

## **Healthcare Beyond Limits: Transcending People, Place and Time**

**Alexandra Health Forum**  
in conjunction with AH Nursing Fest 2014  
6 - 8 November 2014 | Khoo Teck Puat Hospital



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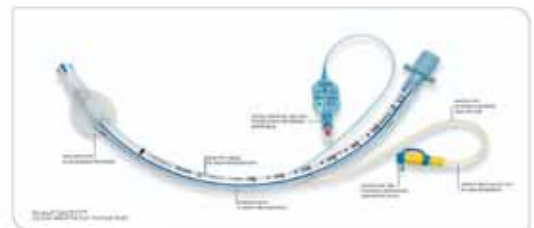


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## ORGANISING COMMITTEE

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Dr Wong Chek Hooi, Senior Consultant, Geriatric Medicine

#### NURSING FEST CHAIRPERSONS

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Ms Alice Leong, Deputy Director, Nursing Administration

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Dr Philip Stanley, Consultant, Ophthalmology & Visual Sciences  
Dr Surendra Mantoo Kumar, Consultant, General Surgery  
Dr Eugene Yang Wei Ren, Consultant, General Surgery  
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Ms Candy Chan, Senior Dietician, Nutrition & Dietetics  
Ms Lee Siok Ying, Senior Clinical Pharmacist, Pharmacy  
Ms Wee Xue Ting, Pharmacist, Pharmacy

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NC Audrey Chua, Inpatient Wards  
NM Loke Wing See, Inpatient Wards  
SN Sheena Ramazanu, Inpatient Wards  
APN Tan Boon Peng, Inpatient Wards  
NM Ng Huoy Ling, Specialist Outpatient Clinic  
SNM Manjit Kaur, Inpatient Wards

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A/Prof Lim Su Chi, Clinical Director, Clinical Research Unit  
Dr Tan Kok Yang, Head of Department, General Surgery  
Dr Edwin Seet Chuen Ping, Head of Department, Anaesthesia

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Research Unit

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## Message from the Organising Committee

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Dear friends and colleagues,

It is our pleasure to welcome you to the Alexandra Health Forum in conjunction with Nursing Fest 2014. The theme this year is 'Healthcare beyond limits: transcending people, place and time'.

The healthcare landscape in Singapore has changed dramatically over the years, and will continue to evolve. The provision and management of healthcare has become increasingly complex with the challenges of an ageing population, increase in chronic diseases, patients with multiple chronic diseases or multimorbidity and disability. This anticipated increase in healthcare requirement necessitates a paradigm shift in our healthcare models.

It is thus important to explore the way in which we can work better together (Transcending People), provide quality care beyond hospital walls (Transcending Place), and tap into the future of healthcare, train the next generation of healthcare providers and improve on the use of technology (Transcending Time).

Furthermore, we are also pleased to present the unprecedented number of abstracts that were submitted for this year's event. We look forward to hearing from our oral and poster presenters as they share their work in the categories of 'Clinical Research', 'Basic Science Research' and 'Quality Improvement & Patient Safety'.

Through the wide span of topics covered, we are confident that the participants at this conference would bring home new knowledge and practices that would ultimately benefit their patients.

Welcome and enjoy!

**Dr Angela Koh & Dr Wong Chek Hooi**

*Chairpersons, Alexandra Health Forum 2014*

**Ms Chee Lay Choo & Ms Alice Leong**

*Chairpersons, Alexandra Health Nursing Fest 2014*

# Alexandra Health Forum 2014 Programme

## DAY 1: 6 NOVEMBER 2014

Time/Date	
0730–0815	Registration
0815–1045	<b>Pre-Conference Workshops</b>
	<div>Workshop 1: Managing ‘Sweetness’</div> <div>Workshop 2: Stop the ‘Leak’</div> <div>Workshop 3: Essentials Related to the ‘Wires’ of the Brain</div> <div>Workshop 4: The Traumatic Golden Hour</div> <div>Workshop 5: Connecting with Older Adults</div>
	<div>APN Winnie Chui APN Sharon Fun APN Shao Yanli SN Puja Sharda Ms Jasmine Kwan</div> <div>SSN Tan Lay Choon Ms Baty Ng NM Ng Huoy Ling Ms Li Mingjuan</div> <div>SSN Sangeetha d/o Sodimani SSN Gimile Valerio Supparamaniam SSN Pan Jin Lan SSN Cao Wei Wei SSN Nur Syahidah Bte Rahmat SN Sharifah Maryam Alhabshee Bte Zen SN Aisyah Bte Nasir SN Kevin May Elpa Dr Roy Koh</div> <div>NC Laura Tham NC Angelica Miranda Abella Ms Lim Woan Wui NC Tan Sok Keng SNC Sin Peck Lin SSN Ratnasari Yawieriin Mr Yeo Chit Ming</div> <div>NC Audrey Chua SSN Cinthia Lim SSN Ling Pei Ing SSN Nur Mumin Bte Suhaimi SN Ann Tay SN Hamizah Bte Mahmud SN Tan Ai Li SN Siti Radiah Ms Denise Chen Ms Leung Yan Yee</div>
<b>Day 1: Transcending People: Towards Team-Based Patient Care</b>	
1000–1115	Registration
1045–1115	Tea Break
1115–1215	<b>Opening Ceremony</b>
	<i>Welcome by</i> Chairperson <i>Welcome Speech by</i> Mr Liak Teng Lit, Group CEO, Alexandra Health System <i>Welcome Performance</i> <i>Speech by</i> Mr Gan Kim Yong, Minister for Health
1215–1300	<b>State of the Art Lecture 1: Collaborating to Heal in the Modern Era</b> Prof Jennifer Weller (University of Auckland)
1300–1400	<i>Networking Lunch / Poster Exhibition</i> <b>Lunch Symposium</b> <b>Beyond NST: Clinical Nutrition Therapy &amp; Outlook</b> by Dr Mariannas Sioson (The Medical City, Philippines)
	<b>Symposium 1: Delivery of Team-Based Patient Care – From Theory to Practice</b> <i>Multidisciplinary Care of the Trauma Patient</i> by Dr Chiu Ming Terk (Tan Tock Seng Hospital) <i>Transdisciplinary Care of the Malnourished Patient</i> by Ms Candy Chan & Ms Supadhara Ramaiyah (Nutrition Support Team) <i>Team-based Diabetes Group Education</i> by Dr Tan Hwee Huan & Diabetes Empowerment Programme Team <i>Question &amp; Answer</i>
1530–1600	Tea Break / Poster Exhibition
1600–1655	<b>Breakout Sessions 1: Working Better Together – Lessons from Clinical Care</b>
	<div>Interdisciplinary Team Interactions in Simulated Perioperative Crisis Management</div> <div>Fracture Prevention in the Osteoporotic Patient</div> <div>Harmonising Care in Life’s Last Journey – A Team Approach</div> <div>Travelling the Journey with a CKD Patient – A Team-Based, Patient-Centred Approach</div>
	<div>Prof Jennifer Weller (University of Auckland)</div> <div>Dr Vivien Lim, SSN Gao Jie &amp; Osteoporosis Team</div> <div>Dr Angeline Seah &amp; Palliative Team</div> <div>Dr Yeoh Lee Ying &amp; Nephrology Team</div>
1700–1730	<b>Featured Lecture 1: The Evolution of the Diabetes Team</b> A/Prof Sum Chee Fang
1730	End of Day 1

## DAY 2: 7 NOVEMBER 2014

Time/Date	
<b>Day 2: Transcending Places: Healthcare Beyond the Hospital</b>	
0800–0830	Registration
0830–0915	<b>State of the Art Lecture 2: Integrating Healthcare In Singapore</b> Dr Jason Cheah (Agency for Integrated Care)

0915–1045	<b>Symposium 2: The Journey from Hospital to Home</b>					
	<i>Healthcare Philanthropy at the Edge of Chaos</i> by Mr Lee Poh Wah (Lien Foundation) <i>Hospice at Home: the Transition between Hospital and Home at the End of Life</i> by Dr John Costello (University of Manchester) <i>Getting Back Up on Your Feet – Journey of a Geriatric Patient Following Hip Fracture</i> by Dr Mallya Jagadish Ullal <i>Question &amp; Answer</i>					
1045–1115	<i>Tea Break / Poster Exhibition</i>					
1115–1300	<b>Breakout Session 2: Healthcare Delivery in the Home and Community</b>					
	<i>Bowel Anastomosis Workshop</i> (0915–1300)	<i>ILTC: Where Shall We Go?</i>	<i>Inside Out Integrated Cardiology Care</i>	<i>Ageing-In-Place</i>	<i>Singapore &amp; Hong Kong's Perspectives on Integrated Care</i>	
	Dr Tan Kok Yang	Dr Lee Kok Keng Dr Lee Liang Tee Dr Kelvin Phua Dr Ee Chye Hua Dr Patricia Lee	Dr Lee Chee Wan Dr Ong Hean Yee Ms Chew Chien Lin Mr Gregory Fam & Cardiac Team	Dr Wong Sweet Fun Dr Ang Yan Hoon SNM Jesbindar Kaur	<i>Pursuing Excellence in Integrated Care: Why and How</i> Prof Sylvia Fung (Tung Wah College, Hong Kong)	<i>Hospital, Community and Home: Team-Based Integrated Care for Dementia</i> Dr Philip Yap Lin Kiat
1300–1400	<i>Networking Lunch / Poster Exhibition</i>					
1400–1530	<b>Plenary Oral Abstracts Session 1: Quality Improvement (Allied Health, Nursing, Physician)</b>					
1530–1600	<i>Tea Break / Poster Exhibition</i>					
1600–1715	<b>Interactive Session: Case Capsule with Audience Participation</b>					
	<i>Case 1: Caring for the Patient with COPD – From Acute Hospital to Home</i> by Dr Phoa Lee Lan, NC Loh May Shan & SSN Norashinta Bte Mansoor <i>Case 2: Surgery for the Elderly Patient – A Holistic Approach</i> by Dr Surendra Mantoo Kumar & Healthcare Quality Improvement Fund (HQIF) Programme Team					
1715–1800	<b>Featured Lecture 2: The Care Continuum – The Challenge of Transforming Healthcare in Singapore</b> A/Prof Kenneth Mak					
1800–1930	<i>Gala / Social Event</i>					

