACR quartile 2 (3.6 to 7.8 mg/g), 3 (7.9 to 12.9 mg) and 4 (13.0 to 30 mg/g), respectively, after adjustment for multiple covariates including age, diabetes duration, HbA1c, blood pressure, eGFR, etc.

### Discussion & Conclusion:

High normal albuminuria is associated with aortic stiffness in T2DM which may in part explain their increased cardiovascular morbidity.

## Association of Circulating Irisin with Renal Function and Body Composition in Type 2 Diabetes Mellitus

**SYLVIA<sup>1</sup>, JJ LIU<sup>1</sup>, DSM WONG<sup>1</sup>, SHC TAN<sup>1</sup>, S TAVINTHARAN<sup>1</sup>, CF SUM<sup>1</sup>, SC LIM<sup>1</sup>**

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

### Introduction:

Irisin is a novel myokine secreted in response to physical exercise. Adipose tissue may be another source contributes to circulating irisin. Recent data suggested that irisin levels were decreased in chronic kidney disease patients. We hypothesise that circulating irisin may be associated with renal function and body composition in type 2 diabetic mellitus (T2DM) patients.

### Methods:

A total of 369 T2DM subjects (61.7% male; mean age  $60.1 \pm 10.5$  years) were recruited in this observational study. Body composition was determined by multifrequency bioelectrical impedance analysis (Inbody S20). Plasma irisin was quantified by ELISA assay.

### Results:

Circulating irisin levels were only significantly decreased in subjects classified as pre-dialysis chronic kidney disease stage 5 (CKD stage 1 to 5, irisin  $77.6 \pm 14.3$ ,  $77.8 \pm 13.2$ ,  $74.2 \pm 14.5$ ,  $76.8 \pm 15.3$ ,  $67.05 \pm 14.04$  ng/mL;  $P = 0.0001$  by ANOVA). Bivariate correlation analysis revealed that irisin concentration was significantly correlated with age ( $r = -0.204$ ,  $P < 0.0001$ ), BMI ( $r = 0.153$ ,  $P = 0.004$ ), HbA1c ( $r = 0.129$ ,  $P = 0.015$ ), diastolic blood pressure ( $r = 0.162$ ,  $P = 0.002$ ), eGFR ( $r = 0.174$ ,  $P = 0.001$ ) and fat mass ( $r = 0.166$ ,  $P = 0.002$ ). Multiple linear regression model indicated that only eGFR ( $\beta = 0.122$ ,  $P = 0.043$ ) was independently associated with plasma irisin after adjustment for multiple variables.

### Discussion & Conclusion:

Circulating irisin appeared to be associated with renal function and body composition in T2DM. The clinical implication of our findings deserves further investigation.

## **An Alternate Plastic Packaging to Reduce Threat of E Coli Contamination**

**R SAHOO**<sup>1</sup>

<sup>1</sup>*Nilai University, Malaysia*

### **Introduction:**

The American Chemistry Council (ACC) funded research report, 'Assessment of the Potential for Cross Contamination of Food Products by Reusable Shopping Bags,' has produced grave public health concern across the world. The ACC report found that coliform bacteria including E Coli were found in half the bags that were tested. The objective of this study was to explore other plastic substitute through synthesise of chitosan-polycaprolactone (PCL) composite and to determine the antibacterial properties of chitosan-PCL composite.

### **Methods:**

After characterisation of film, the test for antimicrobial properties of chitosan-PCL blend were carried out by pouring plate method.

### **Results:**

The dispersion of the crystals and the shape of the chitosan-PCL blend film that has been observed under polarised microscope showed the crystallinity of chitosan-PCL blend films increased from 20% PCL content to 50% PCL content. The chitosan-PCL blend film reduced the number of E coli from the ratio 20% PCL content up to 50% PCL content suggesting 50% PCL content films showing strong antibacterial activity with the most reduction colony of E coli.

### **Discussion & Conclusion:**

The PCL added the effect of antimicrobial activity to the blend film. Based on our result of Chitosan-PCL blend film, it is possible to create plastic substitute as packaging materials in the food manufacturing to prevent food-borne pathogens.

## Spatial Epidemiology of Tuberculosis in Singapore

**W WAH<sup>1</sup>, LY HSU<sup>1</sup>, A EARNEST<sup>2</sup>, MEH ONG<sup>3</sup>**

<sup>1</sup>*National University of Singapore, Singapore,* <sup>2</sup>*Duke-NUS Graduate Medical School, Singapore,* <sup>3</sup>*Singapore General Hospital, Singapore*

### **Introduction:**

The numbers of new tuberculosis (TB) cases are still on the rise in Singapore. Understanding the spatial distribution of TB and identifying high-risk areas is important to focus resources for TB prevention and control measures. This study aimed to investigate the association between population characteristics and spatial distribution of TB and identify high-risk areas at the Development Guide Plan (DGP) census tract levels in Singapore.

### **Methods:**

This is a retrospective, secondary analysis of TB notification data collected from the Singapore Tuberculosis Elimination Program (STEP) Registry from 1995 to 2011. We used Bayesian conditional autoregressive spatial models to examine predictors at the DGP level and calculate smooth relative risk (RR) to locate high-risk areas.

### **Results:**

We found differences in distribution of risks between residents and non-residents across geographic areas. Univariate analysis showed that an increase in TB risk was significantly associated with higher proportions of unemployment, elderly, illiteracy and population density. Higher proportions of personal and household income 5000 and above, 5 rooms and above, senior professionals and transport to school or work by car only was significantly associated with decreased risk of TB. In multivariate analysis, high proportions of household income 5000 and above was significantly associated with a decrease in TB risk (RR = 0.969, 95% Credible Interval = 0.947 to 0.994). We found 15 high-risk areas.

### **Discussion & Conclusion:**

This study could provide the evidence that socio-economic factors are affecting the TB risk among residents in Singapore and priority should be given to impoverished neighbourhoods.

## Development of a Polarised Cellular Model for Chikungunya Virus Infection

**JJH CHU<sup>1</sup>**

<sup>1</sup>*National University Health System, Singapore*

### **Introduction:**

Chikungunya virus (CHIKV) has resulted in several outbreaks across East Africa, South Africa and Southeast Asia in the past decades. Clinical symptoms of Chikungunya infection include fever, skin rash, arthralgia, and an increasing incidence of encephalitis. The re-emergence of CHIKV with more severe pathogenesis highlights its threat on our human health.

### **Methods:**

Polarised HBMEC, polarised Vero C1008 and non-polarised Vero cells were grown on permeable cell culture inserts and infected with CHIKV. The polarised entry and release of virus as well as the sorting of viral proteins were analysed with a combinational of bioimaging and proteomics approaches.

### **Results:**

Viral plaque assays, viral binding assays and immunofluorescence confocal analyses demonstrated apical entry and apical release of CHIKV in polarised HBMEC and Vero C1008 cells, which suggests the presence of apical sorting signal(s) on the host cell receptors for CHIKV and on the CHIKV structural proteins, and the possible enhancement of CHIKV transmissibility. Drug treatment studies were subsequently performed to elucidate host cell and viral factors involved in the apical sorting of CHIKV. Disruption of host cell myosin II, microtubule and microfilament networks individually did not inhibit the polarised release of CHIKV at the apical domain. However, treatment with tunicamycin resulted in a bi-directional release of CHIKV, suggesting that N-glycans on the CHIKV envelope glycoproteins could serve as apical sorting signals.

### **Discussion & Conclusion:**

This study provides novel insights to the polarised infection of CHIKV and the implication in the clinical pathogenesis of CHIKV infection in various polarised human target cells.



## Clinical and Radiological Correlates of Post-Traumatic Amnesia in Moderate to Severe Traumatic Brain Injury During Inpatient Rehabilitation

**K CHUA<sup>1</sup>, WCJ LOW<sup>1</sup>, L LIAUW<sup>2</sup>, T LIM<sup>2</sup>**

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

### Introduction:

Post traumatic amnesia (PTA) duration in traumatic brain injury (TBI) survivors is regarded as an important measure of severity and long-term outcome. This study sought to determine injury, radiological and rehabilitation factors associated with duration and emergence from PTA during rehabilitation.

### Methods:

Data from an inpatient rehabilitation unit functional database spanning 4 years were analysed. First-day CT brain scans were reviewed by an independent radiologist. The 12 point Westmead PTA scale (WPTAS) and Functional Independence Measure (FIM) scale were scored.

### Results:

Altogether, data from 168 TBI inpatients were analysed. (140 males (83.3%), mean age 48.1 years (SD 20.0), mean TBI duration 31.4 days (SD 28.1). Sixty-five patients (45.8%) emerged from PTA during rehabilitation and their PTA duration was significantly shorter (36.1 days (SD 22.4) compared to those who did not emerge. (61.7 days, SD (40.8). ( $P < 0.0001$ ) PTA emergence at discharge was significantly correlated with age (OR 0.95,  $P = 0.003$ ), admission PTA score (OR 1.22,  $P < 0.05$ ), admission cognition FIM (OR 1.12,  $P < 0.001$ ), and admission motor FIM score (OR 0.96,  $P = 0.007$ ). Radiological variables were not associated with PTA emergence. Multivariate linear regression modeling showed significant correlations of admission motor FIM motor (OR -0.006,  $P < 0.05$ ), acute length of stay (OR -0.02,  $P < 0.001$ ), presence of tracheostomy (OR -0.21,  $P < 0.03$ ) and subarachnoid haemorrhage (OR -0.24,  $P < 0.05$ ) with PTA duration.

### Discussion & Conclusion:

Injury and functional variables, more than radiological features were predictive of PTA outcome and duration, thus PTA prediction at onset of rehabilitation is feasible.

## **Tacrolimus Ointment 0.1% in the Treatment of Scrotal Lichen Simplex Chronicus: An Open-Label Study**

**E TAN<sup>1</sup>, HL TEY<sup>1</sup>, ES TAN<sup>1</sup>, AS TAN<sup>2</sup>**

<sup>1</sup>*National Skin Centre, Singapore,* <sup>2</sup>*University of Pennsylvania, United States*

### **Introduction:**

Scrotal lichen simplex chronicus (LSC) poses a therapeutic challenge as conventional treatment with topical corticosteroids and oral antihistamines is often unsatisfactory. We aim to evaluate the efficacy of topical 0.1% tacrolimus ointment in the treatment of scrotal LSC.

### **Methods:**

We performed a prospective, open-label study in adult patients with scrotal LSC over a period of 15 months from 01 December 2011 to 28 February 2013 at the National Skin Centre. All subjects were instructed to apply 0.1% tacrolimus ointment twice daily for 6 weeks. At baseline and 6 weeks, subjects were assessed subjectively on their severity and frequency of itch, degree of itch-induced sleep impairment and disease-related quality of life, and objectively on the clinical disease severity by a single investigator. We performed Wilcoxon Signed-Rank tests to compare these outcome measures pre- and post-treatment.

### **Results:**

Of 39 subjects enrolled, 33 (84.6%) completed the study. Six (15.4%) subjects experienced intolerable burning sensation and discontinued treatment. Of the 28 who completed treatment, there were improvements in mean itch score (maximum 10) from 6.8 to 2.8, mean itch frequency from 29.1 to 13.1 times per week, mean sleep score (maximum 5) from 3.0 to 1.4, mean Dermatology Life Quality Index score (maximum 30) from 9.8 to 4.1, and mean disease severity score (maximum 6) from 3.8 to 1.9. All these improvements were statistically significant ( $P < 0.05$ ), even when assuming all 6 defaulters have not improved.

### **Discussion & Conclusion:**

Topical 0.1% tacrolimus ointment, when tolerated, was an effective and safe treatment for scrotal LSC in our study population.

## Summer-Winter Differences in Total Vitamin D Concentrations in Singapore

**R HAWKINS**<sup>1</sup>

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

### **Introduction:**

Despite its equatorial position and high number of sunlight hours per year, there is a high prevalence of low total 25-OH vitamin D (TD) concentrations, especially in Indians and Malays. This study examined whether there is a seasonal difference in TD concentrations in Singapore.

### **Methods:**

Anonymised records of all TD measurements performed between July 2011 and December 2012 were extracted for analysis using Microsoft Excel, Access and SPSS v16. TD measurement was performed on a Roche Diagnostics e601 analyser. Repeat samples were excluded. Linear regression analysis for TD as output variable and age, sex, race, inpatient/outpatient status and month as predictor variables was performed.

### **Results:**

There were 8122 records included in the analysis with 71% Chinese, 8% Indian, 5% Malay; average age 69 years; 72% male; 47% outpatient. Monthly requests averaged 433 (range, 320 to 512). The results from linear regression analysis showed no systematic pattern of seasonal or monthly variation in TD concentration. The 2 maximum differences seen between months were Jan vs Jun (Jan higher by 4.4 ug/L) and Jan vs. Dec (Jan higher by 3.3 ug/L).

### **Discussion & Conclusion:**

There is no evidence of seasonal or monthly variation in TD concentration in Singapore. Differences in monthly averages may reflect calibration effects and are clinically trivial. Time of year does not need to be considered when interpreting TD concentrations in Singapore.