## DAY 3: 8 NOVEMBER 2014

Time/Date	
<b>Day 3: Transcending Time: Towards the Future of Healthcare</b>	
0800–0815	<i>Registration</i>
0815–1000	<b>Plenary Oral Abstracts Session 2: Basic Science and Clinical (Allied Health, Nursing, Physician)</b>
1000–1100	<b>Breakout Session 3: Innovative Research and Training For Better Outcomes</b>
	<i>Surgical Interest Group Suturing Workshop</i> <i>New Ways of Training in Simulation-Based Training</i> <i>How to Get your Paper Published</i> <i>EBM 2.0</i> <i>Design Thinking &amp; Innovation</i>
	Dr Caroline Simon Ms Pauline Chia & Ms Grace Pheang (Nanyang Polytechnic) Prof Wilfred Peh A/Prof Lim Su Chi Ms Tan Liren
1100–1130	<i>Tea Break / Poster Exhibition</i>
1130–1300	<b>Symposium 3: Towards the Future of Healthcare</b>
	<i>Singapore Residency Training Programme: How and Why We Landed Where We Are?</i> by Prof C Rajasoorya <i>Surgical Residency Training: Confronting Wicked Problems, Sacred Cows and Future Challenges</i> by A/Prof Kenneth Mak <i>The Changing Role of Today's Nurses: Beyond the Bedside</i> by DN Low Beng Hoi (Singapore Nursing Board) <i>Healthcare in the Digital Age: A Glimpse of the Future</i> by Dr Kevin Yap (National University of Singapore) <i>Question &amp; Answer</i>
1300–1330	<b>Closing Ceremony</b>
	Speech & Prize presentations Closing Address by Chairperson
1330	<i>End of Forum</i>

## SCHEDULE FOR ORAL PRESENTATION

Time	Abstract No.	Title	Category	Presenter
<b>7 November 2014, Friday, Auditorium</b>				
2:00pm	AHF14QA001	Redesigning medication processing and collection flow in Outpatient Pharmacy	Quality Improvement (Allied Health)	Miss Loke Ek Theng, Department of Pharmacy, KTPH
2:10pm	AHF14QA002	Factors associated with prolonged hospital length of stay in older patients	Quality Improvement (Allied Health)	Miss Toh Hui Jin, Department of Geriatric Medicine, KTPH
2:20pm	AHF14QA003	Interactive Dashboard for Pharmacy Cost Management	Quality Improvement (Allied Health)	Mr Wu Dan, Healthcare Analytics Unit, KTPH
2:30pm	AHF14QN001	HPV Education and its effect on knowledge and potential vaccination uptake amongst teenagers in Singapore	Quality Improvement (Nursing)	Ms Aslinna Abdul Jabber, Department of Nursing, KK Women's and Children's Hospital
2:40pm	AHF14QN002	A study on filter lifespan between Non-Heparin and Citrate Regional Anticoagulation Continuous Renal Replacement Therapy (CRRT)	Quality Improvement (Nursing)	SSN Gwendolyn Sim, Inpatient Wards, KTPH
2:50pm	AHF14QN003	Change of positioning aids in view of One Anterior Resection Patient sustained Plexus Injury post procedure	Quality Improvement (Nursing)	Ms P Sivamalar, Major Operating Theatre, KTPH
3:00pm	AHF14QP001	Scope of the anaesthesiologists: Evaluation of airway management practice and choice of laryngoscope - A prospective single centre study	Quality Improvement (Physician)	Dr Anusha Kannan, Department of Anaesthesia, KTPH
3:10pm	AHF14QP002	Analgesia Technique in Colorectal Surgery before and after the introduction of Enhanced Recovery Protocols - A Retrospective Audit	Quality Improvement (Physician)	Dr Geraldine Cheong, Department of Anaesthesia, KTPH
3:20pm	AHF14QP003	An Institutional Audit Assessing Utility of Fine Needle Aspiration Cytology of Thyroid Nodules	Quality Improvement (Physician)	Dr Lim Ziying Vanessa, Department of Endocrinology, KTPH
<b>8 November 2014, Saturday, Auditorium</b>				
8:15am	AHF14BS001	Genome-wide association study using ethnic-specific exome-centric nonsynonymous rare-variant microarray for diabetic nephropathy secondary to type 2 diabetes	Basic Science	Dr Su Fen Ang, Clinical Research Unit, KTPH
8:25am	AHF14BS002	Fenofibrate treatment is associated with increased Pigment Epithelium-Derived Factor (PEDF) in patients with Type 2 Diabetes (T2D) and HepG2 cells	Basic Science	Miss Kaing Woon, Clinical Research Unit, KTPH
8:35am	AHF14BS003	An evaluation of an improved electrochemiluminescence immunoassay for free thyroxine on Cobas e170 Analyzer	Basic Science	Miss Heng Ping Ying, Department of Laboratory Medicine, KTPH
8:45am	AHF14CA001	Association of central obesity with renal function in early-onset type 2 diabetes	Clinical (Allied Health)	Dr Angela Moh Mei Chung, Clinical Research Unit, KTPH
8:55am	AHF14CA002	Long-term follow-up of cardiovascular outcome in multi-ethnic Asians with type 2 diabetes	Clinical (Allied Health)	Dr Jian-Jun Liu, Clinical Research Unit, KTPH
9:05am	AHF14CN001	Accuracy of Point of Care Glucometer In Stable Hemodialysis Patients Using Different Blood Samples	Clinical (Nursing)	Ms Si Chanjuan, Renal Centre, KTPH
9:15am	AHF14CN002	Prediction and Precision of Blood Glucose Level in People with Diabetes	Clinical (Nursing)	Ms Sharon Nne Fun, Diabetes Centre, KTPH
9:25am	AHF14CP001	Serum melatonin levels after a single preoperative melatonin dose - associations with perioperative anxiety and pain	Clinical (Physician)	Trin Lyovarin, Yong Loo Lin School of Medicine, NUS
9:35am	AHF14CP002	Risk of malignancy in thyroid fine needle aspiration at Khoo Teck Puat Hospital	Clinical (Physician)	Dr Lang Tee Ung, Department of Laboratory Medicine, KTPH

## SCHEDULE FOR POSTER GUIDED TOUR

To encourage poster viewing, poster guided tours by expert facilitators are arranged. A short presentation of selected posters will be done by the abstract authors/designated presenters. *Please meet at the 1<sup>st</sup> poster indicated for each poster guided tour respectively, before the tour begins.*

Time	Category/Poster No.	Facilitator
<b>6 November 2014, Thursday</b>		
<b>1:00pm – 2:00pm</b> (Posters for Competition)	QA004 – QA006: Quality Improvement (Allied Health) QN004 – QN005: Quality Improvement (Nursing) QP004 – QP007: Quality Improvement (Physician)	Dr Surendra Mantoo
	BS004 – BS008: Basic Science CA003 – CA006: Clinical (Allied Health) CN003 – CN005: Clinical (Nursing) CP003 – CP006: Clinical (Physician)	Dr Philip Stanley
<b>3:30pm – 4:00pm</b>	QA007 – QA015: Quality Improvement (Allied Health)	Ms Gladys Wong
	QA016 – QA024: Quality Improvement (Allied Health)	Ms Lee Siok Ying
<b>7 November 2014, Friday</b>		
<b>10:45am – 11:15am</b>	QA025 – QA032: Quality Improvement (Allied Health)	NE Audrey Chua & SN Sheena Ramazanu
	QA033 – QA034: Quality Improvement (Allied Health) QP008 – QP013: Quality Improvement (Physician)	Dr Ng Zhi Xu
<b>3:30pm – 4:00pm</b>	CP007 – CP014: Clinical (Physician)	Dr Pang Wee Yang
	CP015 – CP023: Clinical (Physician)	Dr Lee Chee Wan
<b>8 November 2014, Saturday</b>		
<b>11:00am – 11:30am</b>	BS009: Basic Science CA007 – CA010: Clinical (Allied Health) CN006: Clinical (Nursing)	Dr James Tan

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## About Alexandra Health Forum




The increasing specialisation and subspecialisation among medical professionals has resulted in fragmentation of care. Some patients are now under the care of multiple specialists, each attending to one aspect of the patient's needs, without a clear holistic plan.

Yet, the most effective care plans often require medical professionals to act as an integrated team, i.e. a 'whole medical-community approach', where each member operates independently but in a coordinated and collaborative manner with other care partners. To achieve this aim, Alexandra Health merged the annual Nursing Festival and Research Forum in 2012, creating the first Alexandra Health Forum.

The interdisciplinary forum integrated the different clinical perspectives of nurses and doctors, as they exchanged frank opinions on the conduct and use of research to inform clinical practice, education, administration and public policy. Allied health professionals and administrators also joined in to share their domain knowledge, thereby helping to redefine patient care with a multidimensional system approach.

Healthcare leaders of the future would be collaborative individuals who harness the expertise of other equally passionate partners while openly sharing their insights and experiences. They would need to be authentic, credible and trustworthy, qualities that are honed by a willingness to learn, unlearn and team up with like-minded individuals. The Alexandra Health Forum was developed to facilitate such opportunities and will lead the way for similar occasions in the future.

### Icons for Alexandra Health Forum in conjunction with Nursing Fest 2014

	<p><b>Transcending People: Towards Team-Based Patient Care</b> Healthcare professionals, patients, families and the community work together, always with the best interest of the patient at heart.</p>
	<p><b>Transcending Place: From Hospital to Home</b> Healthcare is not limited to the hospital setting, as the home and community environments play an integral role in the total patient well-being and care.</p>
	<p><b>Transcending Time: Towards the Future of Healthcare</b> A representation of medical technology combined with the traditional symbol of the stethoscope signify the importance of the judicious use of technology in patient care and healthcare professional training while retaining our time-tested values of care and concern.</p>

## Day 1: Pre-Conference Workshops

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### Managing 'Sweetness'

*Winnie Chui, Senior Nurse Clinician, Diabetes Clinic, Khoo Teck Puat Hospital*

*Team members: APN Sharon Fun; APN Shao Yanli; SN Puja Sharda; Jasmine Kwan, Dietician*

#### OBJECTIVE

To experience the clinical journey of a person with:

- Newly diagnosed type 1 diabetes mellitus
- Type 2 diabetes mellitus

The presentation, diagnosis, management plan and surveillance to reduce morbidity and mortality differ between people with type 1 and type 2 diabetes mellitus.

**Workshop A** focuses on type 1 diabetes mellitus. In this workshop, insulin therapy, insulin delivery devices, technique updates, sugar monitoring and insulin pump therapy will be discussed. Carbohydrate identification, management of carbohydrate exchanges and carbohydrate counting will also be explored.

**Workshop B** focuses on type 2 diabetes mellitus. In this workshop, we will discuss the detection, pathology, pharmacological management and subsequent surveillance of diabetes mellitus to reduce morbidity and mortality. Diet emphasis will be on macro- and micronutrients, nutrient requirements and portion sizes. The essentials in reviewing self-monitoring blood sugar profiles, medication titration, physical activity and collaborative management will be shared, from the perspective of an Advance Practice Nurse.



### Stop the 'Leak'

*Tan Lay Choon, Senior Nurse Clinician, Geriatric Clinic, Khoo Teck Puat Hospital*

*Co-Speakers: Baty Ng, Case Coordinator; NM Ng Huoy Ling; Li Mingjuan, Senior Physiotherapist*

#### OBJECTIVE

To create an understanding among participants on how to prevent and treat urinary incontinence.

**Session one** is 'Understanding Incontinence'. In this session, the normal physiology of voiding, the causes and types of urinary incontinence, and history-taking strategies will be discussed.

**Session two** is 'Investigating Incontinence'. In this session, case studies will be used to illustrate and interpret the bladder chart. Case scenarios will be discussed in small groups. There will also be a demonstration of urodynamic and uroflowmetry studies.

**Session three** is 'Managing Incontinence'. In this session, the participants will have the opportunity to engage in a pelvic floor exercise class. Various types of continence aids like catheters, urosheath and diapers will be displayed and discussed. Strategies for preventing urinary incontinence will also be mentioned.



### Essentials Related to the 'Wires' of the Brain

*Sangeetha d/o Sodimani, Senior Staff Nurse, Inpatient Wards, B86, Khoo Teck Puat Hospital*

*Co-speakers: SSN Joluene Yong; SSN Gimilie Valerio Supparamaniam; SSN Pan Jin Lan; SSN Cao Wei Wei; SN Nur Syahidah Bte Rahmat; SN Sharifah Maryam Alhabshee Bte Zen; SN Aisyah Bte Nasir; SN Kevin May Elpa; SN Farrah Nathassha Bte Abdul Rahman; Dr Roy Koh, Consultant Neurosurgeon*

#### OBJECTIVES

- To gain insight into the way cranial nerve deficits impact nursing care.
- To acquire hands-on experience in performing cranial nerve assessment.

**Part One:** Participants will participate in a fun and energetic song session on cranial nerves. The song will provide an interesting overview and guide participants through the 12 cranial nerves that they will be learning more about.

**Part Two:** The workshop consists of a hands-on session to help participants understand how cranial nerve deficits affect patients. Nurse volunteers will be stationed at the 12 cranial nerve booths to guide participants on various games and activities that allow nurses to gain further insights on how the activities of daily living of patients with cranial nerve deficits are affected. We will also provide tips on better nursing care for such patients.

**Part Three:** The workshop will conclude with an enriching talk on cranial nerves by Dr Roy Koh.



## The Traumatic Golden Hour

*Laura Tham Kwee Ching, Nurse Clinician, Acute and Emergency Care, Khoo Teck Puat Hospital*

*Co-speakers: NC Angelica Miranda Abella, SNC Sin Peck Lin, Major Operating Theatre; Lim Woan Wui, Trauma Coordinator; NC Tan Sok Keng, Acute & Emergency Care; SSN Ratnasari Yawieriin, Accident & Emergency, Khoo Teck Puat Hospital; Yeo Chit Ming, Section Head, Paramedic & Emergency Care, Institute of Technical Education*

### OBJECTIVES

- To introduce concepts in trauma assessment and management.
- To provide opportunity to practice skills in trauma management.

Severe traumatic injuries require urgent surgical intervention to prevent complications. Patient survival rates are highest when assessment and resuscitation are carried out within the first hour following a traumatic event. This critical time period is referred to as the 'Golden Hour'. The effective collaboration of healthcare professionals (paramedics, emergency room and operating theatre personnel) during this first hour not only contributes to patient survival, but also affects the length of patient recovery.

**Three integrated stations:** pre-hospital, emergency department and operating theatre will be arranged.

**Hands-on activities** involve a team approach for:

- preparing and assessing patients using standardised tools
- activating the trauma team
- stabilising airway, breathing, circulation and critical injuries

Participants are encouraged to reflect on their experiences through the eyes of patients and healthcare providers.



## Connecting with Older Adults

*Audrey Chua Hui Chin, Nurse Clinician, Inpatient Wards, Khoo Teck Puat Hospital*

*Co-speakers: SSN Cinthia Lim; SSN Ling Pei Ing; SSN Nur Mumin Bte Suhaimi; SN Ann Tay; SN Hamizah Bte Mahmud; SN Tan Ai Li; SN Siti Radiah; Denise Chen, Occupational Therapist; Leung Yan Yee, Physiotherapist*

With an ageing population, increasing number of geriatric patients are visiting the hospital.

### OBJECTIVE

To enable participants to experience and understand the needs of older adults, in order to improve the care rendered.

This workshop encompasses three sessions:

**Session One** is 'The Ultimate Geriatric Experience'. This experiential session will enable the participants to truly experience the difficulties and challenges that an older adult faces. The participants will complete the assigned tasks while donning functionally limiting attires to simulate the discomfort and helpless condition that the older adults may encounter.

**Session Two** is 'Sharing of Geriatric Giants' such as immobility, instability, incontinence, intellectual impairment and iatrogenic. This lecture and discussion session will help the participants to understand the disabilities and problems of geriatric patients.

**Session Three** entails the use of case studies to introduce some of the assistive devices that can be introduced to the geriatric patients.

## Day 1: State of the Art Lecture 1 (by Keynote Speaker)

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### Collaborating to Heal in the Modern Era

*Prof Jennifer Weller, Director, University of Auckland, Centre for Medical and Health Sciences Education*

#### ABSTRACT

In the past, the doctor-patient relationship was central to patient care. However, modern healthcare is complex, and many different health professionals are involved in caring for a patient, each playing a different role, and perhaps, with different perspectives on the patient's needs. Furthermore, patients often know the most about their illness, and their central role in the healthcare team is often overlooked. Good decision-making requires collaboration among all members of the healthcare team. Failures in communication could and do result in avoidable patient harm. Estimates of 23 million lost disability-adjusted life years due to avoidable harm in hospitalised patients demonstrate the importance of the problem on a global scale.

While modern healthcare is a multidisciplinary venture, training of health professionals, to a large extent, remains discipline-based. Furthermore, a large part of healthcare continues to be delivered by practitioners working within their professional silos. Failures in collaboration affect the quality of decisions made for the patient, and increase risks of communication failures, errors and adverse events.

Training healthcare teams together can aid the understanding of each other's roles, build trust and respect, and develop more effective strategies for communicating and collaborating on patient care. A recent review found evidence of positive clinical outcomes following interventions to improve teamwork and collaboration. Organisational changes may be required to fully leverage the advantages of collaboration between healthcare providers and patients to provide the best care.

## Day 1, Symposium 1: Delivery of Team-Based Patient Care – From Theory to Practice

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### Multidisciplinary Care of the Trauma Patient

*Dr Chiu Ming Terk, Head of Department of General Surgery and Director of Trauma, Tan Tock Seng Hospital*

#### ABSTRACT

Good trauma management in the current age requires a well-oiled system. Gone are the days when trauma was managed by a single specialist or different specialists, each working within their own sphere.

In this session, the following ten concepts will be introduced to help participants ponder about managing trauma in an integrated multidisciplinary manner:

1. In trauma, no man is an island....
2. A trauma system has multiple levels....
3. A trauma system should be like a well-made jacket....
4. Some are more equal than others....
5. The trauma team is like the Fellowship of the Ring....
6. Choose your leader wisely....
7. There is no democracy in trauma resuscitations....
8. Make sure you have experts...
9. Make sure your experts perform like experts....
10. Playing to the gods....



## Transdisciplinary Care of the Malnourished Patient

*Candy Chan Hiu Nam, Senior Dietician, Nutrition & Dietetics; Supadhara Ramaiyah, Principal Clinical Pharmacist, Pharmacy, Khoo Teck Puat Hospital*

### ABSTRACT

Malnutrition has been well documented as a global health concern in acute care settings. Up to 30% of patients admitted to acute care hospitals have malnutrition. Early prevention and treatment of community- and hospital-acquired malnutrition could optimise the overall quality of patient care, improve clinical outcomes and reduce cost.

With the advent of transdisciplinary care, healthcare professionals come together from the beginning to jointly communicate and identify key concerns. They exchange ideas and collaboratively develop and execute their action plans. This model of care may potentially ameliorate malnutrition and health outcomes.

As part of transdisciplinary care, the Nutrition Support team (comprising physicians, pharmacists, dietitians, nurses and other allied health professionals) is able to implement early interventions in patients to reduce malnutrition risks, thus expediting their recovery.