## Examining the Relationship Between Folic Acid Deficiency and Depressive Symptoms in Children with Disruptive Behaviour Disorders

XY LEE<sup>1</sup>, YP OOI<sup>1</sup>, WS LIM<sup>1</sup>, DSS FUNG<sup>1</sup>

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

### Introduction:

Previous evidence has drawn a link between deficits in folic acid and depression. Low folate levels are common in depressive symptoms and several studies have shown the use of folate supplements in addition to medical treatment in reducing these symptoms. However, to date, these studies have focused on the adult population and no studies have examined folic acid deficiency in children with depressive symptoms. This study aimed to examine the relationship between folic acid deficiency and depressive symptoms in children with Disruptive Behaviour Disorders (DBD). In addition, we examined the relationship between folic acid deficiency and attention problems and aggressive behaviours.

### Methods:

Parent-reported Child Behaviour Checklist (CBCL) from 152 participants between ages 7 and 16 years old (mean age = 10.14, SD = 1.73) were collected from an ongoing randomised controlled trial. Depressive symptoms, attention problems, and aggressive behaviours were measured by the CBCL Withdrawn/Depressed, Attention Problems, and Aggressive Behaviours syndrome scales, respectively. Dietary information was collected using a 3-day food diary.

### Results:

Results from correlational analysis indicated a marginally significant negative relationship between folic acid and withdrawn/depressed scores ( $r = -0.15$ ,  $P = 0.067$ ). Interestingly, folic acid was also inversely related with both attention problems and aggressive behavior although results were not statistically significant.

### Discussion & Conclusion:

Consistent with what was found in an adult population, these results provide preliminary evidence that folic acid deficit is associated with depressive symptoms in children. These findings may guide practitioners in the use of folic acid supplements in addition to medication for children with depressive symptoms.

## Effect of Femoral Nerve Block on Ambulation following Total Knee Arthroplasty

**EY CHAN<sup>1</sup>, YH TEO<sup>1</sup>, CTL NG<sup>1</sup>, EL NG<sup>1</sup>, TWS YIN<sup>1</sup>, PN ASSAM<sup>2</sup>, M FRANSEN<sup>3</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore,* <sup>2</sup>*Duke-NUS Graduate Medical School, Singapore,*

<sup>3</sup>*University of Sydney, Australia*

### Introduction:

Femoral nerve block (FNB) is an effective postoperative analgesia for total knee arthroplasty (TKA). However its effect on ambulation is less clear. We hypothesised that there are no difference between FNB (single-injection or continuous) and intravenous patient-controlled analgesia (opioids) on measures of ambulation following TKA.

### Methods:

This was an analysis of secondary outcomes of a randomised-controlled trial where 200 patients undergoing unilateral TKA were randomised to single-injection FNB, continuous FNB, or intravenous patient-controlled opioids. The outcomes were the timed 'Up and Go' (TUG) performance, six-minute walk distance (6MWD) and the day achieved independent walking using various walking aids. Blinded assessors assessed: TUG at day 3/4, week 2 and week 12; 6MWD at week 2 and week 12; and day achieved independent walking measured daily during hospitalisation. The change from pre-surgery scores was used to evaluate differences between the analgesic groups, at each post-surgery time-point. A 2-sided alpha level, adjusted for multiple testing, of 0.05 was used for statistical significance.

### Results:

On day 3/4, TUG mean  $\pm$  sd (s) were  $78 \pm 49$  for single-injection FNB,  $78 \pm 42$  for continuous FNB groups, and  $82 \pm 48$  for PCA;  $P = 0.87$ . TUG between groups were also similar for the other time-points. Likewise, 6MWD, knee flexion and day achieved independent walking, were also similar between the analgesic groups.

### Discussion & Conclusion:

Following primary TKA, there were no significant differences between FNB (single-injection or continuous) and patient-controlled opioids on the various measures of ambulation. The findings could be used to guide patient expectations and rehabilitation programme after TKA.

## Development of a Computer-Based Objective Grading System for Facial Paralysis

**J YONG<sup>1</sup>, R NGO<sup>2</sup>, YL LIU<sup>3</sup>, K FOONG<sup>3</sup>, HP LEE<sup>4</sup>**

<sup>1</sup>National University Hospital, Singapore, <sup>2</sup>National University Hospital Systems, Singapore, <sup>3</sup>National University of Singapore, Singapore, <sup>4</sup>National University of Singapore (Suzhou) Research Institute, China

### Introduction:

Facial paralysis is a commonly encountered condition with a myriad of aetiologies. This disfiguring condition is typically assessed clinically using various subjective grading systems. However there can be a lot of inter- and intra-observer variability. Objective grading systems that exist are typically based on 2D images resulting in loss of information. This study aims to develop an automated objective asymmetry grading system to assist in the grading of facial paralysis.

### Methods:

This was a prospective study involving patients from the Department of Otolaryngology, National University Hospital. 3D image data of patients with facial paralysis and normal healthy subjects were collected. For each subject 4 models of expression were obtained and surface contour was measured. The asymmetry degree was calculated from surface contour and difference in position. The asymmetry index was then compared against subjective scores of Sunny Brooke Facial Grading System and Disease specific quality of life survey.

### Results:

The 3D image data of 8 patients with facial paralysis and 12 healthy subjects were obtained. There was good correlation of the asymmetry disease index to the subjective scores of the Sunny Brooke Facial Grading System and the Disease specific quality of life survey.

### Discussion & Conclusion:

There was good correlation in the 3D image asymmetry grading and the traditional subjective clinical grading systems. The 3D image asymmetry grading is also found to have better local contour information and overcomes the subjectivity encountered by landmark based computer aided grading system. This could prove to be an effective objective grading system available for clinicians.

**A Pilot Study to See Variation of Central Aortic Systolic Pressures (CASP) and Augmentation Index (AI) with SphygmoCor in Supine and Sitting Posture in Normotensive or Prehypertensive Cohorts—A Study on 21 Subjects**

**AA SULE<sup>1</sup>, JC TAY<sup>1</sup>, HH TEONG<sup>1</sup>**

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

**Introduction:**

Sphygmocor uses principle of tonometry to measure parameters of arterial stiffness. It is done over radial artery. It gives values for parameters for arterial stiffness like augmentation index, augmentation pulse pressure and central aortic pressure if the operative index is 80% and above. The measurement of central aortic systolic pressure (CASP) is now accepted as a major cardiovascular risk factor which is as important as brachial pressures. None of the studies have opined about the variations of CASP, augmentation index with posture. This is a pilot study to know if there is variation of CASP and AI on posture in normotensive or prehypertensive subjects when analysed with SyphgmoCor.

**Methods:**

A total 21 subjects were recruited for the study. All subjects were normotensives healthy volunteers or those who BP was in the prehypertensive range and less than 140/90 mm Hg. All these subjects underwent pulsewave analysis on SphygmoCor in the morning between 8 am to 10 am initially in supine and then in sitting position after 3 minutes. Patients were told to refrain from smoking, eating or drinking beverages 3 hours before the test and to refrain from drinking alcohol 10 hours before the test. Statistical analysis was done by Wilcoxon signed-rank test.

**Results:**

There was statistically significant difference between supine and sitting augmentation index ( $P$  value 0.017) as well as augmentation pressure ( $P$  value 0.0409).

**Discussion & Conclusion:**

Significant variation of augmentation index, augmentation pressure with posture and whether it translates into increased early morning CVA or MI needs to be studied further.

## Vitamin D Deficiency and Osteoporosis in Asian Patients with Inflammatory Bowel Disease

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

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

### Introduction:

Vitamin D deficiency and low bone mineral density (BMD) are common amongst patients with inflammatory bowel disease (IBD). This study aims to evaluate the prevalence of vitamin D deficiency in multi-racial IBD patients in Singapore, and evaluate its association with BMD.

### Methods:

Medical records of IBD patients in our centre were retrospectively reviewed. Vitamin D levels were measured using assay for vitamin D3 or total vitamin D. BMD is measured using DEXA. Data were analysed using Fisher's Exact and chi-square test.

### Results:

Of 81 IBD patients, 64 had low vitamin D. Of the 47 UC patients, 39 (83%) had low vitamin D; compared to 34 CD patients, 25 (74%) had low vitamin D, with no statistical difference ( $P = 0.41$ ). Among Chinese IBD patients, 39 (71%) had low vitamin D; compared to 17 (94%) Indian and 8 (100%) Malay IBD patients ( $P = 0.03$ ). Out of 85 IBD patients measured, 50 (59%) had low BMD. Of the 53 UC patients, 25 (47%) had normal BMD, 28 (53%) had low BMD; of the 32 CD patients, 10 (31%) had normal BMD and 22 (69%) had low BMD, with no statistical difference ( $P = 0.18$ ). Of the 13 IBD patients with normal vitamin D, 7 (54%) have low BMD and 6 (18.3%) have normal BMD, with no statistical difference ( $P = 0.77$ ).

### Discussion & Conclusion:

Low vitamin D and BMD are common among Asian IBD patients. More Indian and Malay IBD patients had hypovitaminosis D compared to Chinese patients. There is a trend towards low BMD in CD patients, compared to UC patients. The lack of association between vitamin D status and BMD, suggests other risks factors for low BMD in IBD patients.



## **Influence of Medical Consultation and Audiometry Test on the Hearing Handicap Inventory for Adults-Screening (HHIA-S)**

**Y XU<sup>1</sup>, EC HO<sup>1</sup>, KX LI<sup>1</sup>**

<sup>1</sup>*University of Sheffield, United Kingdom, <sup>2</sup>Tan Tock Seng Hospital, Singapore, <sup>3</sup>National University of Singapore, Singapore*

### **Introduction:**

Hearing Handicap Inventory for Adults- Screening (HHIA-S) questionnaire quantifies patients' self-perception of hearing disability due to hearing loss. We hypothesise that HHIA-S will be affected by a medical consultation and an awareness of one's pure tone audiometry (PTA) results.

### **Methods:**

A total of 44 consecutive participants (<65 years old) were recruited from Tan Tock Seng Hospital, Singapore. Participants completed the HHIA-S before and after their medical consultation with a PTA. The higher the HHIA-S score, the higher the hearing disability.

### **Results:**

Fifty-five percent of participants experienced no change in score while 45% experienced a change in score. Amongst those who experienced a change, 80% showed a negative change i.e. a reduction in hearing disability. The highest proportion (35%) experienced a change of -2 to -4, followed by -6 to -8(25%), >-10(20%), >+10(10%), +2 to +4(5%) and +6 to +8(5%). The proportion of participants with mild hearing loss (66%) and moderate hearing loss (72%) who showed a change in score was greater than those with severe hearing loss (33%) and normal hearing (39%). Participants who had higher pre-scores (>8) were also more likely to have negative change. (Odds ratio = 9.3,  $P = 0.05$ )

### **Discussion & Conclusion:**

Patients' knowledge of their hearing levels and the opportunity to speak to a doctor significantly alters their self-perception of their hearing disability. Since 'pre vs post hearing aid' HHIA-S scores are frequently used to evaluate patient's response to hearing aid, the timing of the pre hearing aid HHIA-S needs to be carefully planned to avoid over or underestimation of hearing aids benefit.

## **A Single Centre Prospective 5-Year Clinical Experience with Robotic-Assisted Transperineal Prostate Biopsy in Patients with Previous Negative Biopsies**

**ZW LAW<sup>1</sup>, H HO<sup>1</sup>, J TEO<sup>1</sup>, H HUANG<sup>1</sup>, JSP YUEN<sup>1</sup>, CWS CHENG<sup>1</sup>**

<sup>1</sup>*Singapore General Hospital, Singapore*

### **Introduction:**

iSR'obot™ Mona Lisa (BiobotSurgicals Pte Ltd, Singapore) is a robotic system that performs ultrasound-guided transperineal prostate biopsy (rTPB) in Singapore General Hospital. A 3D model of the prostate is reconstructed based on the US images. After the urologist approves the biopsy plan, the robot assists biopsy to the planned location. We evaluated modifications made to this system and correlated clinical outcomes and detection rates with each modification.

### **Methods:**

This institution review board-approved prospective clinical trial included 278 men with previous negative biopsies and rising PSA levels. Between September 2006 and June 2012, 4 modifications were made and 284 biopsy sessions were performed. Mechanical accuracy is the distance (mm) between the tip of biopsy needle on real-time US and planned biopsy location. Biopsy time is the time of insertion to removal of the TRUS probe. We evaluated the following in 4 different versions of iSR'obot™ Mona Lisa: patient demographics and clinical outcomes. Post-rTPB complications were evaluated.

### **Results:**

A total of 68 (24.5%) patients were diagnosed with CaP, 27 (39.7%) had CaP with GS $\geq$ 7. CaP detection and detection of clinically significant CaP improved from 16.7% to 33.3% and 25% to 35.3% respectively. Mechanical accuracy improved from 2.5 mm to 1.5 mm. Median biopsy time shortened from 35 ( $\pm$ 14) min to 19 ( $\pm$ 5) min. Two (0.7%) patients had fever requiring admission for intravenous antibiotics. In all, 41 (14.7%) patients had retention post-rTPB.

### **Discussion & Conclusion:**

With 5 years of system improvement and clinical experience, we have overcome its learning curve. We achieved reduced biopsy time, increasing detection rates and diagnosis of clinically significant CaP and maintaining low risk of serious complications.

## Characterisation of Erythroderma: A Retrospective Analysis of 225 Singaporean Patients

**FLG TAN<sup>1</sup>, HL TEY<sup>1</sup>, YL KONG<sup>1</sup>, AS TAN<sup>2</sup>**

<sup>1</sup>National Skin Centre, Singapore, <sup>2</sup>University of Pennsylvania, United States

### Introduction:

Erythroderma is characterised by generalised inflammation of the skin. This retrospective study aims to characterise the features of erythroderma and identify the associated causes of this condition in our population.

### Methods:

We reviewed the clinical, laboratory, histological and other disease-specific investigations of 225 in- and out-patients with erythroderma over a 7.5-year period between January 2005 and June 2012.

### Results:

The most common causative factors were underlying dermatoses (68.9%), idiopathic causes (14.2%), drug reactions (10.7%), and malignancies (4.0%). When drugs and underlying dermatoses were excluded, malignancy-associated cases constituted 19.6% of the cases. A total of 55.0% of malignancies were solid organ malignancies, which is much higher than those previously reported (0.0% to 25%). Endogenous eczema was the most common dermatoses (69.0%), while traditional medications (20.8%) and anti-tuberculous medications (16.7%) were commonly implicated drugs. In patients with cutaneous T-cell lymphoma, skin biopsy was suggestive or diagnostic in all cases. Also, 52.4% of patients with drug-related erythroderma had eosinophilia on skin biopsy. The sensitivity and specificity of serum tumour markers in detecting an underlying malignancy was 20.0% and 63.8% respectively. Relapse rate at 1 year was 17.8%, with no associated mortality.

### Discussion & Conclusion:

Our study highlights the significant proportion of malignancy-related erythroderma in those whom common underlying causes such as dermatoses and drugs have been excluded. There were more cases of solid organ malignancies compared to primary cutaneous malignancies. Skin biopsy was effective in identifying primary cutaneous malignancies.

## **A Preliminary Finding of EEG Differences of Children with Disruptive Behaviour Disorders in Singapore**

**HT TOR<sup>1</sup>, NSJ LIM-ASHWORTH<sup>1</sup>, SJ WENG<sup>1</sup>, YP OOI<sup>1</sup>, CG LIM<sup>1</sup>, DSS FUNG<sup>1</sup>, AS RUDO-HUTT<sup>2</sup>, A RAINE<sup>2</sup>**

*<sup>1</sup>Institute of Mental Health, Singapore, <sup>2</sup>University of Pennsylvania, United States*

### **Introduction:**

Many electroencephalography (EEG) studies have underscored that children with Attention Deficit Hyperactivity Disorder (ADHD) have an elevated theta/beta ratio compared to those in both normal and other clinical populations. Thus, EEG is an important clinical tool in diagnosis and assessment of ADHD. Clinically, ADHD often presents with comorbidities, most commonly with conduct disorder (CD). This study investigated the EEG differences in theta/beta ratio in children diagnosed with disruptive behaviour disorders. We hypothesised that these measures would discriminate between those with an ADHD diagnosis and comorbid CD.

### **Methods:**

A total of 105 children aged between 7 and 16 years were recruited. Participants were assigned into one of the following groups: (i) ADHD only (n = 43), (ii) ADHD+CD (n = 48) and, (iii) CD only (n = 14). EEG recording were obtained using 12 scalp electrodes on both hemispheres of the brain. Fourier transformation was performed to provide absolute power and theta/beta ratio were then computed.

### **Results:**

Repeated measures one-way ANOVA was performed. The result indicated that there were no significant differences in theta/beta ratio ( $F(2,11) = 0.10$ ,  $P = 0.89$ ) characteristics across groups.

### **Discussion & Conclusion:**

Our preliminary results did not show any significant differences in theta/beta ratio between those with only an ADHD diagnosis and comorbid CD. Our findings might suggest that these EEG measures do not sufficiently discriminate between groups in our local subsample. Data collection is still currently ongoing; this will provide the basis for a more conclusive finding. In addition, the complexity of comorbid conditions is difficult to elucidate the underlying brain mechanism.

## Post-tonsillectomy Haemorrhage: An Evaluation of Risk Factors in a Single Institution

DY ANG<sup>1</sup>, LC LEE<sup>2</sup>

<sup>1</sup>National Healthcare Group HQ, Singapore, <sup>2</sup>National University Of Singapore, Singapore

### Introduction:

Tonsillectomy is commonly done for recurrent tonsillitis and sleep disordered breathing. The incidence of post-tonsillectomy haemorrhage (PTH) is up to 9.3% and extensive research has been done to identify risk factors. Well-established factors include age, gender and surgical techniques. However, some were either inconclusive or inadequately explored. Hence, this study evaluates the risk of PTH with the use of non-steroidal anti-inflammatory drugs (NSAIDs) as post-operative analgesia and the clinical diagnosis of chronic tonsillitis versus obstructive sleep apnea (OSA). Hypothesis: post-operative NSAIDs use increases the risk of PTH while a pre-clinical diagnosis of OSA has a lower risk compared to chronic tonsillitis.

### Methods:

Medical records of tonsillectomy patients with or without hemorrhage were collected and reviewed for patient demographics, pre-operative clinical diagnosis, smoking history, methods of post-operative analgesia and grade of performing surgeon.

### Results:

A total of 1404 tonsillectomy patients were identified from 2005 to April 2013 (65% male, 35% female, mean age 20.6). Among them, 78 (5.6%) of them presented with post-tonsillectomy haemorrhage. There were 10 (12.8%) primary hemorrhages and 68 (87.2%) secondary hemorrhages. The control group consisted of 234 non-hemorrhage patients matched for age, gender and ethnicity. A conditional multivariate logistic regression analysis showed that there is no significant difference in risk of PTH between patients with OSA and chronic tonsillitis ( $P = 0.5978$ ). NSAIDs use is also not significantly associated with PTH ( $P = 0.5488$ ).

### Discussion & Conclusion:

Our study shows that there is no significant increase in risk of PTH with postoperative NSAID use. The clinical diagnosis of OSA does not significantly decrease the risk of PTH.

## Sex Hormone Concentrations in Singaporean Men

**R HAWKINS<sup>1</sup>**

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

### **Introduction:**

Sex hormone concentrations can vary between groups based on ethnicity. This study examined whether differences in serum testosterone concentration exist between Chinese, Indian and Malay men in Singapore.

### **Methods:**

Anonymised records of all male serum testosterone measurements performed between March 2007 and December 2012 were extracted for analysis using Microsoft Excel, Access and SPSS v16. Testosterone measurement was performed on a Roche Diagnostics e601 analyser. Repeat samples were excluded and the dataset was split to examine  $\leq 40$  y and older  $\geq 41$  y men separately.

### **Results:**

There were 1372 records in the  $\leq 40$  y group; 73% Chinese, 21% Indian, 6% Malay; 83% outpatients, average age 31.4 years (range, 13 to 40). There were 5302 records in the  $\geq 41$  y group; 88% Chinese, 8% Indian, 5% Malay; 90% outpatients, average age 58.8 y (range, 41 to 113). For the  $\leq 40$  y group, linear regression analysis for testosterone (nmol/L) showed average effect sizes of: Indian vs Chinese +1.14 ( $P = 0.022$ ), Malay vs. Chinese -1.81 ( $P = 0.037$ ). For the  $\geq 41$  y group, average effect sizes were: Indian vs Chinese -0.38 ( $P = 0.302$ ), Malay vs Chinese -1.33 ( $P = 0.004$ ).

### **Discussion & Conclusion:**

There are statistically but not clinically significant age related differences in serum testosterone concentration between Chinese, Indian and Malay men. Factors such as body composition, smoking and disease status may explain these differences.

## Deciding Where to Allocate Diabetic Educational Resources

**R HAWKINS**<sup>1</sup>

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

### **Introduction:**

Diabetes mellitus is the commonest endocrine disorder seen in clinical practice. Detecting evidence of recent poor diabetic control during hospital admission can facilitate organisation of dietician, diabetic nurse educator and physician follow-up while the patient is still in hospital. This study examined which demographic factors best predicted poor diabetic control in hospitalised patients in Singapore.

### **Methods:**

Anonymised details of all HbA1c (turbidimetric immunoinhibition method, Beckman Coulter LX20) measurements performed on inpatients from 2009 to 2011 were extracted from the laboratory information system for analysis using Microsoft Excel and SPSS v16. Logistic regression analysis was performed for HbA1c  $\geq 8\%$  (NGSP) as outcome variable and age  $\geq 70$  y, sex, race and medical/surgical discipline as predictor variables.

### **Results:**

There were 28,712 records available, of which 61% were Chinese, 13% Indian, 12% Malay, 45% female, 82% from medical disciplines, 26% with HbA1c  $\geq 8\%$ . Average age was 66 years (range, 15 to 110). Logistic regression analysis for HbA1c  $\geq 8\%$  adjusted for sex showed the following significant odds ratios: age  $\geq 70$  years: 0.403 ( $P < 0.001$ ), Indian vs Chinese: 1.594 ( $P < 0.001$ ), Malay vs Chinese 1.552 ( $P < 0.001$ ), surgical patient vs medical patient: 1.801 ( $P < 0.001$ )

### **Discussion & Conclusion:**

Independent risk factors for HbA1c elevation ( $\geq 8\%$ , NGSP) in diabetic inpatients include Malay and Indian ethnicity and surgical patient status. Age  $\geq 70$  years is associated with decreased risk. Knowledge of these factors can help direct case finding activities. Resource allocation for education and follow-up should consider these issues, particularly with respect to the language fluency and cultural familiarity of healthcare staff.

## Intraocular Pressure Spikes following Sequential Laser Peripheral Iridotomy for Angle Closure

**TL LEE<sup>1</sup>, JY NG<sup>2</sup>, M NONGPIUR<sup>3</sup>, T AUNG<sup>3</sup>, S PERERA<sup>3</sup>, WJ TAN<sup>4</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore,* <sup>2</sup>*National University Health System, Singapore,* <sup>3</sup>*SingHealth HQ, Singapore,* <sup>4</sup>*National Healthcare Group HQ, Singapore*

### Introduction:

This study determines the incidence of intraocular pressure (IOP) spikes within the first 30 minutes after sequential argon-Nd:YAG laser peripheral iridotomy (LPI) in patients with angle closure and to explore risk factors for their occurrence.

### Methods:

A total of 428 consecutive eyes of 298 patients who had undergone LPI at the Singapore National Eye Centre (SNEC) between June 2011 and August 2011 were reviewed retrospectively. There were 238 primary angle closure suspect (PACS) eyes, 85 primary angle closure (PAC) eyes, 92 primary angle closure glaucoma (PACG) eyes and 13 acute primary angle closure (APAC) eyes. The pre and post-LPI IOP, gonioscopic findings, medications, laser parameters and the need for acute IOP-lowering treatment were recorded.

### Results:

The proportion of patients with a post-LPI IOP elevation  $\geq 8$ mmHg was 10.7% ( $n = 46$ ) and those with a significant IOP spike of  $\geq 30$ mmHg was 31 (7.2%). There were no significant differences between those with or without a post-LPI IOP elevation  $\geq 8$ mmHg and those with or without a post-LPI IOP of  $\geq 30$ mmHg, in terms of age, gender, race, total laser energy utilised and seniority of the physician performing the procedure. Patients who experienced IOP spike  $\geq 8$ mmHg were on fewer pre-LPI medications ( $P = 0.009$ ). On logistic regression, patients with APAC had a significantly higher probability of an IOP spike ( $P = 0.03$ ).

### Discussion & Conclusion:

The incidence of post sequential LPI IOP elevation  $\geq 8$ mmHg was 10.7%. The primary diagnosis of APAC was a risk factor, and using pre-procedure ocular hypotensives can potentially reduce their occurrence.



## Pseudoexfoliation Syndrome at a Singapore Eye Clinic

**J LEE<sup>1</sup>, SL HO<sup>1</sup>**

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

### Introduction:

Pseudoexfoliation syndrome (PXF) is an age-related syndrome with geographic and racial variations in prevalence. Current data on PXF in the Singapore population are limited. This study aims to determine the demographics of PXF in a Singapore hospital eye outpatient clinic.

### Methods:

A retrospective study of consecutive patients with pseudoexfoliation syndrome (PXF) encountered by a single ophthalmologist over a period of 37 months (1 July 2006 to 31 July 2009) was conducted.

### Results:

Eighty-nine (2.7%) of the 3294 consecutive patients seen were found to have PXF. The mean age of PXF patients was significantly higher than non-PXF patients ( $P < 0.001$ ). PXF was bilateral in 53 patients (59.6%). The major ethnic origins among the 89 PXF patients were Chinese ( $n = 57$ , 64.0%), Malay ( $n = 9$ , 10.1%) and Indian ( $n = 23$ , 23.6%). There was a significant association between PXF and race ( $P < 0.001$ ) where PXF was more in the Indian study population and less in the Chinese study population. No significant gender predisposition for PXF was noted. 21 patients (23.6%) had glaucoma and more males had pseudoexfoliative glaucoma (PXFG) compared to females ( $P < 0.001$ ). There was no association between race and PXFG.