## Team-Based Diabetes Group Education

*Dr Tan Hwee Huan, Senior Consultant, General Medicine; Dr Angela Koh, Senior Consultant, General Medicine, Khoo Teck Puat Hospital Diabetes Empowerment Programme Team members: SSN Angie Tang; APN Sharon Fun; Jasmine Kwan, Dietician; Toylyn Lee and Gregory Fam, Physiotherapists; Iris Tay, Optometrist; Chelsea Law, Podiatrist; Li Chi, Medical Social Worker*

### ABSTRACT

The current Diabetes Empowerment Programme (DEP) conducted by the KTPH Diabetes Centre has its origins in Alexandra Hospital, a decade ago. A/P Lim Su Chi, inspired by what he witnessed during an attachment at the renowned Joslin Diabetes Centre in Boston, brought this concept of patient education back to Singapore. By garnering the expertise of a multidisciplinary healthcare team that includes diabetologists, nurses, dietitians, physiotherapists, medical social workers, optometrists and podiatrists, this programme aims to empower patients through experiential learning over a defined period of time. After collecting relevant health information from patients, this team of experts will meet to work out a customised plan for each participant, looking into their physical, mental, social and cultural needs.

## Day 1, Breakout Session 1: Working Better Together – Lessons from Clinical Care



## Interdisciplinary Team Interactions in Simulated Perioperative Crisis Management

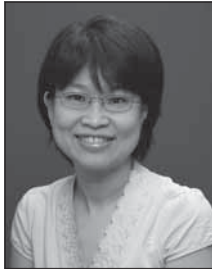
*Prof Jennifer Weller, Director, University of Auckland, Centre for Medical and Health Sciences Education*

At the end of this session, attendees will:

- Understand the potential reasons for miscommunication in the perioperative setting
- Understand the knowledge, skills and attitudes required for effective teamwork
- Be able to utilise strategies to improve communication in a crisis
- Be able to use a teamwork instrument to facilitate structured reflection following a perioperative crisis



The perioperative setting brings together health professionals from different disciplines in a high-acuity and often stressful environment. In a crisis, there is little room for error, and the need for effective teamwork is paramount for achieving the best outcome for the patient. Each team member has specialised knowledge and skills to contribute, but effective teamwork is needed to best utilise this valuable resource. Improving teamwork requires knowledge of the elements of effective teamwork, skills in effective communication, and attitudes that encourage a democratic and open environment for optimal team collaboration. Improving teamwork also requires some measure to chart progress. In this session, participants will have the opportunity to learn about the importance of teamwork in relation to patient safety and consider specific communication strategies. Using videos of simulated crises, participants will rate teamwork using a structured instrument designed to promote team reflection and improvement following both simulated and real crises in the perioperative setting and beyond.



## Fracture Prevention in the Osteoporotic Patient

*Dr Vivien Lim, Consultant, Division of Endocrinology; Gao Jie, Senior Staff Nurse, Case Management, Khoo Teck Puat Hospital & The Osteoporosis Team*

### ABSTRACT

In Singapore, we are faced with a tsunami wave of ageing, and with it, chronic diseases such as osteoporosis and subsequent fractures, including the most dreaded of the lot – hip fractures, from which one in four affected patients would die within a year. Fractures are accompanied by a huge burden, from morbidity and mortality to financial and caregiver burden. Hence, it would be prudent to focus on the prevention of osteoporotic fractures. This would need to involve hospitals and communities, and would span several medical disciplines. The talk will hence focus on systems and collaborations that are in place currently or planned, in order to address this aim.



## Harmonising Care in Life's Last Journey – A Team Approach

*Dr Angeline Seah, Senior Consultant, Geriatric Medicine, Khoo Teck Puat Hospital & The Palliative Team*

### ABSTRACT

The Palliative Care Service at KTPH was set up by Dr James Low and A/Prof Pang Weng Sun in 2001 at the Alexandra Hospital. It is now nested with the Department of Geriatric Medicine at KTPH. The service comprises a multidisciplinary team of doctors and nurses, and is supported by a medical social worker, dietician, pharmacist and occupational therapist. It works closely with community home hospice services to facilitate care of patients suffering from advanced progressive illnesses at home.

Annually, the service looks after more than 500 patients ranging from terminally ill patients to those suffering from symptoms that require specialist palliative care while undergoing treatment, focusing on the needs of the patients and their families. In providing adequate pain and symptom management, avoiding the prolongation of the process of dying, helping patients achieve a sense of control and in strengthening their relationships with their loved ones, the team does all it can to help relieve the burden on patients' families. This challenging task requires close collaboration between the multidisciplinary palliative care team and other teams from KTPH, bridging care transitions to integrate care with home hospice organisations.

We describe cases managed across care transitions by both KTPH and home hospice care teams, and with KTPH allied healthcare in this talk, highlight interventions that make a difference in improving quality of life, making active living possible in the face of dying and contributing to happiness during life's final journey.



## Travelling the Journey with a CKD Patient – a Team-Based, Patient-Centred Approach

*Dr Yeoh Lee Ying, Senior Consultant, Division of Renal Medicine, Department of Medicine; Dr Leong Chuo Ren, Consultant, Department of Surgery; Bek Choon How Joseph, Senior Renal Coordinator, Renal Centre; Mok Chee Peng, Senior Medical Social Worker, Medical Social Service; Kylie Siu Ka Fai, Senior Physiotherapist, Rehabilitation Service; Wong Feai Voon, Dietician, Khoo Teck Puat Hospital*

### ABSTRACT

The patients with advanced chronic kidney disease who require renal replacement therapy usually have multiple morbidities. Their psychosocial, nutritional and rehabilitation aspects are interrelated to the medical condition. A multidisciplinary approach is essential to provide comprehensive management in order to help the patients to cope, adjust and return to the community in the optimal state. Multidisciplinary care has been shown to have better outcomes for these patients.

Here, we are sharing a team-based approach in caring for a middle-aged man. He had diabetes mellitus with complications, hypertension, ischemic heart disease and newly diagnosed end-stage kidney disease. He stopped working about three months prior to the admission due to functional decline. He initially declined dialysis but eventually agreed when he experienced uraemic symptoms and volume overload. His physical recovery was slow, as the condition was compounded by depression, malnutrition and muscle wasting. Our team will share the challenges in managing this patient.

## Day 1, Featured Lecture 1

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### The Evolution of the Diabetes Team

*A/Prof Sum Chee Fang, Head of Department, Diabetes Centre, Khoo Teck Puat Hospital*

### ABSTRACT

Patients with diabetes present with a whole spectrum of complexity. The Diabetes Team needs to acquire a host of different skills and draw upon an infinite body of knowledge to assist patients with a complex diabetic condition in finding solutions to their problems. These skills and knowledge cannot be acquired by an individual healthcare professional and require the concerted effort of a whole team of healthcare professionals, each doing his or her part as well as working together as a team to provide practical solutions for the patient.

Over the years, Diabetes Centre has developed a model of care in which doctors of different specialties, as well as nurses and other allied health professionals work together to harness the potential of multidisciplinary, interdisciplinary as well as transdisciplinary collaboration in different aspects of care for patients with diabetes.

The Diabetes Team is brought together by a sense of mission—the mission of providing holistic care to our patients and assisting with solutions to their problems. Even as the best is brought out in each individual team member, the context of the team is always borne in mind. The experience of building up collaborative diabetes care will be discussed in this lecture.

## Day 2, State of the Art Lecture 2

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### Integrating Healthcare in Singapore

*Dr Jason Cheah, Chief Executive Officer, Agency for Integrated Care*

#### ABSTRACT

Despite advances in health and social care, many systems today are optimised individually but do not serve the holistic needs of individuals and the population. Integrated care has thus been widely adopted to address such challenges. Leutz's laws of integration suggest that fundamental changes have to be considered to benefit the system as a whole. Multiple elements account for the success from international systems: building strong relationships with clients (Alaska), fostering collaborative 'health pathways' and unifying health-social budgets (Canterbury, New Zealand), and introducing coordinators as single points of access (Torbay, UK). In Singapore, efforts undertaken by the Regional Health Systems in identifying common priorities, and by the Agency for Integrated Care in developing new community care models, pave the way towards bridging the traditional health-social care divide. The path towards fuller integration of care in Singapore requires continued efforts in transcending institutional boundaries between health, social and mental health services.

## Day 2, Symposium 2: The Journey from Hospital to Home

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### Healthcare Philanthropy at the Edge of Chaos

*Mr Lee Poh Wah, CEO, Lien Foundation*

#### ABSTRACT

In many ways, the eldercare sector is plagued by chaos – chaos that comes with confronting deep-seated beliefs, managing the intertwined lives of patients and caregivers, and navigating an unwieldy healthcare system. Breakthrough solutions in such a complex space cannot be found in old approaches or prevailing assumptions. We need to consider rule changes as game changers. With this modus operandi, the Lien Foundation has been striving in recent years to destigmatise conversations about end-of-life care, declutter the service delivery of eldercare professionals and deinstitutionalise the design of future nursing homes. In this talk, the CEO of this institution shares the challenges tackled, the insights learnt, and explains why innovation in healthcare is born on the fine line between order and chaos.



### Hospice at Home: the Transition between Hospital and Home at the End of Life

*Dr John Costello, Programme Director & Director of Operations, Nursing Practice Programme, University of Manchester*

**ABSTRACT**

There is no place like home; home is where the heart is, where the family are and where the love is. This presentation is focused on end-of-life care at home. Specifically, the speaker will critically consider the transition from acute hospital care to palliative home care at the end of life. The presentation will focus on four key issues:

- Hospital ideology, including the transition from cure to care
- Good death concepts and how good deaths can be facilitated in home care settings
- The provision of effective symptom control and emotional support in the community
- The role of professionals and lay care givers at the end of life

Research suggests that the vast majority of individuals who know they are dying prefer to be cared for at home. This raises several issues not only for the provision of effective professional intervention, but also for the role of lay caregivers, who often carry the emotional burden placed on them at the end of life.

Drawing on contemporary research, the evidence supporting the need to develop what is referred to as programmes of hospice at home care will be presented. The presenter will draw on research in the UK, Singapore and elsewhere, to identify how palliative home care has been developed and implemented. The progress and the problems of hospice at home will be outlined, and audience participation will be involved throughout.