### Discussion & Conclusion:

PXF is not an infrequent encounter among the elderly Singapore eye clinic patients. It is associated with increasing age and ethnicity, being more common in Indians and less common among Chinese. It is important for ophthalmologists to diagnose PXF early and monitor these patients regularly for cataracts and glaucoma.

## Corneal Thickness in Asian Keratoconus Patients

**HK WONG<sup>1</sup>, J LIM<sup>1</sup>, WJ HENG<sup>1</sup>**

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

### **Introduction:**

Keratoconus is a common corneal ectasia that causes low vision in patients affected by the disease. This study aims to determine the risk factors affecting corneal thickness in Asian Keratoconus patients.

### **Methods:**

A retrospective review of corneal topography of keratoconus patients seen in the corneal clinic from July 2003 to June 2011 was conducted. The mean change in thinnest part of the cornea was evaluated over 3 years and risk factors affecting the cornea thickness were determined.

### **Results:**

Eighty eyes of 43 patients were reviewed, of which 58.1% were male (25/43) and 41.9% female (18/43). The mean age was 30.3 years (range 17-62) and there was a highest proportion of Indian [39.5% (17/43)], followed by Chinese [34.9% (15/43)], Malay [23.3% (12/43)] and of other ethnic origin [2.3% (1/43)]. There was a negative correlation between the thinnest corneal thickness and maximal keratometry reading [ $-0.32$ , ( $P = 0.01$ )]. The mean change in thinnest corneal thickness was  $9.3 \pm 14.7$  m at 1 year ( $n = 23$ ),  $17.7 \pm 25.7$  m at 2 years ( $n = 14$ ) and  $45.1 \pm 55.6$  m at 3 years ( $n = 17$ ). Presence of atopy was not associated with a greater change in corneal thickness at 1 year [ $11.6 \pm 3.36$  m,  $n = 5$ ] vs.  $18.5 \pm 45.7$  m ( $n = 19$ ),  $P = 0.52$ ]. Patients on RGP lenses had a greater change in corneal thickness at 1 year [ $40.6 \pm 63.4$  m ( $n = 8$ ) vs.  $4.7 \pm 14.4$  m ( $n = 15$ ),  $P = 0.05$ ]

### **Discussion & Conclusion:**

There is a negative correlation between corneal thickness and maximal keratometry reading. A progressive increase in rate of corneal thinning over time was demonstrated.

## Antibiotic Susceptibility of Ocular Bacterial Isolates in an Asian Tertiary Eye Centre: A 5-year Retrospective Review

**YP XU<sup>1</sup>, TL CHAN<sup>2</sup>, E LOH<sup>2</sup>**

*<sup>1</sup>National Healthcare Group HQ, Singapore, <sup>2</sup>Singapore National Eye Centre, Singapore*

### Background/Hypothesis:

This study aims to investigate the microbial spectrum and antimicrobial susceptibilities of ocular isolates.

### Methods:

This is a retrospective review of 596 ocular bacterial isolates from 2004 to 2008 at a tertiary eye centre. Data included origin of ocular isolates and sensitivities to commonly used antibiotics.

### Results:

The commonest bacteria isolated were *Pseudomonas Aeruginosa*, *Staphylococcus Aureus* and Coagulase negative *Staphylococcus*. Sensitivities of gram-positive bacteria were: Cephalothin (58.7%), Tobramycin (59.4%), Ciprofloxacin (70%), Levofloxacin (73.6%) and Chloramphenicol (86.1%). Sensitivities of gram-negative bacteria were: Chloramphenicol (32.4%), Tobramycin (74.1%), Levofloxacin (79.7%) and Ciprofloxacin (86.2%). From the study, when considering susceptibilities of all organisms isolated, a large majority of the organisms were sensitive to Levofloxacin, Ciprofloxacin and Tobramycin. The *Streptococcus* species was an exception, with high resistance to Ciprofloxacin and Tobramycin. The gram-positive bacteria had the highest resistance to Cephalothin and the gram-negative bacteria to Chloramphenicol

### Discussion & Conclusion:

A large proportion of organisms tested were sensitive to the commercially available antibiotics Levofloxacin, Ciprofloxacin and Tobramycin.

## Reasons Influencing Non-Adherence to Medications in Psychiatric Patients

**SY LOW<sup>1</sup>, HF TIONG<sup>2</sup>**

<sup>1</sup>*Tan Tock Seng Hospital, Singapore,* <sup>2</sup>*National University of Singapore, Singapore*

### **Introduction:**

Adherence to medications plays an important role in improving treatment outcomes. Adherence is frequently influenced by a combination of socio-demographic, psychological, biological and medication factors. Consequently, identification of relevant factors influencing non-adherence can assist healthcare professionals in addressing these factors and henceforth, improve disease outcome. This is especially important for psychiatric patients, as many require long-term medications to keep their condition in remission. We hypothesise that the reasons for non-adherence to medication are multifactorial in nature. Hence, our study aims to identify psychiatric patients' reasons for non-adherence.

### **Methods:**

A total of 207 patients were surveyed at Tan Tock Seng Hospital psychiatry outpatient clinic from February to April 2013. The anonymous and voluntary Interviewer-assisted questionnaire consisted of questions to identify factors associated with medication adherence, and reasons for non-adherence. The questionnaire consisted of common anticipated reasons for non-adherence for respondents to tick if applicable, and also a free-text box where patients could comment if they had other reasons not mentioned in the questionnaire.

### **Results:**

The 2 most common reasons which non-adherent patients reported included: (i) forgetting to take medications (27.5%); (ii) stopping their medications once they feel better (27.1%). A commonly cited reason for non-adherence observed in the free-text box was: they were too busy to take their medications regularly.

### **Discussion & Conclusion:**

The aforementioned reasons for non-adherence can be adequately addressed. The incidence of forgetting or being too busy to take medicines can be reduced, if medication regimes can be simplified. Proper patient education regarding the importance of continuity of appropriate medications (with common misconceptions clarified) can also be enforced.

## **Report of a Pilot Social Skills Intervention for Inpatient Adults with Intellectual Disability and Mental Health Issues**

**G MONTERONA<sup>1</sup>, D BARRON<sup>1</sup>, J GOH<sup>1</sup>**

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

### **Introduction:**

This poster describes a pilot of a small-group intervention for patients in a Long Stay Psychiatric Ward for Women with Intellectual Disabilities. The group intervention aimed to reduce the frequency of incidents involving conflict between patients and improve social skills while providing meaningful activities. The purpose of this pilot study was to ascertain the acceptability of this intervention in the local context.

### **Methods:**

The group adopted a closed, level one, psychotherapy group format. There were 5 sessions over a period of 6 weeks structured around a group project chosen by the participants. Participants were selected who were regularly involved in conflicts with one another. The group facilitators were identified from ward based nursing and medical staff, supervised by members of the Adult Neuro Developmental Service MDT.

### **Results:**

The pilot group was completed successfully. Patients made use of the group to accomplish the task. The ward based staff were able to gain a valuable training experience. Limitations identified included difficulties encountered by some one of the group ward based group facilitators to regularly attend the group.

### **Discussion & Conclusion:**

Research shows that social skills training can help individuals acquire skills required to develop and maintain friendships. Ordinarily such interventions are conducted by psychologists and occupational therapists. As such our group intervention represents a novel approach to care in our local context. The pilot demonstrated that this approach to ward-based group therapy is largely acceptable to patients and staff and may be feasible to undertake with modification.

## **A Preliminary Observation on the Role of Fatty Acids in Childhood Disruptive Disorders in Singapore**

**XW POH<sup>1</sup>, NSJ LIM-ASHWORTH<sup>1</sup>, CG LIM<sup>1</sup>, DSS FUNG<sup>1</sup>, D YANG<sup>2</sup>**

*<sup>1</sup>Institute of Mental Health, Singapore, <sup>2</sup>National University of Singapore, Singapore*

### **Introduction:**

Some of the most prevalent childhood psychiatric disorders worldwide include disruptive behavior disorders such as attention deficit hyperactivity disorder (ADHD), oppositional defiant disorder (ODD) and conduct disorder (CD). Research studies have posited that deficiencies in vitamins and/or minerals and weight status can affect these children's behavior and cognitions. Many overseas studies have attempted to examine and describe the relation between fatty acids and behavioral difficulties in children. However, no local studies have looked into children diagnosed with disruptive behaviour disorders and their nutritional intake. Therefore, this study aims to discuss the nutritional intake of Singapore children aged 9 to 16 years old diagnosed with disruptive behavior disorders.

### **Methods:**

Participants' dietary intakes were collected through a 3-day food diary questionnaire and analysed using Foodworks 2007.

### **Results:**

Most participants did not meet the adequate intake (AI) for fatty acids. Nutritional and energy intake were also below recommendations.

### **Discussion & Conclusion:**

Past studies have found inverse relationship between fatty acids level and behaviors. Concentrations of essential fatty acids (EFA) were found to be significantly lower in children with ADHD by another group of researchers. These findings were parallel to the fatty acids intake of present study's participants whereby the AI for EFA were not met. Results illustrated in the current study appeared to be consistent with past findings showing a relationship between low nutritional intake, particularly fatty acids, and behavioral disorders in children. Hence, it is conceivable that dietary deficiency of fatty acids may be a contributory factor.

## Cutaneous Mosaicism—Concepts and Interesting Cases from the National Skin Centre, Singapore

**E TAN<sup>1</sup>, YC GIAM<sup>1</sup>**

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

### **Introduction:**

Mosaicism is characterised by the presence of two or more genetically different populations of cells arising from the same zygote in an individual.

### **Methods:**

Cutaneous mosaicism can be observed in many genodermatoses.

### **Results:**

Genomic mosaicism results from post-zygotic gene mutations or chromosomal aberrations. In somatic mosaicism, autosomal mutations occur during embryogenesis and are thus propagated in a limited number of cells during development, with no risk of transmission to offspring. In gonadal mosaicism, the mutations affect germline tissue and explain the observation of autosomal disorders such as tuberous sclerosis occurring in siblings whose parents are clinically unaffected. Gonosomal mosaicism arises from early mutations involving both somatic and germline tissues, and provides the mechanism for a parent with segmental neurofibromatosis having children with generalised neurofibromatosis. Chromosomal mosaicism results from non-disjunction events after fertilisation, and provides the basis for hypomelanosis of Ito and linear and whorled naevoid hypermelanosis. Epigenetic (functional) mosaicism is caused by retrotransposons which are genomic elements capable of influencing neighbouring gene expression. X-linked dominant genodermatoses in women such as incontinentia pigmenti and focal dermal hypoplasia are believed to be a result of random X chromosome inactivation or lyonisation by retrotransposons. Similarly, female carriers of X-linked recessive disorders such as hypohidrotic ectodermal dysplasia may manifest subtle clinical features as a result of functional mosaicism.

### **Discussion & Conclusion:**

In conclusion, cutaneous mosaicism is more common than previously thought. Apart from accurate diagnosis, it is important to keep in mind the underlying concepts of cutaneous mosaicism in order to provide appropriate genetic and disease counselling to patients.

## **Family Adversity Risk Factors for Attention Deficit Hyperactivity Disorder and Associated Disruptive Behaviour Disorders in Singapore**

**J CHUA<sup>1</sup>, NSJ LIM-ASHWORTH<sup>1</sup>, YP OOI<sup>1</sup>, CG LIM<sup>1</sup>, DSS FUNG<sup>1</sup>, RP ANG<sup>2</sup>**

*<sup>1</sup>Institute of Mental Health, Singapore, <sup>2</sup>National Institute of Education, Singapore*

### **Introduction:**

In view of the imperative role that genes play in disruptive behavioural disorders (DBD), researchers have highlighted that more emphasis should be placed on identifying and understanding family factors that may contribute to the manifestation of this genetic predisposition. The study aims to provide supporting evidence for the role that family adversity plays in predicting DBD in a sample of clinically referred children in Singapore. This study hypothesises that a higher family adversity index increases the risk of a positive DBD diagnosis.

### **Methods:**

A total of 178 children, aged between 9 and 17 years, who attended a local outpatient psychiatric clinic were included in this study. Participants have to satisfy DSM-IV-TR criteria for ADHD, CD and/or ODD. Parents of participants to complete a parent intake interview form and a computerised structured diagnostic interview. A family adversity index was summed using six items from the parent intake interview form. Index used in our study includes socio-economic status, status of family structure, family size, stressful events in the past 12 months, and prior psychiatric consultation.

### **Results:**

Logistic regression analysis indicated that the family adversity index significantly predicted DBD, with 3.3% of the variance accounted for by the index. Odds ratio for each adversity factor ranged from 1.21 to 11.59.

### **Discussion & Conclusion:**

Our findings are congruent with previous studies which reported that a high adversity score increases the risk of a DBD. Additionally, our results demonstrated that within an Asian context, child mental health concerns, especially disruptive behaviour problems, are still positively connected to demographic adversity.



## Pilot Study on Nurses' Perceptions Towards Different Aspects of Learning

**A LOW<sup>1</sup>, B K LI<sup>2</sup>**

<sup>1</sup>*NHG College, Singapore*, <sup>2</sup>*National Healthcare Group HQ, Singapore*

### Introduction:

As healthcare professionals, nurses need to be engaged in continuous professional development and lifelong learning. Understanding nurses' perceptions towards learning will be useful in planning for nursing training curriculum and instructional design. This pilot study seeks to explore nurses' perceptions towards different aspects of learning.