## Getting Back Up on Your Feet: Journey of a Geriatric Patient Following Hip Fracture

*Dr Mallya Jagadish Ullal, Senior Consultant, Geriatric Medicine, Khoo Teck Puat Hospital*

**ABSTRACT**

Falls rank high among serious clinical problems faced by older adults. They cause substantial morbidity and mortality, and contribute to immobility and premature nursing home admissions. Unintentional injuries are a leading cause of death in older adults, and falls comprise two thirds of these deaths. Hip fractures occur predominantly in older adults, particularly those with frailty, in whom homeostatic systems are impaired. They often have multiple comorbidities and may function well until they have a serious acute event. At this point, they are at a high risk of developing complications and are likely to have difficulty recovering or are at risk for further complications, which can set off a vicious downward spiral. The road to recovery of function can be slow, with frequent setbacks.

We will look at the journey of a patient with hip fracture, which starts at home and follows turbulent water literally into the unknown. It is a journey of many uncertainties, many ups and downs with anxious moments for patients and their loved ones; a journey where the patients and their families have to make difficult choices and come across many unfamiliar faces from different disciplines working together in an attempt to smoothen their turbulent journey towards light and safety.

## Day 2, Breakout Session 2: Healthcare Delivery in the Home and Community

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## Bowel Anastomosis Workshop (0900–1300)

*Dr Tan Kok Yang, Head of Department, General Surgery, Khoo Teck Puat Hospital*

**ABSTRACT**

This workshop comprehensively covers the techniques of intestinal anastomosis using both the hand-sewn and stapled techniques. The steps of the procedures, including the pearls and pitfalls, will be clearly demonstrated, and participants will have the opportunity to practice each technique on animal material. This course is suitable for surgical trainees, especially those starting to perform anastomoses.



## Intermediate and Long-term Care (ILTC): Where Shall We Go?

*Dr Lee Kok Keng, Principal Staff Physician, Geriatric Medicine, Khoo Teck Puat Hospital; Dr Lee Liang Tee, Clinical Director, Renci Community Hospital; Dr Kelvin Phua, Medical Director, Ang Mo Kio–Thye Hua Kwan Hospital; Dr Ee Chye Hua, Director, ECH Consultancy; Dr Patricia Lee Sueh Ying, Consultant, Geriatric Medicine, Changi General Hospital*

### ABSTRACT

The practice of geriatric medicine (GRM) was formally started in 1988 with the first department of GRM. The move towards ILTC started in 1993. Currently, six restructured hospitals (RH) supported by five community hospitals (CH) provide GRM services.

Would building more RH or CH be sufficient? Would that reduce resources for others in the ILTC, particularly those who help to maintain the elderly patients in their own home? Or how should RH/CH extend care beyond the hospital? What would be the challenges to truly meet the ever complex medical and social needs of the elderly patients?

Our four speakers have experienced the trials and tribulations in care delivery. On behalf of their team members, the various allied healthcare practitioners who provide direct services to the elderly patients and their families, they will share the current ILTC landscape, and will attempt to paint the 'ideal' future.



## Inside Out Integrated Cardiology Care

*Dr Lee Chee Wan, Consultant, Cardiology; Dr Ong Hean Yee, Head of Department, Cardiology; Chew Chien Lin, Senior Pharmacist, Pharmacy; Serene Lim Chiew Peng, Senior Staff Nurse, Case Management; Gregory Fam Jia Chyi, Principal Physiotherapist, Department of Rehabilitation Services, Khoo Teck Puat Hospital*

### ABSTRACT

Cardiac rehabilitation is becoming an integral part of any comprehensive cardiac care provided by hospitals. It usually follows inpatient treatment for cardiac conditions, and serves to assist patients in returning them to as best function as possible in the community. In this session, we would like to share the KTPH experience in this important area. This will include a general discussion on the evidence and role of cardiac rehabilitation, history and development of the KTPH programme, individual presentations by cardiac nurse, physiotherapists and pharmacists about our experiences and challenges, as well as stories from some patients. In KTPH, cardiac rehabilitation is a multidisciplinary and multifaceted programme that transcends time, place and people.



## Ageing-In-Place

*Dr Wong Sweet Fun, Senior Consultant; Dr Ang Yan Hoon, Senior Consultant, Geriatric Medicine; SNM Jesbindar Kaur, Home Care Service, Khoo Teck Puat Hospital*

### ABSTRACT

Alexandra Health piloted our Ageing-In-Place (AIP) programme in September 2011 as one of the initiatives to manage the growing demand of subsidised beds. The programme targets a group of heavy users of bed days – frequent flyers or patients who have a history of three or more admissions over a six-month period.

As part of the pilot, the AIP team visited the homes of 50 patients and found that with appropriate support to meet their unarticulated and unmet needs, re-admissions can be avoided. These findings confirmed studies showing that 70% of health determinants (social, environmental, healthcare, behavioural) are modifiable, and appropriate interventions can make a difference.

AIP's community nurses develop individualised care plans for our patients to address their specific needs in their homes. Our nurses remain as the single points of contact for our patients even as we actively engage community partners to support our patients in their homes. The community nurses are supported by our Business Analytics, Design Thinking and Technology colleagues, who provide them with actionable insights, human-centric approaches and real time information to continuously deliver their care effectively on the go.



An initial study of the first 400 patients under the programme's care showed a reduction of average admission rate from 3.6 to 1.2 times per patient in a six-month period. With this promising start, the AIP received RF funding to develop the care model further, and a study on the programme's effectiveness was undertaken by Duke-NUS.



## Pursuing Excellence in Integrated Care – Why and How

*Prof Sylvia Fung, Professor and Acting President, Tung Wah College, Hong Kong*

### ABSTRACT

With the ageing population, health care is under immense pressure of exponentially increasing needs. Healthcare institutions and infrastructure cannot catch up with the demand. As a result, the delivery model has extended from hospital-based to more community-oriented or home-based care.

Furthermore, advancements in healthcare technologies and specialisation of healthcare professionals have led to a disintegration and fragmentation of care for the individual. Fragmentation may lead to gaps as well as duplications. These will contravene the three golden yardsticks of healthcare quality, viz. economy, efficiency and effectiveness. Moreover, it will negatively impact the other crucial domain, i.e. client's experience.

As a result, reform in healthcare services is driven and fuelled by these two aforementioned forces. The remodelling and restructuring of care model warrants comprehensive structural review and process re-engineering under a new, overarching underlying principle. It necessitates a top-down health policy from the government and bottom-up building blocks from the frontline clinical care level. Stakeholders cut across many government bureaus, all health, housing, community and social services sectors, all professional and managerial disciplines, etc. Last but not the least, the engagement and empowerment of patient groups and community leaders are the major determinants of success. Although the continuity of carers may not possibly be attained under the integrated care model, continuity of care should remain as the guidance when steering along the patient journey in this integrated care path.



## Hospital, Community and Home – Team-Based Integrated Care for Dementia

*Dr Philip Yap Lin Kiat, Senior Consultant, Geriatric Medicine, Khoo Teck Puat Hospital*

### ABSTRACT

Dementia has been described as the chronic disease of the 21st century. The chronic, progressive and protracted course of dementia, which affects the mental, physical and functional faculties of the affected individual and exerts significant social and financial toll on families, challenges the limits of health and social care systems to care well. CARITAS iCommunity@North endeavours to provide holistic, person-centred and team-based transdisciplinary care for individuals with dementia and their families across care settings. The talk will discuss the rationale, goals and operational challenges for CARITAS. Indeed, to borrow a quote from an editorial in the Lancet, "if we can get services right for dementia, then we will be a long way towards getting them right for all individuals with complex and long-term disorders."

## Day 2, Interactive Session: Case Capsule with Audience Participation

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## Case 1: Caring for the Patient with COPD – From Acute Hospital to Home

*Dr Phoa Lee Lan, Senior Consultant, General Medicine; Loh May Shan, Nurse Clinician (Respiratory Nurse), Khoo Teck Puat Hospital; Norashinta Bte Mansoor, Senior Staff Nurse 1, Agency for Integrated Care*

**ABSTRACT**

Chronic obstructive pulmonary disease (COPD) is a condition characterised by irreversible airflow limitation that is progressive in nature and that can be debilitating towards the advanced stage. According to the World Health Organization, the global burden of moderate to severe COPD is estimated to be 65 million and the actual burden is expected to be higher, as the prevalence in undeveloped countries is generally underreported. About 3 million people died of COPD in 2005, accounting for 5% of all deaths worldwide. Estimates show that COPD will be the third leading cause of death by the year 2030. The management of COPD patients entails several challenges as the disease progresses, and patients experience incapacitating symptoms with severe limitations to their activities of daily living. This includes addressing the psychosocial aspects and end-of-life issues that are often neglected. The holistic management of COPD patients requires both evidence-based medical therapy and community support services that would help such patients cope with their disease when they are out in the community.

**Case 2: Surgery for the Elderly Patient – A Holistic Approach**

*Dr Surendra Mantoo Kumar, Consultant, General Surgery, Khoo Teck Puat Hospital & The Healthcare Quality Improvement Fund (HQIF) Programme Team*

**ABSTRACT**

Elderly surgical patients present a dual challenge of the surgical problem itself and a complex range of issues such as cognitive impairment, dementia, risk of postoperative delirium, frailty, nutritional status, and patient-family and the social support system besides the usual co-morbidities associated with aging. This renders it beyond the scope of a practising surgeon to provide a comprehensive perioperative care to an elderly surgical patient. Recent studies have reported that a transdisciplinary team approach could deliver a comprehensive level of surgical care in elderly patients. All members of this team work together to determine the most effective plan of care, and each member plays a unique role. The transdisciplinary approach allows team members to come together from the beginning to jointly communicate, exchange ideas and come up with adaptable solutions for each individual patient. The current forum will discuss the transdisciplinary care of an elderly surgical patient from a surgeon's and a specialist nurse's perspective.

## Day 2, Featured Lecture 2

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**The Care Continuum – The Challenge of Transforming Healthcare in Singapore**

*A/Prof Kenneth Mak, Chairman, Medical Board, Khoo Teck Puat Hospital*

**ABSTRACT**

The healthcare landscape is a complex one, with many institutions, agencies and healthcare providers partnering to provide care to the patients in our community. This presentation shares the challenges of providing integrated care from a national perspective. It is important to identify the different ways in which patients navigate the public healthcare system and utilise healthcare services, so as to better plan how to provide appropriate care, in an efficient and accessible manner. Current perspectives are shared on how specific subgroups in the population may be risk stratified and identified for targeted strategies to optimise their health. There are many opportunities for further change to take place – in the community, in preventive health, and in ambulatory and residential settings – to promote health in Singapore.