### Methods:

Registered nurses from specialty institutions were surveyed over 3 weeks using a questionnaire (20-item five-point Likert scale) that measures their perceptions towards different aspects of learning. Data analysis was conducted using descriptive statistics.

### Results:

A total of 39 registered nurses participated in this pilot survey. Respondents perceived themselves to learn better with defined learning objectives (67.5%) and structured learning process (85.0%). Learning is perceived to be better with non-formal assessment (85.0%) or absence of assessment (85.0%), compared to formal assessment (47.5%). Respondents perceived that they will learn better if their learning will lead to official qualifications (95.0%) or credentials (57%). Their learning is perceived to be better if it is facilitated by instructors with relevant formal qualifications (77.5%) or with only relevant experiences (85%). Good quality of teaching/instruction enables 72.5% of respondents to learn although the education/training institutions are not reputable. Learning is perceived to improve with self-initiated learning (67.5%) and personal interest (100%), compared to recognition by employers (77.5%).

### Discussion & Conclusion:

Registered nurses perceived themselves to learn better with defined learning objectives, structured learning process, certification, instructors with relevant experiences, and good quality of teaching/instruction. Non-formal assessment and absence of assessment in learning is preferred to formal assessment. Intrinsic motivators encourage better learning compared to extrinsic motivators.

## The Building Blocks of High Quality Health Professions Education in National Healthcare Group

**YPL NG<sup>1</sup>, KY THAM<sup>2</sup>**

<sup>1</sup>*National Healthcare Group HQ, Singapore,* <sup>2</sup>*Tan Tock Seng Hospital, Singapore*

### **Introduction:**

Three columns of building blocks make up a high quality education system: Standards and Accountability, Human Capital, Structures and Organisation. In response to changes in Singapore's postgraduate medical education in 2009, National Healthcare Group (NHG) invested in human capital and structures to build a quality education system. The hypothesis of this study is that the right people armed with right tools will do the right things and do them right.

### **Methods:**

Interventions to raise standards and improve accountability were introduced at micro, meso and macro levels: NHG selected and nurtured a team of good teachers to become educators; developed flagship faculty development programs with world renown centers; persuaded clinicians to upgrade their teaching skills; recruited and developed a strong administrative team; set up structures and systems; and engaged partners e.g. MOH/MOHH, NTU-LKCMedicine pro-actively.

### **Results:**

NHG passed all ACGME International (ACGME-I) accreditation with flying colours, and with commendations from Director of Medical Services and previous Health Minister. ACGME-I invited NHG to assist Qatar in their graduate medical education (GME) programme and an educator to be a member of the ACGME-I Review Committee. NHG educators/members have been invited by MOH to lead key committees e.g. National Licensing Examination, and write Standard-Operating-Procedures for GME. Eight educators have graduated with Master of Science in Health Professions Education. NHG residents continue to improve In-Training Examinations performance with some performing  $\geq 75$ th-percentile compared to American peers.

### **Discussion & Conclusion:**

Returns on investment in Human Capital and Structures have met expectations. NHG needs to strengthen weaker building-blocks and ensure sustainability.

## A Comparative Study of Career Choice Influences Among First-Year Healthcare Undergraduates in a Singapore University

**M LOW<sup>1</sup>, KK TAN<sup>1</sup>, SY LIAW<sup>1</sup>, S CHAN<sup>1</sup>**

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

### **Introduction:**

The Singapore government plans to increase the intakes of nursing, dental, medical, and pharmacy course to help meet the healthcare needs of its ageing population. This study compared career choice influences among first-year undergraduates from these disciplines at the National University of Singapore (NUS). Greater emphasis on comparatively stronger attractive factors of each discipline can enhance recruitment strategies for respective professions.

### **Methods:**

This study adopted a quantitative, comparative-descriptive design using self-reported questionnaires. Questionnaires included a Career Choice Inventory (CCI) with subscales of intrinsic, extrinsic, and interpersonal factors, and additional open-ended questions on attractive and deterring factors towards nursing. Cronbach's alpha of the CCI was 0.74, 0.86, and 0.91 for intrinsic, extrinsic, and interpersonal factors respectively. One-way analysis of variance was used to determine differences across the disciplines on the CCI subscales. Open-ended responses were content analysed.

### **Results:**

A total of 442 undergraduates were surveyed. Nursing, medical, and dental undergraduates' career choice were significantly more intrinsically influenced than pharmacy undergraduates ( $P < 0.001$ ). Nursing and medical undergraduates' career choice were significantly less extrinsically influenced than dental ( $P < 0.001$ ) and pharmacy ( $P < 0.05$ ) undergraduates. Dental undergraduates followed by medical undergraduates were most highly influenced by interpersonal factors such as parents' professions. Open-ended responses supported the importance of intrinsic factors and parental influence, and highlighted a strong influence of gender stereotyping on nursing undergraduates' career choice.

### **Discussion & Conclusion:**

Findings of this study enhanced the insight into career choice influences of first-year healthcare undergraduates at the NUS. The comparative understanding of healthcare undergraduates can help to guide future recruitment and research.

## Exploring the Perception of Sexually Transmitted Infection Amongst Immigrant Construction Workers in Singapore

**M ADNAN<sup>1</sup>, B LIM<sup>1</sup>, HT XIE<sup>2</sup>**

<sup>1</sup>National Skin Centre, Singapore, <sup>2</sup>Singapore Nurses Association, Singapore

### Introduction:

Preventive efforts against sexual transmitted infection (STI) are crucial to reduce the incidents of human immunodeficiency virus (HIV). There are about 277,600 of immigrant construction workers (ICW) in Singapore but little is known about their perception on STI/HIV. This study aims to examine their perception of STI and HIV infection.

### Methods:

A descriptive survey was conducted on a convenience sample of 235 male immigrants working in the construction industry. Face-to-face interviews were conducted by nurse volunteers at health screening events to obtain data on perception of ICW towards STI/HIV.

### Results:

Out of the 235 male immigrants, 74.5% were from India and 26.5% of the immigrants were from Bangladesh, China, Philippines and others. The percentage of married immigrants is 58.7%. The mean age of the immigrants were 33 years old and with years of working in Singapore ranged from 0.3 to 18 years. In term of marital status, 59% were married, 40% were single and 1% was divorced. Only 55.3% of the immigrants interviewed shared using condom all the time during their sexual activities. The numbers of sex partners among the immigrants were ranged from 1 to 5 over the past 6 months. A total of 80% of the married ICW did not believe that STI/HIV was treatable, and there was a marked association between the ICW's marital status believed in HIV are treatable ( $P < 0.001$ ).

### Discussion & Conclusion:

An ongoing preventive program would be necessary to improve the immigrant workers' awareness on STI, overcoming barriers in the use of condoms and information in accessing sexual health clinics.

## **Comparison of Patient Pain Experience: Benzathine Penicillin 2.4 mega with Water for Injection vs Benzathine Penicillin 2.4 mega with Lignocaine 1% for Injection in Patients with Syphilis**

**M ADNAN<sup>1</sup>, KW TAN<sup>1</sup>, B LIM<sup>1</sup>, J NG<sup>1</sup>, M RAHIDDEER<sup>1</sup>, W QUEK<sup>1</sup>**

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

### **Introduction:**

Intramuscular injection of benzathine penicillin (BP) is the first line treatment for syphilis. Use of lignocaine (LH) as diluent with BP was highlighted by Amir et al (1998) on paediatric patients for pain control, and however the effectiveness in adults is not known. The study aims to examine patients' experience of pain in adult patients who received intramuscular BP with water versus BP with LH as diluent.

### **Methods:**

A pilot project utilising the comparative study design was conducted from 2 May to 30 August 2012 to examine patients' experience of pain with and without using LH as a diluent for BP injection. Baseline of pain score and gender of patients were collected from the same patients throughout the 3 injections. Pain score was assessed based on Wong-Baker pain assessment scale within 2 minutes after injection. On the 1st visit, only BP with water for injection was administered followed by 2nd and 3rd injections of LH as diluent with BP.

### **Results:**

In total, 116 males and 81 females were recruited. Patients' experience of pain reduced when LH was used as diluent for BP injection. Baseline injection and third injection, the mean pain score dropped significantly by 1.12,  $t(196) = 32.02$ ,  $P < 0.001$ . Mean pain score reduced by 0.98 between the first injection containing BP only ( $M = 2.14$ ,  $SD = 1.02$ ) and second injection containing BP with LH ( $M = 1.16$ ,  $SD = 0.38$ ),  $t(196) = 28.41$ ,  $P < 0.001$ .

### **Discussion & Conclusion:**

There was marked improvement of pain reduction when patients received BP with LH as diluent when given intramuscularly.

## Oral Conditions Among Dependent Community-Dwelling Elderly Persons

**N MORISAKI<sup>1</sup>, H MIURA<sup>2</sup>, S HARA<sup>3</sup>, A KUDO<sup>1</sup>, S NIGARA<sup>1</sup>**

*<sup>1</sup>University of KinDAI Himeji, Japan, <sup>2</sup>National Institute of Public Health, Japan, <sup>3</sup>Kyushu University of Health and Welfare, Japan*

### Introduction:

This study aimed at characterising the oral conditions among dependent community-dwelling elderly persons in Japan.

### Methods:

The oral conditions of 92 dependent community-dwelling elderly persons in Japan were examined through a survey, which asked about the number of residual teeth, swallowing function, tongue pressure, and labial closure force. Swallowing function was assessed using the Dysphagia Risk Assessment for the Community-dwelling Elderly (DRACE). The DRACE consists of the 12 questions. The individual scores were added together to obtain the total score. Tongue pressure was measured using a tongue pressure measurement system (JMS Co. Ltd., Hiroshima, Japan). Labial closure force was measured using the Lip De Cum (Cosmo-Instruments Co, Ltd, Tokyo, Japan), a device measuring labial closure force.

### Results:

The mean number of the residual teeth was 10.31 (SD = 10.13). The mean tongue pressure was 23.65 (SD = 11.11). The levels of tongue pressure of 29 subjects (34.5%) were less than 20 Kp, which is considered the standard tongue pressure of Japanese adults in their 70s and older. The mean labial closure force was 12.08 (SD = 7.82).

### Discussion & Conclusion:

This study revealed that oral cavity function was decreased in most elderly people. Functional decline of the oral cavity as an indispensable organ for eating and conversation may be influenced by many factors. It is necessary to examine an approach to counter the functional decline of the oral cavity with age.

## Timely 1100 Hour Discharge to Free up Beds for Admission

**SM ENG<sup>1</sup>, PW HO<sup>1</sup>**

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

### **Introduction:**

The hospital bed crunch situation has been highlighted. We face the challenges to free up beds for patients waiting for admission in the emergency department. Tan Tock Seng Hospital (TTSH) has undertaken the initiative to staggered discharge at 1100 hours and 1300 hours. Our target was set to ensure 20% of patients are discharged before 1100 hours daily.

### **Methods:**

In order to improve the discharge rate, we restructured the nursing jobscope, work closely with family, carers, primary care providers, community services and social services. The liaison nurse develops a plan for timely discharge based on a plan of care for clinical management. Effective communication system is set up between the multidisciplinary team to address and meet the needs of the patients, families and communities. The nurse encountered any difficulties in facilitating early discharge. The NO would rectify the issue to ensure that the 1100 hours target is met. Structured orientation materials and conducted briefing to the Medical Officers and House Officers who were assigned to the Level 5 ward. The NOs at Level 5 were recognised as the drivers for this improvement.

### **Results:**

Since 2013, ward 5A, B & D has achieved 20% of discharges before 1100 hours and 13 other wards have achieved 20% of discharges before 1100 hours.

### **Discussion & Conclusion:**

The nurse-led initiative at Level 5 has contributed significantly to the achievement of discharging at least 20% of patients before 1100 hours, which has helped to alleviate the bed crunch situation at TTSH. The team continues to innovate and create value-adding processes to achieve excellent outcomes.

## A Study of Attitudes of Polyclinic Physicians and Nurses Towards Interprofessional Collaboration

**M ZHENG<sup>1</sup>, WE TANG<sup>1</sup>, P KANNANPIRAN<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

### Introduction:

With the ageing population in Singapore and increasing chronic disease burden, patients seen at polyclinics are increasingly more complex. Interprofessional collaboration (IPC) is essential to improve patient outcome. This study aims to determine the attitudes of polyclinic physicians and nurses towards IPC, demographic characteristics affecting attitudes and factors perceived to facilitate IPC. Our hypothesis is suboptimal attitudes of polyclinic physicians and/or nurses towards IPC leads to a lack of IPC in practice.

### Methods:

A self-administered questionnaire, adapted from Jefferson scale of attitudes toward physician-nurse collaboration (JSAPNC), was distributed over four weeks to all physicians and nurses in all nine National Healthcare Group Polyclinics. Higher scores indicate better attitudes.

### Results:

JSAPNC total scores for physicians and nurses are high, with average scores of 50.39 (95% CI, 49.67 to 51.16) and 51.61 (95% CI, 51.09 to 52.13) respectively. While the difference is statistically significant ( $P = 0.011$ ), it might not be significant practically. Nurses with advanced education have higher JSAPNC score (mean: 52.28, 95% CI, 51.48 to 53.08) than nurses with basic education (mean: 51.1, 95% CI, 50.44 to 51.79). This is statistically significant ( $P$ -value 0.027) but practically the absolute difference may not be significant. Many participants think that revising practice regulations (54.2%), conducting training (67.2%), adequate time (65.9%) and working in fixed teams (48%) will facilitate IPC. The difference in response rate of physicians versus nurses is statistically significant (80.9% versus 98.9% respectively,  $P < 0.001$ ). This could have led to a respondent bias.

### Discussion & Conclusion:

Polyclinic physicians and nurses have similar good attitudes towards IPC. Many believe that revising practice regulations, conducting training, adequate time and working in fixed teams will help facilitate IPC. These suggestions could be considered and implemented to practice.



## **An Improvement Process in the Management of Direct Observed Therapy Patients in Primary Care Setting**

**PH TAN<sup>1</sup>, CC YAN<sup>1</sup>, HC CHEAH<sup>1</sup>, MJ ANG<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

### **Introduction:**

Tuberculosis (TB) is a public health problem. The number of patients under directly observed therapy (DOT) has increased from 10% before 1997 to more than 55% according to Ministry of Health statistic for 2012. DOT patients are considered non-infectious after 2 weeks of medication with clinical improvement. Newly diagnosed TB patients are advised to put on their surgical mask during the first two weeks of their therapy. This study aims to improve the compliance rate of DOTS patients with less than 2 weeks of treatment in wearing their surgical mask to reduce risk of transmission in the polyclinic vicinity.

### **Methods:**

Baseline data were captured for 3 months at 2 polyclinics with the highest number of DOTS patients. Intervention taken to improve compliance rate in wearing mask includes attaching a reminder label on the appointment card, placement of mask with easy accessibility and educational reinforcement.

### **Results:**

Compliance rate in the two polyclinics increased from 40% to 80% ( $P < 0.001$ ) and 43% to 88% ( $P < 0.001$ ) respectively. A post audit conducted a year after the intervention showed good compliance of 98% and 95% respectively in both clinics. The average compliance rate was estimated at 96.5% (95% CI, 94.9% to 97.7%) 1-year after intervention.

### **Discussion & Conclusion:**

It is important to ensure effective infection control measures are in place to prevent the transmission of TB in the primary healthcare and community setting. Good compliance with respiratory control measures served to further optimise care while protecting vulnerable patients within the polyclinics.

## **A Pilot Study: Parental Attitudes and Perceptions of Childhood Immunisations in a Singapore Primary Healthcare Setting**

**PH LIM<sup>1</sup>, YF SIM<sup>1</sup>, J MATHEWS<sup>1</sup>, VB DRURY<sup>2</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore,* <sup>2</sup>*National University of Singapore, Singapore*

### **Introduction:**

This study aims to examine parental attitudes and perceptions of childhood immunisation in a polyclinic in Singapore. Secondary outcomes were to identify differences in the attitudinal variables by demographic characteristics. Refusal or delay in vaccine administration has implications in the success of immunisation programmes. Understanding the importance of vaccine resistance will allow healthcare providers to address any parental concerns and hence, increase immunisation rates and improve herd immunity.

### **Methods:**

Parents of 57 Singaporean children below 6 years of age were administered the modified Parent Attitudes about Childhood Vaccines (PACV) survey. Information on attitudes and behaviours indicative of immunisation safety concerns and hesitancy of receiving immunisations were obtained.

### **Results:**

Majority of parents (70% to 79%) were concerned about side effects, safety and effectiveness of the immunisation shots. Association with education level, monthly household income, and number of children were found to correlate with hesitancy scores. Higher hesitancy score of 57.14 (95% CI, 35.63 to 78.65), was seen in parents with secondary education than those with university education or above. A household income <\$3000 per month also yielded a higher hesitancy score of 55.48 (95% CI, 49.06 to 61.89). The number of children parents have also had some bearing on hesitancy scores, with 3 children or more scoring 51.79 (95% CI, 43.70 to 59.88) compared to 42.86 (95% CI, 31.11 to 49.61) in parents with one child.

### **Discussion & Conclusion:**

This study has shown that although most parents believe in the general safety of childhood vaccines, a substantial minority will have concerns pertaining to immunisations which can be addressed by healthcare providers.

## Knowledge of Osteoporosis Among Singapore Adults in National Healthcare Group Polyclinics (NHGP) Settings

**WL CHIANG<sup>1</sup>**

<sup>1</sup>*National Healthcare Group Polyclinics, Singapore*

### **Introduction:**

National Nutrition Survey showed that 35.2% of Singapore adults consumed inadequate calcium in 2010. It may be due to insufficient knowledge. This study was to investigate the knowledge of osteoporosis and calcium-rich foods among patients seen in NHGP.

### **Methods:**

A cross-sectional anonymous survey was administered to patients visited NHGP from 1 March to 31 May 2013. Patients (n = 511) aged 21 to 69 years were randomly selected. The questions were divided into four domains and the data were analyzed using STATA SE Version 12.0.

### **Results:**

A total of 482 patients (213 male, 269 female) completed the questionnaire. The overall knowledge score was  $38.9 \pm 19.7$  (mean  $\pm$  SD). Only 16% scored  $>50$  marks out of 100 and 65% could not answer all calcium knowledge questions. Education level was associated with overall score and all domains ( $P < 0.05$ ). Above secondary education level group had highest overall score, followed by secondary and primary education group ( $47.7 \pm 20.0$  vs  $37.8 \pm 18.8$  vs  $28.8 \pm 15.8$ ;  $P < 0.05$ ). Female had higher scores for overall knowledge ( $41.4 \pm 20.1$  vs  $35.8 \pm 18.7$ ;  $P < 0.05$ ), calcium knowledge ( $37.6 \pm 23.8$  vs  $30.8 \pm 21.3$ ;  $P < 0.05$ ) and vitamin D knowledge ( $29.0 \pm 38.6$  vs  $20.9 \pm 36.0$ ;  $P < 0.05$ ) than male. Chinese had highest osteoporosis knowledge score ( $P < 0.05$ ). Participants who were consuming calcium supplement had higher vitamin D knowledge score ( $34.8 \pm 40.6$  vs  $22.2 \pm 36.1$ ;  $P < 0.05$ ).

### **Discussion & Conclusion:**

The result indicates poor knowledge of osteoporosis and calcium-rich foods among participants and this may be one of the reasons for inadequate calcium among Singapore adults. Factors that affect the knowledge level were education level, gender, race and calcium supplements intake. Educational programmes are needed to increase the knowledge of osteoporosis and calcium-rich foods among Singapore adults.

## **An Analysis of the Public's Perception on What Constitutes a Medical Emergency According to Established Guidelines and a Review of the Reasons for Visiting the Emergency Department**

**SY LOW<sup>1</sup>, J TAN<sup>2</sup>**

<sup>1</sup>*National University Hospital, Singapore,* <sup>2</sup>*National University Health System, Singapore*

### **Introduction:**

Overcrowding of emergency departments (EDs) with non-emergencies is a long-standing problem. While the percentage of non-emergencies has dropped from 57% to 18% over the past 3 decades, overcrowding has led to negative consequences and adverse outcomes. Our study aimed to analyse the public's perception on what constitutes a medical emergency according to established guidelines and review reasons for ED visits. Our hypothesis: The public's perception of an emergency differs from established guidelines.

### **Methods:**

Surveys were conducted on 200 respondents from National University Health System ED, P3 area (April to May 2013) comprising questions on demographics, reasons for ED visits and a questionnaire comprising 11 emergency and 11 non-emergency scenarios defined according to established guidelines. Respondents' responses were considered congruent with guidelines if they matched >9/11 of the definitions of emergencies and non-emergencies respectively.

### **Results:**

In total, 79% (n = 158) and 19.5% (n = 39) of responses were incongruent with the definition of an emergency and non-emergency respectively. The top 4 non-emergency scenarios perceived as emergencies: (i) referral to specialist (23.5%), (ii) dyspepsia (14%), (iii) chronic headache (9.5%), (iv) vomiting and diarrhoea (9.5%). The top 4 emergency scenarios perceived as non-emergencies: (i) melaena (81%), (ii) haematemesis (65.5%), (iii) acute appendicitis (44.5%), (iv) acute myocardial infarction (35.5%).

### **Discussion & Conclusion:**

In addition to EDs becoming overcrowded with non-emergencies, this study shows that patients with emergency conditions might fail to seek appropriate medical attention. We suggest providing public education about what defines an emergency, and updating guidelines to be differentiated according to urgency and site of care, standardised nationwide and made publicly accessible. Right-siting of care is imperative in maximising healthcare resources.

## Satisfaction of Bereaved Families on an End-of-Life Programme for Nursing Home Residents

**WLC NG<sup>1</sup>, AG RAJ<sup>1</sup>, WSK TEO<sup>1</sup>, YOI LEONG<sup>2</sup>**

<sup>1</sup>National Healthcare Group HQ, Singapore, <sup>2</sup>Tan Tock Seng Hospital, Singapore

### Introduction:

In Singapore, most nursing homes do not offer palliative care management. In 2009, TTSH initiated Project CARE (CAre at the end-of-life for Residents in homes for the Elderly) in 7 nursing homes to provide palliative care, and advance care planning for residents with a  $\leq 1$  year prognosis and their families on their preferences for end-of-life care. This study aims to examine the satisfaction of bereaved families with end-of-life care.

### Methods:

Residents who preferred comfort measures in the nursing home received palliative care; those who preferred full treatment at the hospital received routine care. Telephone interviews were conducted with families 1 to 3 months after the resident's demise. Satisfaction with end-of-life care was measured using a modified "After-death Bereavement Family Member Interview" instrument. T-tests compared the mean scores between families of both groups.

### Results:

Between September 2009 and October 2011, 143 families (86 palliative care; 57 routine care) completed the interview. There were no significant differences in the domains of Physical comfort and emotional support and Provide coordination of care. Families of residents on palliative care reported significantly fewer problems in Inform and promote shared decision-making ( $P = 0.02$ ), Encourage advance care planning ( $P = 0.04$ ), Attend to the emotional and spiritual needs of the family ( $P < 0.01$ ), and greater satisfaction in Support the self-efficacy of the family ( $P < 0.01$ ), and Overall rating scale for patient-focused, family-centred care ( $P < 0.01$ ).

### Discussion & Conclusion:

The results highlight the importance of palliative care management in nursing homes. Further studies are recommended to validate the results of this study, and use of the modified instrument in other healthcare settings.

## Knowledge Adequacy of Diagnosis and Treatment Plans of Elderly Patients on Discharge from Tertiary Hospital

**HF TIONG<sup>1</sup>, SK SEETHARAMAN<sup>2</sup>, RA MERCHANT<sup>3</sup>**

*<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>National University Hospital, Singapore*

### Introduction:

Every hospital's patient charter states that the patient and family will be informed of medical treatment received and participate in decision-making. This is important for elderly patients as they often have multiple comorbidities, take multiple medications and run high risks of adverse events. We hypothesise that elderly patients and caregivers have insufficient understanding about their discharge diagnosis and treatment plans. Our study aims to evaluate the knowledge adequacy of elderly patients and caregivers apropos to their diagnosis and treatment plans upon discharge.

### Methods:

Between 20 May and 14 June 2013, interviewer-assisted questionnaires were administered on the day of discharge to eligible elderly patients above 65 years old or their caregivers if cognitive impairment is documented in clinical notes, from 2 general medical wards. They were asked about their diagnosis on discharge, names, indications and side-effects of their medications, and lifestyle changes necessary.

### Results:

A total of 33 patients were recruited, with median age range of 80 to 84 years and male:female ratio of 1:2.3. Findings show 57.6% of respondents knew the discharge diagnosis well; 3.03% knew all their medications' names; 21.2% knew all their medications' indications; 6.06% knew all their medications' important side effects, and 51.5% knew the important lifestyle changes necessary.

### Discussion & Conclusion:

At least 50% of patients were aware of their diagnosis and lifestyle changes necessary. However, there were huge knowledge gaps about one's medication(s), their indications and side effects. A likely explanation for these results would be that pharmacists have yet to conduct medication counselling. In conclusion, communication on diagnosis and treatment, and reinforcement on discharge is necessary to ensure treatment compliance.

## Health Resource Use and Outpatient Cost of a Care Coordinator-Led Programme for Stable Hypertension and Hyperlipidaemia

**J MOLINA<sup>1</sup>, BS KUNWAR<sup>2</sup>, YH NG<sup>2</sup>, HT LIM<sup>2</sup>, YC TUNG<sup>2</sup>, WE TANG<sup>2</sup>**

<sup>1</sup>National Healthcare Group HQ, Singapore, <sup>2</sup>National Healthcare Group Polyclinics, Singapore

### Introduction:

A new model of care for patients with stable hypertension and/or hyperlipidaemia, which potentially reduces unnecessary visits while keeping the chronic condition stable was piloted in Toa Payoh Polyclinic (TPY). This evaluation aimed to assess patients' utilisation of health services (hospitalisations and emergency department (ED) visits), as well as one-year cost of Polyclinic services.