## Day 3, Breakout Session 3: Innovative Research and Training for Better Outcomes

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### Surgical Interest Group Suturing Workshop

*Dr Caroline Simon, Consultant, General Surgery, Khoo Teck Puat Hospital*

#### ABSTRACT

This workshop introduces medical students to the use and handling of surgical instruments during basic suturing. Multiple techniques of knot-tying and basic suturing will be demonstrated, and students will have the opportunity to practice each technique. They will also be provided with a skin kit and a CD containing comprehensive information on surgical suture materials, knot-tying and suturing techniques. This course is suitable for enthusiastic final year medical students who may be interested in pursuing a career in surgery and obtaining an exposure to basic suturing.



### New Ways of Training in Simulation-Based Training

*Pauline Chia, Senior Lecturer; Grace Pheang, Senior Multimedia Programmer & Lecturer, School of Health Sciences (Nursing), Nanyang Polytechnic*

#### ABSTRACT

The use of high-fidelity simulation in nursing education has increased over the years, as it can offer realistic patient encounters and provide real-time physiological feedback. However, due to limited resources, not every student had the opportunity to experience the simulation learning process as a primary nurse. To overcome this limitation, Nanyang Polytechnic, School of Health Sciences has developed a case-based virtual ward environment to provide students with the opportunity for active learning. The virtual simulated activities allow all students to go through an authentic learning experience of managing patients, similar to real clinical situations. This will serve as prior knowledge for students before they attend the simulation-based learning session.

The implementation of a case-based virtual ward environment aims to improve the quality of our graduates' cognitive and clinical reasoning skills over time as they are being exposed to more cases in the virtual ward environment.



### How to Get Your Paper Published

*Prof Wilfred Peh, Head of Department, Diagnostic Radiology, Khoo Teck Puat Hospital*

#### ABSTRACT

A good manuscript is one that is potentially publishable, and is able to communicate a clear and useful message to the readers of a particular journal. Ideally, this message should also be exciting and should have an impact on clinical practice. From the editor's viewpoint, good manuscripts, when published, enhance the standing and reputation of a journal. From the authors' viewpoint, publication marks the endpoint of a scientific project. Producing a bad manuscript will only delay or prevent publication of good scientific material. Four points that merit attention are: material, structure, message and style.

Material that is not new, innovative, exciting or interesting is unlikely to get published in a reputable journal. Papers published in journals can almost always be classified into one of a variety of categories. It is important for authors to be aware that each type of paper is specific in nature,

serves a distinct purpose, and is hence judged by different criteria. Authors should be clear about the type of paper that they are planning to write, construct the manuscript according to the prescribed guidelines for the specific type of paper, and be familiar with the requirements and standard of the target journal. Placing authors' material in a structured form facilitates communication between authors and readers.

In summary, a good manuscript is one that conveys the authors' thoughts in a logical manner. It should be constructed in the format that best showcases the authors' material and written in a style that transmits the message with clarity.



## EBM 2.0

*A/Prof Lim Su Chi, Clinical Director, Clinical Research Unit, Khoo Teck Puat Hospital*

### ABSTRACT

Evidence-based medicine (EBM) relies primarily on randomised controlled clinical trials (RCTs). However, RCTs, like all experiments, are vulnerable to error due to bias, confounding and chance. Therefore, the results are often non-reproducible and the effect size reported tends to substantially diminish in subsequent RCTs ('winners' curse'). Furthermore, not all clinical questions are amenable to RCT due to ethical issues, rare occurrence of events or resource constraints.

Meta-analysis builds upon RCTs. Besides the risk of amplifying errors accumulated from multiple RCTs (some with suboptimal validity), meta-analysis is uniquely vulnerable to study heterogeneity and publication bias. Observation (case-control or prospective cohort) studies pose additional challenges to clinicians who are unfamiliar with the limitations of causal inference associated with non-experimental design.

Typically, the underlying biology of disease is not considered in-depth in clinical studies. Incorporating genomics and biomarkers into the field further enhances the complexity of clinical science/epidemiology. Overly prescriptive clinical practice guidelines (CPGs) dependent on fragmented data or RCTs with significant limitations often lead to awkward and non-practical recommendations such as 'don't start and don't stop' intervention strategies. These will be succinctly discussed to provide practicing clinicians an overview of the issues to help them appreciate EBM at the next level (2.0).



## Design Thinking and Innovation

*Tan Liren, Industrial Designer, Healthcare Innovation and Research, Khoo Teck Puat Hospital*

### ABSTRACT

Inspired by the Centre for Innovation in Mayo Clinic and the book 'Change by Design', our innovation team was set up in 2010 to use design thinking as an approach to provide new perspectives on our healthcare challenges. In order to improve the consumer healthcare experience and delivery, design thinking seeks to empathise with our consumers to understand their needs, and then work around those insights to design an experience that matters to them through a process of ideation and prototyping. Alongside other process improvement tools, design thinking is now a part of the hassle-free framework that the hospital leverages to deliver better care for our patients.

## Day 3, Symposium 3: Towards the Future of Healthcare

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### Singapore Residency Training Programme: How and Why We Landed Where We Are?

*Prof C Rajasoorya, Senior Consultant, General Medicine, Khoo Teck Puat Hospital*

#### ABSTRACT

Medical education aims to produce future doctors with competencies and skills that meet reasonable patient expectations within a healthcare framework. House Officer or Postgraduate Year 1 (PGY1) training is a mandatory component of medical training for all fresh medical graduates. Initially, the house officer was perceived as a first-line doctor with predominantly service responsibilities and duties determined largely by service needs; learning was incidental and largely on the job. Over the years, limits were imposed on duty hours, and supervisors were formally appointed. The concern of the gradual erosion of the apprenticeship system due to service pressures as well as the lack of structure in training led to the introduction of the residency system in 2010. The residency system utilised principles and processes from the American College of Graduate Medical Education (ACGME). The needs of Singapore were taken into account in adapting to local needs. One critical difference in the Singapore adaptation was the retention of broad-based learning of medical and surgical postings in the first year, irrespective of the residency programme selected. With the introduction of the residency system, a clear structure with four main components related to Systems (accreditation process, oversight structures and committees), Curriculum (defined learning objectives, core competencies and graded responsibilities), Assessment (regular formative assessment) and People (designated core faculty with protected time) was defined. The emphasis has switched to one of training with adequate supervision. Work is in progress in defining competencies, standards and outcomes, and setting clear guidelines to the certifying authorities on granting of certificate of experience for those who have successfully completed PGY1.



### Surgical Residency Training: Confronting Wicked Problems, Sacred Cows and Future Challenges

*A/Prof Kenneth Mak, Chairman, Medical Board, Khoo Teck Puat Hospital*

#### ABSTRACT

Surgical specialty training is at a crossroad in Singapore. We have evolved from a model of training via apprenticeship to a structured training framework centred around the attainment of core proficiencies, with a dedicated time frame and resources allocated for training. The evolution to our current structure of residency training has not been without pain. In this talk, the history of surgical specialty training is reviewed, and the current and future challenges of training future surgeons are identified. These challenges form wicked problems and require not only an enlightened approach to specialist training, but also a willingness to challenge the current paradigm.



### The Changing Role of Today's Nurses: Beyond the Bedside

*Low Beng Hoi, Chairman, Singapore Nursing Board & Director of Nursing, Khoo Teck Puat Hospital*

#### ABSTRACT

As modern medicine advances, healthcare delivery/model evolves and social structure shifts toward an ageing population, present day nurses will need to move in tandem with these changes. Hence, they may not necessarily remain at the bedside caring for the sick. With health management



increasingly being addressed upstream, health promotion and disease prevention are now considered part of the continuum of care, such that care extends beyond pre-illness to include post-illness as well. Therefore, care beyond the bedside would encompass other spectrum of roles, from acute setting to step-down and home settings, in addition to the promotion of health and well-being. Roles within the community such as community case managers, community nurses and transitional nurses, are set to gain increasing relevance. Back-end support of front-end roles, such as systems and processes, is becoming equally important. Even nurses interested in building healthcare processes and systems could pursue other related skills and expertise. With the building of more quality clinical IT systems related to patient care, a key role for nursing informatics has been created. Upfront data/information, available real-time, will also become more important in decision-making as data analytics grows in popularity.

In an increasingly affluent society, public expectations of healthcare will continue to rise, as will the trend of demand exceeding supply of health services. Against this backdrop, questions are raised regarding the changing roles of nurses today and the review of roles based on benefits and consequences. The question of whether the creation of more roles equates to seamless and appropriate care for patients should also be addressed.



## Healthcare in the Digital Age: A Glimpse of the Future

*Dr Kevin Yap Yi-Lwern, Lecturer, Department of Pharmacy, National University of Singapore*

### ABSTRACT

The emergence of various technologies, the internet and the World Wide Web in the last decade has affected the way in which health-related information is distributed and accessed, not only for healthcare professionals, but also for patients. Furthermore, the social media revolution has opened up new channels for communication and learning. Patients are becoming more well-informed about health-related issues via the information they receive over the internet. Several new disciplines have emerged in the attempt to provide 'e-therapy' to patients, among which digital healthcare is an upcoming multidisciplinary domain that involves the use of information and communication technologies to help address health problems and challenges faced by patients. Pharmaco-cybernetics (also known as cybernetic pharmacy or cyber-pharmacy) is a niche field within digital healthcare, which merges the science of technologies with human-computer-environment interactions so as to support medicine and drug use, as well as reduce or prevent drug-related problems.

This presentation will attempt to address the channels that have been leveraged upon by healthcare professionals to provide 'e-therapy' to patients and discuss how patient care has evolved in response to the digital age. It will also attempt to address the issue of whether a new breed of clinician-scientists who have a combination of clinical knowledge and technical skills to develop tools are required, so that patient care can be optimised.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA001

## Redesigning medication processing and collection flow in the outpatient pharmacy

Loke ET<sup>1</sup>, Neo XRC<sup>1</sup>, Fan WS<sup>1</sup><sup>1</sup>Department of Pharmacy, Khoo Teck Puat Hospital, Singapore

**INTRODUCTION** Significant time is spent at the outpatient pharmacy (OP) performing interventions, medication reconciliation (MR) and medication top-up after a patient's clinic consultation. In this study, we aimed to investigate whether waiting time can be reduced if MR and interventions were performed at the clinic.