### Methods:

The new model involved care coordinator-led patient management, standardised follow-ups and evidence-based protocols for those whose hypertension and/or hyperlipidaemia were stable for at least 6 months. Patients received education on medication, self-management and lifestyle changes; midyear care coordinator and annual doctor's assessment. The proportion of programme patients with ED visits and who were hospitalised within 1 year of enrollment were determined. One-year Polyclinic bill sizes were compared between TPY (program) patients and stable hypertension and hyperlipidaemia patients from Ang Mo Kio Polyclinic (standard care). This comprised hypertension/lipid-related cost (including consultations), pharmacy cost and cost related to conditions other than the chronic disease.

### Results:

Of the 215 patients who completed 1 year, only 1 (0.5%) had an unplanned ED visit, and 2 (0.9%) were hospitalised. Hypertension-related cost was cheaper for program patients (difference = \$84.31; 95% CI, \$59.16 to \$109.46). For both diseases, non-chronic disease cost was cheaper for program patients (patients with hypertension: difference = \$34.00, 95% CI, \$17.15 to \$50.84; patients with hyperlipidaemia: difference = \$27.39, 95% CI, \$8.44 to \$46.35). However, the pharmacy cost was more expensive.

### Discussion & Conclusion:

Less than 1% of program patients had an unplanned ED visit or hospitalisation. Total 1-year cost of Polyclinic services for hypertensive patients was cheaper for programme patients.

## **An Analysis of the Public's Perception on What Constitutes a Medical Emergency According to Established Guidelines and a Review of the Reasons for Visiting the Emergency Department**

**J TAN<sup>1</sup>, SY LOW<sup>1</sup>**

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

### **Introduction:**

Overcrowding of emergency departments (EDs) with non-emergencies is a long-standing problem. While the percentage of non-emergencies has dropped from 57% to 18% over the past 3 decades, overcrowding has led to negative consequences and adverse outcomes. Our study aimed to analyse the public's perception on what constitutes a medical emergency according to established guidelines and review their reasons for visiting the ED. Our hypothesis: The public's reasons for visiting the ED vary and may stem from misconceptions regarding sites of care.

### **Methods:**

Surveys were conducted on 200 respondents from the National University Health System ED, P3 area (April to May 2013) comprising questions on demographics, reasons for visiting the ED over a General Practitioner/Family Physician (GP/FP) and a questionnaire comprising 11 emergency and 11 non-emergency scenarios defined according to established guidelines.

### **Results:**

A total of 48.5% (n = 97) of respondents did not have a regular GP/FP and 56% (n=112) did not consider visiting their GP/FP for the condition for which they presented to the ED. Their main reasons were: (i) They have no GP/FP (51.4%), (ii) EDs can do laboratory tests and/or X-rays while GPs/FPs cannot (28.8%), (iii) GPs/FPs unable to handle their current condition (27.9%), (iv) There are specialists in the hospitals (27.9%), (v) EDs are open 24 hours (25.2%), (vi) EDs provide faster treatment (21.6%).

### **Discussion & Conclusion:**

The public's reasons for visiting the ED include misconceptions about the ED and the capabilities of GPs/FPs. Public education about these aspects and the importance of having a regular GP/FP should be provided. Right-siting of care is imperative in maximising healthcare resources.



## **Mission Possible: Setting up a Hospital Acquired Infection (HAI) Surveillance System**

**MH TUN<sup>1</sup>, SS SATHAPPAN<sup>1</sup>, N RAHMAT<sup>1</sup>**

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

### **Introduction:**

Hospital Acquired Infections (HAIs) are an increasingly recognised problem. The morbidity and mortality from HAIs has a very huge financial and social impact. Hospital Information System has been developed to provide better quality of patient care and efficient hospital management. However, there is no single system for tracking HAIs. Manual data collection is time consuming, inefficient for quantitative analysis, and accurate surveillance is essential to identify areas for improvement

### **Methods:**

Electronic surveillance system (ARUS-surveillance system) was implemented using microbiology results, radiology and antibiotic use data based on Centre of Disease Control's (CDC's) National Healthcare Safety Network (NHSN) criteria, and classification algorithms for collecting, reporting, investigation and comparing HAIs.

### **Results:**

With the ARUS-surveillance system, the average number of CAUTI cases to be reviewed monthly dropped drastically from 780 to 60 cases. Similarly, the system also helps to reduce the average number of SSI cases to be reviewed from 1200 to 30 cases. This enables regular and early audit, facilitating improvement in clinical practices to reduce HAIs. Additionally, this reduces the total number of man hours to review the HAIs from 390 hours to 15 hours for CAUTI and 600 hours to 7.5 hours to SSI. This is significantly contributed by the reduced number of cases to be reviewed, as well as the time required to review each case.

### **Discussion & Conclusion:**

Surveillance of HAIs offers valuable information on the occurrence of HAIs and on factors influencing the incidence of HAIs.

## Evaluation of Pharmacy Receiving Process Moved Upstream as Part of Post-Consult Processes

**YW CHEN<sup>1</sup>, WC LIM<sup>1</sup>**

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

### Introduction:

A pilot experiment in year 2011 on moving prescription receiving process upstream into Clinic 5A (instead of pharmacy) led to reduced rework rates, waiting times and improved patient satisfaction. Alongside this, a standard communication script was developed and included medication reconciliation, promotion of home delivery and fast track services. Primary aims were to evaluate effectiveness of this upstream process by determining pharmacy rework rates and investigating the reasons for poor home delivery and fast track take-up rates. Secondary aims were to analyse common interventions, medication reconciliation modes, financial counseling modes, average receiving times and percentages of patients who did not require medication counselling.

### Methods:

Reworks were collated by dispensing pharmacy staff. Reasons for patients not taking up home delivery or fast track services were taken via phone surveys. Analysis was done via Microsoft Excel using daily data recorded.

### Results:

Rework rates were reduced (L2 Pharmacy: 15% to 6.3%; B2 Pharmacy: 23% to 7.3%). Many also rather collect the medications themselves on the same-day consultation. Other common reasons included unaware of these services or they frequented the hospital hence convenient to collect from pharmacy themselves. Most common interventions were for clarification purposes. Receiving times were longer with patients on polypharmacy. The number of patients who did not require counseling was lowest in orthopedic likely as they are unfamiliar with their new medications on their first visit.

### Discussion & Conclusion:

The standard communication script has a positive effect on rework. Majority of patients failed to meet the criteria for home delivery and fast track services.

## Learning About How to Improve Clinical Handover Through Audit

**J L TONG<sup>1</sup>, J YANG<sup>1</sup>, HY LIN<sup>1</sup>**

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

### **Introduction:**

The aim of this study is to provide an education initiative for the residents to learn how to improve the quality of handovers through audit. The handover is important for good continuity of patient care, but local literature is limited. We conducted an audit on handovers and how it relates to identifying patients who need medical review at night.

### **Methods:**

The audit was conducted over 2 consecutive weeknights, on Department of General Medicine patients. On-call doctors indicated if the patients they had been called for were handed over. Nurses documented the indications for calling the doctors. Case sheet review was performed for the cases.

### **Results:**

There were 37 calls. Handover was present in 18.9% of patients. Among the cases that were not handed over, all the calls for review were justified although the indication is not on the traditional protocol (31.6%) or the indication was not present before the call commenced (26.3%). Main indications for review were fluctuating vital signs, pending investigations, replies of earlier consults, and new symptoms. Subgroup analysis showed that review was needed for patients who had worsening laboratory markers and were not improving despite treatment.

### **Discussion & Conclusion:**

A significant number of patients who did not fulfill the traditional handover criteria required medical attention at night. Addition of the following: patients with pending investigations, consult replies, post-procedure reviews and patients who are not improving with treatment or have worsening laboratory markers, would improve continuity of care. Our study is limited by the small sample size and the short duration of study.

## **Achievement and Satisfaction of Student Towards Educational Learning with E-book in Sex Education**

**N TALUE<sup>1</sup>, R NARKBUBPHA<sup>1</sup>**

<sup>1</sup>*Praboromarachanok Institute, Ministry of Public Health, Thailand*

### **Introduction:**

The purpose of this descriptive research was to study achievement and satisfaction of student towards educational learning with E-book in Sex education.

### **Methods:**

Population was 30 grade 2 students of Bangjanwithaya School, in the academic year 2012. The research instrument using for collecting data was E-book from PATH and pretest-posttest about sex education. The content validity was done by nursing instructor experts and the reliability analyzed by using Cronbach's Alpha Coefficient was 0.79. The data were then analysed by using percentage, mean, standard deviation and t-test

### **Results:**

The total mean score on Post-test was high level more Pretest. The total mean score on satisfaction of students was at the high level of 4.41, standard deviation (SD) = 0.46. As for considering in each aspect; using for learning all time was the highest mean score of 4.67, SD = 0.61.

### **Discussion & Conclusion:**

This study suggests that the instructors should use E-book to support in their educational programme and develop the model of E-book to enhance learning of students.

## National University Hospital System (NUHS) Memory Clinic: An Integrative Model

**J L LIM<sup>1</sup>, YSJ TAN<sup>2</sup>, S KOH<sup>2</sup>**

*<sup>1</sup>National University Hospital, Singapore, <sup>2</sup>National University Hospital System, Singapore*

### **Introduction:**

In 2012, 9.9% of Singapore's resident population was aged 65 years and above, a remarkable contrast to 3.4% in 1970 and 7.2% in 2000 (Singstats, 2013). Meeting the challenge posed by this unprecedented increase, and in accordance with government's directive of ensuring access to a 'seamless continuum of efficient, cost-effective and easily accessible healthcare and eldercare services' (MSF, 2013), the National University Health System has established a new model for Memory Clinic in the Western part of Singapore. This new model focuses on improving service for patients through managed care provided by a multi-disciplinary team.

### **Methods:**

In this model, through preliminary triage, patients benefit through consultation with the appropriate doctor (neurologists, geriatricians and psychiatrists specialising in psychogeriatrics) for their respective conditions, allowing them both time and monetary savings as they consult a single doctor rather than multiple doctors. Qualified clinical psychologists conduct neuropsychological assessments upon doctors' requests. To address the psychosocial needs of the patient, care coordinators and medical social workers provide psychoeducation and coordinate care plans for patients and their families. A shared care programme was established to ensure smooth continuity during medical and social transitions. In addition, the Memory Clinic is piloting a system of discharging stable patients to the Choa Chu Kang Polyclinic, which could eventually be implemented at the other polyclinics if successful.

### **Results: -**

### **Discussion & Conclusion:**

Through this new model, we hope to provide better care which is sensitive to the medical, financial and social needs of elderly and their families in Singapore.

## Index of First Author

<b>Author Surname</b>	<b>Author First Name</b>	<b>Code</b>	<b>Page</b>
Abdin	E	OP-QHSR-02	S219
Abdul Jalil	R	YIA-BSTR-01	S13
Abraham	J	OP-PCR-04	S211
Acharya	R	OP-HPE-02	S178
Acharya	R	OP-HPE-09	S185
Adnan	M	PP-NA-01	S310
Adnan	M	PP-NA-02	S311
Ainul	MZ	OP-BSTR-03	S85
Alejandro	I	OP-NA-10	S196
Amran	MK	OP-BSTR-08	S90
Ang	CH	YIA-CR-02	S16
Ang	DY	PP-CR-13	S295
Ang	KYR	OP-BSTR-16	S98
Ang	KYR	OP-BSTR-17	S99
Ang	Y	OP-QHSR-17	S234
Bahnassy	A	OP-NA-09	S195
Banerji	S	OP-CR-03	S102
Batra	K	OP-HPE-07	S183
Bi	CL	YIA-BSTR-02	S14
Biala	ME	OP-NA-08	S194
Cai	S	OP-CR-29	S127
Carvalho	L	SG-CIA-04	S4
Chan	CY	SGPCR-O-01	S27
Chan	EY	BP-CR-01	S36
Chan	EY	BP-NA-01	S43
Chan	EY	PP-CR-05	S287
Chan	GC	OP-CR-06	S105
Chan	J	OP-AH-28	S80
Chan	LG	OP-CR-27	S125
Chan	LG	OP-CR-60	S157
Chan	MC	OP-CR-55	S153
Chan	MF	OP-QHSR-19	S236
Chan	SP	OP-CR-14	S113
Cheah	GJS	SGPCR-P-03	S52
Chemat	J	OP-NA-20	S206
Chen	YW	PP-QHSR-07	S324
Cheong	K	BP-AH-01	S30
Cheong	K X	SG-CIA-06	S6
Chia	BKY	OP-CR-23	S121
Chia	CK	HPE-RI-02	S25
Chia	HS	OP-AH-26	S78
Chiang	WL	PP-AH-03	S260