**METHODS** A pharmacy technician (PT) was deployed to the diabetes clinic from 10 am to 12 pm. Time gaps between registration, consultation and payment were fully utilised to carry out interventions and MRs. It has been shown that omission of counselling for unchanged chronic medications does not compromise patient education, and thus, the PT will also triage patients for eligibility when no counselling is required. The prescriptions were processed and sent to the main pharmacy for packing in anticipation of their arrival. On arrival at the OP, patients were given an expedited queue number and the

counselling time was recorded. A follow-up study with a different PT was done to determine the inter-PT variability. Primary outcomes compared included the number of interventions captured, the number of MRs and the waiting time.

**RESULTS** Overall, 317 subjects were screened and 41% were eligible for this new workflow. A total of 37 out of 43 interventions and 30 MRs were carried out at the clinic level. A significant 41% reduction in waiting time was achieved with the 'no-counselling' group (32 vs. 21 min,  $p < 0.001$ ). There was no significant difference in the number of interventions (18 vs. 19,  $p = 0.875$ ) and MRs (8 vs. 7,  $p = 0.627$ ) done by the different PTs.

**CONCLUSION** Deploying a PT at the clinic could shorten the waiting time, as interventions and MRs were carried out on site. This should be routinely employed for clinics with high intervention rates.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA002

## Factors associated with prolonged hospital length of stay in older patients

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**INTRODUCTION** Prolonged stay in acute hospitals increases the risk of hospital-acquired infections, and disrupts patient flow and access to care due to bed shortages. The hospital bed crunch problem raises concerns about patient safety and adequacy of healthcare infrastructure. We investigated the factors associated with prolonged length of stay (LOS) of geriatric patients (age  $\geq 78$  years) in a tertiary hospital with a view to identifying the modifiable factors from a quality improvement standpoint.

**METHODS** During a three-month period from January to March 2013, a total of 72 patients with prolonged LOS ( $\geq 21$  days) were identified and compared to 80 randomly selected 'controls' (LOS  $< 21$  days) for demographic and clinical variables using univariate and multivariate analyses.

**RESULTS** The mean age of the patients was  $85 \pm 5.5$  years, 51.4%

were male and 79.1% were Chinese. Nursing home discharges comprised 37.5% of the patients. In 22.2% of the cases, family members were reluctant to bring the patient home, while 62.5% of the family members had inadequate skills and resources to care for the patient. Logistic regression revealed the following significant factors for increased LOS: planned discharge to nursing homes (odds ratio [OR] 3.04, 95% CI 1.33–4.75,  $p < 0.01$ ), increased severity of illness (OR 1.36, 95% CI 1.40–2.38,  $p < 0.01$ ), average/high financial status (OR 1.66, 95% CI 1.06–3.25,  $p = 0.04$ ) and caregiver stress (OR 2.86, 95% CI 1.48–4.24,  $p < 0.01$ ).

**CONCLUSION** Early assessment of caregivers' stress and needs, and provision of the appropriate tailored interventions are potentially modifiable factors to ameliorate prolonged LOS of older patients in acute hospitals.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA003

## Interactive dashboard for pharmacy cost management

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**INTRODUCTION** Drug cost is a major part of patient financial burden, especially for non-standard drugs. This project aimed to identify opportunities for better formulary management by improving information visibility and enhancing analytic capabilities using an interactive dashboard.

**METHODS** Outpatient prescription data collected from KTPH Pharmacy from July 2013 to May 2014 were used as inputs to the dashboard created with QlikView. The dashboard allowed in-depth exploration along three dimensions – clinical specialty, drug class (non-formulary/non-standard/retail) and individual items. The values of interest included acquisition cost, selling price, profit, revenue/expenditure ratio and the quantity of drugs dispensed. All values were normalised against the number of prescriptions.

**RESULTS** The time taken for data analysis used to be 2 hrs. With the dashboard, the time was reduced to 15 min, suggesting an

improvement of 88%. Due to the highly tedious nature of data processing, monitoring was done only when required. With the dashboard, monitoring could be performed on a more regular basis. Data after normalisation provides an accurate and fair picture of the cost composition, especially when comparing among different specialties. With such information, the patterns of high-cost prescriptions could be identified and the drug formulary, better managed.

**CONCLUSION** Management requires evidence to make informed decisions. The interactive dashboard visually reveals patterns with ease, and allows for further investigations through dashboard drilling down. The prototype has been well received and deemed to be a useful tool by the pharmacy management staff. There are plans to extend the dashboard to include inpatient prescription data and other sources.

## CATEGORY: QUALITY IMPROVEMENT (NURSING)

AHF14QN001

## HPV education and its effect on the knowledge and potential vaccination uptake among teenagers in Singapore

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**INTRODUCTION** This study aimed to determine the effectiveness of human papillomavirus (HPV) education in enhancing the knowledge and understanding of HPV and promoting the potential uptake of the HPV vaccination.

**METHODS** Convenience sampling was used to select the population. Female students aged 12–19 years were recruited. Students who had undergone HPV vaccination were excluded. The school that accommodated our study was chosen via the school health advisory that we had contacted. Questionnaires were given out before and after the educational session. The questionnaires included questions on HPV screening, vaccination and cervical cancer. The educational session was conducted by one of the co-investigators. PowerPoint slides were used to impart information on HPV and cervical cancer. Post-education questionnaires were given to participants one week after the education session.

**RESULTS** A total of 41 students completed both pre- and post-education questionnaires. All the subjects were from Secondary Three express and normal stream. None of them were sexually active. Most of these students (65%) had not heard of HPV, while 75.6% were unaware of cervical cancer or HPV vaccination. Marked improvement in awareness of HPV, vaccination and cervical cancer were seen in post-education questionnaires responses. There was an increase from 31.7% to 36.6% of students who would consider receiving HPV vaccination within a year.

**CONCLUSION** The study showed that education does affect the level of knowledge of HPV and potential HPV vaccination uptake among teenagers in Singapore.

CATEGORY: QUALITY IMPROVEMENT (NURSING)

AHF14QN002

## A study on filter lifespan between non-heparin and citrate regional anticoagulation continuous renal replacement therapy

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**INTRODUCTION** Acute kidney injury (AKI) accounts for a high mortality rate of 60% in critically ill patients (Uchino et al, 2005). Continuous renal replacement therapy (CRRT) became the treatment of choice for such patients with haemodynamic instability. To ensure the efficacy of therapy, prevention of filter clotting is required, leading to the introduction of heparin as an anticoagulant (Davenport & Tolwani, 2009). In recent years, the use of citrate regional anticoagulation to prolong filter lifespan has become more popular due to its lower bleeding risk. A three-month pilot study was conducted in the Surgical Intensive Care Unit with the introduction of citrate regional anticoagulation. It aimed to explore the outcomes of filter lifespan between non-heparin and citrate regional anticoagulation CRRT.

**METHODS** Purposive sampling was used in 29 patients who were selected according to the following inclusion criteria: (a) requirement of CRRT, (b) either non-heparin or citrate regional anticoagulation CRRT and (c) blood flow rate in CRRT  $\geq$  150 ml/min.

**RESULTS** The end point was filter clotting. Patients under the citrate regional anticoagulation CRRT group showed a significantly longer filter lifespan compared to those under the non-heparin CRRT group ( $p = 0.0003$ ).

**CONCLUSION** The pilot study demonstrated that a longer filter lifespan can be achieved with the use of citrate regional anticoagulation. It enables the continuity of therapy without disruption from frequent filter changes due to filter clotting, and hence, reduces the cost incurred by patients with each filter change.

CATEGORY: QUALITY IMPROVEMENT (NURSING)

AHF14QN003

## Change of positioning aids in an anterior resection patient who sustained plexus injury post procedure

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**INTRODUCTION** Positioning aids for patients undergoing anterior resection (AR) usually include leg supports, the side support and safety belt. One patient sustained brachial plexus injury during AR in early 2012, and took two weeks to recover. We aimed to improve on the positioning of patients undergoing AR with additional positioning aids.

**METHODS** A vacuum surgical bean bag for the body was used in patients to immobilise them securely and comfortably during AR surgery. First, the patient was placed on a vacuum bean bag positioner and the bag was moulded around the patient. Suction was then used

to apply negative pressure and create a rigid structure that conformed perfectly to the surgery. The shoulders of the patient were protected with gel shoulder supports, while the head and the ears were protected with Orthoban and linen paddings supported by two side supports. The patient was in the Lloyd–Davies position.

**RESULTS** Since the implementation of the enhanced positioning of AR, no complaint regarding brachial plexus injury was noted.

**CONCLUSION** The change in the positioning aids for the Lloyd–Davies position in AR improved the delivery of safe and good patient care. No report of brachial plexus injury was noted after this change.

## CATEGORY: QUALITY IMPROVEMENT (PHYSICIAN)

AHF14QP001

## Scope of the anaesthesiologists: evaluation of airway management practice and choice of laryngoscope. A prospective single-centre study

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**INTRODUCTION** Airway management is of utmost importance in the operating theatre, as failure to oxygenate could lead to death or permanent hypoxic brain damage. The use of videolaryngoscopes in this regard has gained popularity over the past years. We aimed to review the airway management practice in the anaesthesia department of KTPH by focusing on the anticipation of difficult intubation, choice of laryngoscope and complications from airway management.

**METHODS** The airway management information of patients administered general anaesthesia was reviewed prospectively over a period of seven months, with approval from NHG-DSRB. Using pre-described predictors, the anticipated difficult mask ventilation and intubation, true difficult intubation, failed intubation and other complications encountered during airway management were recorded.