Chiang	WL	PP-PCR-04	S317
Chiang	YL	OP-NA-15	S201
Choksi	SP	OP-BSTR-12	S94
Chong	SC	PP-AH-09	S266
Chow	A	SG-CIA-01	S1
Chow	A	OP-CR-49	S147
Chu	JJH	PP-BSTR-09	S282
Chua	BY	OP-QHSR-10	S227
Chua	GSW	OP-QHSR-23	S240
Chua	HCA	OP-QHSR-37	S254
Chua	J	PP-CR-24	S306
Chua	K	PP-CR-01	S283
Derina	K	OP-BSTR-15	S97
Eng	GK	OP-AH-01	S53
Eng	S	OP-AH-11	S63
Eng	SM	PP-NA-04	S313
Gan	EY	OP-CR-04	S103
Gan	EY	OP-CR-10	S109
Gan	NY	OP-CR-66	S163
Gan	V	OP-CR-13	S112
Goh	CG	OP-CR-08	S107
Goh	CG	OP-CR-44	S142
Goh	CG	OP-CR-61	S158
Goh	CG	OP-CR-71	S168
Goh	JY	YIA-CR-04	S18
Goh	L	OP-AH-05	S57
Goh	L	OP-PCR-07	S214
Goh	TJ	PP-AH-15	S272
Goh	YS	OP-NA-01	S187
Gu	H	OP-CR-19	S118
Hao	Y	OP-CR-32	S130
Hawkins	R	BP-CR-03	S38
Hawkins	R	PP-CR-03	S285
Hawkins	R	PP-CR-14	S296
Hawkins	R	PP-CR-15	S297
Heng	K	PP-AH-05	S262
Heng	ST	SG-AH-01	S7
Heng	XW	OP-BSTR-04	S86
Ho	SSY	BP-AH-02	S31
Hou	W	OP-CR-01	S100
Huang	MC	PP-BSTR-03	S276
Huang	Y	OP-QHSR-11	S228
Indhu Shree	R	OP-BSTR-05	S87
Jamil	SK	OP-AH-03	S55

Jeyagurunathan	A	OP-AH-16	S68
Jing	MX	OP-BSTR-09	S91
Johari	F	OP-AH-29	S81
Kalaivanan	D	OP-NA-06	S192
Kan	E	OP-QHSR-13	S230
Kang	XY	OP-AH-25	S77
Kannapiran	P	OP-QHSR-29	S246
Kng	KK	OP-AH-27	S79
Koh	A	OP-AH-17	S69
Koh	CY	OP-AH-10	S62
Koh	E	OP-CR-46	S144
Koh	GM	OP-HPE-08	S184
Kong	YL	OP-CR-16	S115
Kuswanto	CN	OP-CR-22	S120
Kuswanto	CN	OP-CR-58	S155
Kwok	BC	OP-QHSR-01	S218
Lai	WW	PP-AH-02	S259
Lam	J	OP-CR-53	S151
Lau	S	YIA-QHSR-02	S21
Law	ZW	PP-CR-10	S292
Lee	E	OP-QHSR-36	S253
Lee	J	PP-CR-17	S299
Lee	KH	SGPCR-O-02	S28
Lee	R MK	SGPCR-P-01	S50
Lee	TL	PP-CR-16	S298
Lee	W	OP-CR-18	S117
Lee	W	OP-QHSR-22	S239
Lee	XY	PP-CR-04	S286
Lee	YL	OP-QHSR-09	S226
Leong	C	OP-NA-02	S188
Leong	SM	BP-AH-03	S32
Li	BK	OP-AH-23	S75
Li	KX	OP-CR-35	S133
Li	KX	OP-CR-37	S135
Li	KX	OP-CR-41	S139
Li	KX	OP-CR-67	S164
Li	R	OP-QHSR-30	S247
Li	Z	OP-NA-03	S189
Liang	M	OP-CR-59	S156
Liang	W	OP-CR-72	S169
Liaw	SY	BP-HPE-02	S41
Liew	TM	OP-CR-38	S136
Lim	B	OP-QHSR-26	S243
Lim	CM	SG-CIA-05	S5
Lim	D	OP-CR-63	S160



Lim	HA	OP-CR-42	S140
Lim	HS	OP-QHSR-31	S248
Lim	J	BP-HPE-03	S42
Lim	J	OP-AH-13	S65
Lim	J L	PP-QHSR-10	S327
Lim	JL	PP-AH-01	S258
Lim	PH	PP-PCR-03	S316
Lim	SH	OP-CR-26	S124
Lim	SL	SG-AH-03	S9
Lim	V	OP-QHSR-16	S233
Lim	WS	HPE-RI-03	S26
Lim-Ashworth	N	OP-CR-65	S162
Liu	JJ	PP-BSTR-05	S278
Liu	WC	OP-AH-21	S73
Liu	Z	OP-AH-22	S74
Loh	YB	YIA-QHSR-04	S23
Loke	KC	OP-AH-14	S66
Loo	G	OP-CR-21	S119
Low	A	PP-HPE-01	S307
Low	LCM	OP-CR-62	S159
Low	M	PP-HPE-03	S309
Low	SY	PP-CR-20	S302
Low	SY	PP-QHSR-01	S318
Luo	B	OP-BSTR-14	S96
Ma	V	OP-AH-18	S70
Macachor	J	OP-CR-24	S122
Mah	CS	PP-AH-07	S264
Mak	HW	OP-CR-74	S171
Mel	SDE	OP-CR-11	S110
Meng	F	OP-QHSR-14	S231
Meng	F	OP-QHSR-27	S244
Merchant	R	OP-CR-50	S148
Mok	A	OP-NA-19	S205
Mok	WQ	BP-NA-02	S44
Mok	WQ	OP-QHSR-21	S238
Molina	J	PP-QHSR-04	S321
Monterona	G	PP-CR-21	S303
Morisaki	N	PP-NA-03	S312
Munshi	V	OP-PCR-03	S210
Mustafa	N	BP-BSTR-02	S34
Narkbubpha	R	OP-NA-11	S197
Nashi	N	OP-QHSR-07	S224
Ng	D	OP-PCR-02	S209
Ng	I	SG-NA-01	S10

Ng	I	OP-NA-04	S190
Ng	K	SGPCR-P-02	S51
Ng	WK	PP-CR-08	S290
Ng	WLC	PP-QHSR-02	S319
Ng	Y	OP-HPE-10	S186
Ng	YPL	PP-HPE-02	S308
Ng	YYK	OP-BSTR-02	S84
Nithiya	M	OP-AH-19	S71
Nurjono	M	OP-AH-08	S60
Nurjono	M	OP-CR-34	S132
Oei	J	OP-QHSR-38	S255
Oh	CC	OP-HPE-06	S182
Ong	A	OP-QHSR-34	S251
Ong	LP	OP-AH-04	S56
Ong	MY	OP-CR-15	S114
Ong	SH	OP-PCR-05	S212
Ong	SK	OP-AH-20	S72
Ong	WMW	OP-CR-75	S172
Ong	WMW	OP-CR-76	S173
Ong	WMW	OP-CR-77	S174
Ong	WMW	OP-CR-78	S175
Ong	WMW	OP-QHSR-40	S257
Ong	YH	OP-HPE-01	S177
Oo	AM	OP-CR-31	S129
Oo	AM	OP-CR-52	S150
Paing	S S T	OP-CR-02	S101
Panday	V	OP-CR-30	S128
Pang	S	OP-QHSR-04	S221
Peh	CX	OP-NA-05	S191
Picco	L	OP-AH-12	S64
Picco	L	OP-AH-15	S67
Pillay	A	OP-CR-45	S143
Poh	XW	PP-CR-22	S304
Poo	R	PP-AH-16	S273
Predeebha	K	OP-HPE-03	S179
Quan	WL	BP-CR-04	S39
Rajaram	S	SG-NA-03	S12
Rajesh	V	OP-PCR-10	S217
Rashidah	S	BP-NA-03	S45
Renjan	V	OP-AH-24	S76
Sagayadevan	V	OP-AH-09	S61
Sahoo	R	PP-BSTR-07	S280
Said Rahmat	SMS	PP-AH-18	S275
Saifudin	MD	SG-AH-02	S8
Sambasivam	R	YIA-QHSR-01	S20

Sarkar	J	OP-QHSR-39	S256
Seah	D	SGPCR-O-03	S29
See	MTA	OP-NA-16	S202
Seet	E	OP-QHSR-06	S223
Seghers	A	OP-CR-28	S126
Selvarajan	V	BP-BSTR-01	S33
Seow	LSE	YIA-QHSR-03	S22
Shafie	S	BP-QHSR-03	S48
Shazana	S	PP-AH-13	S270
Shimpi	T	OP-CR-48	S146
Siah	K	BP-QHSR-04	S49
Sia-Umali	J	OP-PCR-06	S213
Siddiqui	S	OP-CR-36	S134
Siddiqui	S	OP-CR-43	S141
Siddiqui	S	OP-CR-51	S149
Singh	KB	OP-PCR-01	S208
Soh	A	OP-AH-02	S54
Soh	WJ	PP-AH-12	S269
Suishu	C	BP-QHSR-01	S46
Sule	AA	PP-CR-07	S289
Sum	MY	YIA-CR-03	S17
Sum	MY	OP-CR-05	S104
Sum	MY	OP-CR-70	S167
Sun	CH	OP-CR-12	S111
Sun	CH	OP-CR-17	S116
Sun	Y	OP-QHSR-15	S232
Sylvia		PP-BSTR-06	S279
Takagi	M	OP-QHSR-03	S220
Talue	N	PP-QHSR-09	S326
Tan	C	SG-CIA-02	S2
Tan	C	YIA-BSTR-03	S15
Tan	C	OP-CR-39	S137
Tan	CY	PP-AH-08	S265
Tan	CY	PP-AH-10	S267
Tan	E	BP-HPE-01	S40
Tan	E	OP-QHSR-35	S252
Tan	E	PP-CR-02	S284
Tan	E	PP-CR-23	S305
Tan	FLG	PP-CR-11	S293
Tan	GC T	SG-CIA-03	S3
Tan	J	PP-QHSR-05	S322
Tan	KML	OP-BSTR-06	S88
Tan	LS	OP-BSTR-01	S83
Tan	LS	OP-PCR-08	S215

Tan	PH	PP-PCR-02	S315
Tan	SHC	BP-BSTR-03	S35
Tan	SL	OP-CR-54	S152
Tan	TL	OP-NA-21	S207
Tan	WS	OP-CR-47	S145
Tang	C	OP-HPE-05	S181
Tay	HY	OP-CR-09	S108
Tay	SE	PP-AH-17	S274
Tay	SKH	BP-CR-02	S37
Teng	D	OP-BSTR-13	S95
Teo	BW	OP-CR-25	S123
Teo	HZ	OP-QHSR-20	S237
Teo	T	PP-AH-04	S261
Teoh	AKJ	OP-QHSR-05	S222
Teoh	CL	OP-NA-18	S204
Teoh	E	HPE-RI-01	S24
Teoh	KJA	OP-QHSR-28	S245
Teoh	L	OP-HPE-04	S180
Teoh	PJ	OP-BSTR-07	S89
Thet	MM	OP-QHSR-24	S241
Thinn	SS	OP-QHSR-12	S229
Tiew	LH	SG-NA-02	S11
Tiong	HF	OP-CR-33	S131
Tiong	HF	PP-AH-06	S263
Tiong	HF	PP-QHSR-03	S320
Toh	A	OP-QHSR-25	S242
Toh	QC	OP-CR-56	S154
Tong	J L	PP-QHSR-08	S325
Tong	M	OP-AH-06	S58
Tong	M	OP-AH-07	S59
Tong	M	OP-NA-17	S203
Tor	HT	PP-CR-12	S294
Tun	MH	PP-QHSR-06	S323
Vaingankar	JA	OP-QHSR-32	S249
Wah	W	OP-BSTR-11	S93
Wah	W	PP-BSTR-08	S281
Wini	MK	OP-CR-40	S138
Wong	A	OP-NA-13	S199
Wong	HK	PP-CR-18	S300
Wong	J	OP-NA-12	S198
Wong	SL	OP-AH-30	S82
Wu	CX	OP-QHSR-08	S225
Xie	H	OP-CR-07	S106
Xie	HT	OP-PCR-09	S216

Xiong	G	OP-BSTR-10	S92
Xu	Y	PP-CR-09	S291
Xu	YP	PP-CR-19	S301
Yang	SY	BP-QHSR-02	S47
Yap	PLK	PP-AH-14	S271
Yeo	A	PP-AH-11	S268
Yeo	B	OP-QHSR-18	S235
Yeo	D	OP-CR-73	S170
Yong	J	PP-CR-06	S288
Yuan	P	OP-NA-07	S193
Zhang	HY	OP-CR-64	S161
Zhang	HY	OP-CR-68	S165
Zhang	HY	OP-CR-69	S166
Zhang	HY	OP-CR-79	S176
Zhang	J	YIA-CR-05	S19
Zhang	YC	PP-BSTR-04	S277
Zhang	YJ	OP-QHSR-33	S250
Zheng	M	PP-PCR-01	S314
Zhou	AJ	OP-NA-14	S200



**Annals, Academy of Medicine, Singapore**

81 Kim Keat Road, #11-00 & #12-00 NKF Centre, Singapore 328836

Tel: +65 6593 7800 Fax: +65 6593 7867

E-mail: [annals@ams.edu.sg](mailto:annals@ams.edu.sg) Homepage: <http://www.annals.edu.sg>