**RESULTS** Out of 3,071 patients, intubation and mask ventilation

were anticipated to be difficult in 10.2% and 9.8% patients, respectively. However, the true incidence of difficult intubation was only 2.1% and that of mask ventilation was 5.5%. No emergency surgical airway or failed intubation was reported. The first equipment of choice was the traditional Macintosh laryngoscope (36.6%). In about 60% of patients, videolaryngoscopes such as the CMAC (36%), glidescope (20.1%), McGrath (3.5%) and Bonfils (0.7%) were used. Intubation was mostly successful in two attempts (98.3%). The complications encountered were dental trauma (0.2%), oesophageal intubation (0.2%), aspiration (0.06%), bronchospasm (0.6%) and desaturation (0.7%).

**CONCLUSION** About 60% of our patients were intubated with a videolaryngoscope rather than the traditional Macintosh laryngoscope. Our study showed that cautious assessment with anticipation and careful planning with the use of videolaryngoscopes can lead to high success rates of intubation and low complication rates.

## CATEGORY: QUALITY IMPROVEMENT (PHYSICIAN)

AHF14QP002

## Analgesic technique in colorectal surgery before and after introduction of enhanced recovery protocols: a retrospective audit

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**INTRODUCTION** The importance of optimal analgesia for patients undergoing colorectal surgery has been explored extensively in the Enhanced Recovery Protocols (ERPs). Multimodal opioid-sparing postoperative analgesia, combined with the use of regional techniques, is associated with good outcomes. The ERP was introduced to the anaesthesia department of KTPH in July 2013. We aimed to retrospectively investigate for any change in the analgesic technique for elective colorectal surgery after introducing ERP, and to determine whether patient outcomes such as postoperative pain scores and hospital length of stay (LOS) have improved.

**METHODS** A retrospective audit of patients who underwent elective colorectal surgery in KTPH over a period of four months was performed. Retrospective data were extracted from an existing computerised database, pain management forms and case notes of patients.

**RESULTS** A total of 31 patients underwent elective colorectal surgery over four months. After the introduction of ERP, the number of patients who were administered patient-controlled analgesia opioids as their initial analgesic technique decreased, resulting in a higher number of patients administered either an epidural or TAP block. The percentage of patients with no pain at rest increased, while that of patients with dynamic pain score  $\geq 5$  decreased over four months. The median LOS was 7.3 days before and 6.4 days after the introduction of ERP ( $p > 0.05$ ).

**CONCLUSION** Our audit showed that the introduction of ERP has shown promising trends in analgesic technique and improvement in pain control for patients undergoing colorectal surgery. Some of the limitations of this study were its small sample size and retrospective nature.



## CATEGORY: QUALITY IMPROVEMENT (PHYSICIAN)

AHF14QP003

## An institutional audit assessing the utility of fine needle aspiration cytology of thyroid nodules

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**INTRODUCTION** In order to streamline a care pathway for differentiated thyroid cancer across disciplines, we audited the fine needle aspiration cytology (FNAC) results of thyroid nodules to evaluate the utility of the procedure and assess its adherence to guidelines.

**METHODS** This is a retrospective analysis of all thyroid FNACs performed between September 2011 and December 2012 in our centre. The FNAC grade was deduced from the free text report if not explicitly mentioned. The outcomes were evaluated, and compared where the subsequent surgical pathology report was available. Relevant information was collected from the institutional electronic system.

**RESULTS** A total of 250 FNACs were performed on 235 patients (82% female, 94% cases with FNA of a single nodule). Of these, 54% had formal FNAC grading on their report (THY or Bethesda). On comparing the initial FNAC Bethesda scores with the surgical histology, 10 out of 11 patients who initially scored Bethesda V/VI had final diagnoses of

malignancy, while one patient was lost to follow-up. Out of 13 patients with Bethesda IV, 9 underwent surgical resection, with 3 final diagnoses of follicular carcinoma and 6 benign diseases. Out of 32 patients with non-diagnostic FNAC results, 21 had either repeat FNAC (n = 10) or ultrasound (n = 11), or were surgically treated (n = 2), leaving 9 patients with suboptimal follow-up.

**CONCLUSION** Our distribution of FNAC grades was comparable to a neighbouring unit's audit, with positive correlation between FNAC grade and predictive value for thyroid cancer. The Pathology Department has since adopted the Bethesda classification to achieve consistent reporting. Non-diagnostic results would require collaborative effort across disciplines to achieve standards according to the best practice. The implementation of a structured care pathway for thyroid nodules would be one important step in this direction.

## CATEGORY: BASIC SCIENCE RESEARCH

AHF14BS001

## Genome-wide association study using ethnic-specific, exome-centric, non-synonymous, rare-variant microarray for diabetic nephropathy secondary to type 2 diabetes mellitus

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**INTRODUCTION** Diabetic nephropathy (DN) is a leading cause of end-stage renal disease (ESRD) in Singapore. A strong body of epidemiological evidence implicates genetic susceptibility as a major factor for the development of DN. However, despite several reports of genome-wide association studies (focused primarily on common variants), the exact genetic determinants of DN remain largely unclear. Evolving genetic theory suggests that coding non-synonymous rare variants (minor allele frequency [MAF]  $\leq 0.01$ ), together with the common variants, collectively form the global genetic landscape of DN. Therefore, this study aimed to investigate the role of rare variants in DN.

**METHODS** This was a case-control study. Cases were defined as Chinese subjects with > 10 years of type 2 diabetes mellitus with spot urinary albumin/creatinine ratio  $\geq 1,000$  mg/g and/or abnormal serum creatinine. As part of the Asian Exome Consortium, frequency and age-matched healthy Chinese adults without any known chronic

illness constituted a shared pool of 13,801 controls. Genotyping was performed using the Illumina Exome SNP BeadArray (~250,000 probes) enriched with additional ~30,000 Asian-specific non-synonymous coding single nucleotide polymorphisms.

**RESULTS** After extensive quality control measures and Q-Q plot (to evaluate potential population stratification), the dataset was subjected to GEMMA and SKAT-O algorithms for single-allele and gene-based allele analyses, respectively. Both analyses yielded the SNP exm936697 in the gene encoding for *PPFIA1* (protein tyrosine phosphatase, receptor type, f polypeptide [PTPRF], interacting protein [liprin], alpha 1) as significantly associated with DN ( $P \sim 5 \times 10^{-8}$ ).

**CONCLUSION** *PPFIA1* (involved in cell-matrix interactions) may be a novel candidate gene for diabetic glomerulopathy, which is characterised by basement membrane sclerosis. Our preliminary observation would require further validation in an independent cohort.

## CATEGORY: BASIC SCIENCE RESEARCH

AHF14BS002

## Fenofibrate treatment is associated with increased expression of pigment epithelium-derived factor in patients with type 2 diabetes mellitus and HepG2 cells

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**INTRODUCTION** Diabetic dyslipidaemia is characterised by elevated triglyceride and reduced high-density lipoprotein cholesterol (HDL-C) levels, which is denoted as the atherogenic phenotype and is typically amenable to fibrate therapy. Pigment epithelium-derived factor (PEDF), a marker for insulin resistance, has been suggested to have a protective role in atherosclerosis. We have previously shown that in humans, circulating PEDF is negatively associated with HDL-C. We hypothesised that fibrates may modify PEDF and ApoA-I expression, and explored this association in humans and cell culture models.

**METHODS** In this cross-sectional study, a total of 600 patients with type 2 diabetes mellitus were recruited from the diabetes centre of our institution. Fenofibrate was used in 11.3% of the patients. Fasting plasma was collected, and PEDF (ELISA [Biovendor]) was compared between those with/without fenofibrate. Cultured hepatoma cell line (HepG2) was treated with various concentrations of fenofibrate (10–100 µM) for 18 hr. The cells were then collected and used to

determine PEDF and ApoA-I expression using real-time polymerase chain reaction and Western blotting.

**RESULTS** The mean age of our cohort was 58 ± 11 years (48% male). Patients receiving fenofibrate had significantly higher PEDF (18.06 µg/ml vs. 15.72 µg/ml;  $p = 0.001$ ), even after adjusting for baseline HDL-C, triglyceride and body mass index. In HepG2, fenofibrate increased PEDF gene expression by 1.8–2.6 fold, in a dose-dependent manner ( $p = 0.017$ ). Similar result was observed in PEDF protein expression, and ApoA-I protein expression was significantly up-regulated by 1.4–1.8 fold ( $p = 0.042$ ).

**CONCLUSION** Fenofibrate increases the expression of PEDF and ApoA-I, with a causal relationship as suggested by our *in vitro* study. Further *in vitro* experiments are required to confirm and understand the mechanistic associations, and possibly provide a scientific basis to explore the use of fenofibrate in diabetic dyslipidaemia and in microvascular complications such as retinopathy.

## CATEGORY: BASIC SCIENCE RESEARCH

AHF14BS003

## Evaluation of an improved electrochemiluminescence immunoassay for free thyroxine on cobas E170 analyser

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**INTRODUCTION** Thyroxine (T4) is the main thyroid hormone secreted into the bloodstream by the thyroid gland. Free T4 (fT4) is the biologically active form of the hormone, and the measurement of fT4 is a routine diagnostic test used to assess thyroid status. The Elecsys® fT4 II (Roche Diagnostics, Switzerland) assay kit was introduced to mitigate the interference of anti-ruthenium (anti-RU) antibodies on the measurement of fT4 observed using the previous generation of the assay kit. We evaluated the new-generation assay kit to ensure that its performance is comparable to that of the assay kit currently in use.

**METHODS** Plasma samples ( $n = 36$ ) that were previously analysed with the first-generation Elecsys® fT4 assay kit on the Roche cobas E170 module (Roche Diagnostics, Switzerland) were re-analysed using the Elecsys® fT4 II assay kit for correlation. Pooled plasma samples were used for studies regarding imprecision, linearity and limits of blank, detection and quantitation.

**RESULTS** The correlation study showed a linear relationship between the current and new assay kits, and the linear regression was:  $y = 1.06x - 1.00$ . The within-run and between-run imprecision ranged from 1.8% to 3.9% (15.76 pmol/L and 87.92 pmol/L, respectively). The established limits of blank, detection and quantitation were 2.29 pmol/L, 2.46 pmol/L and 2.80 pmol/L (at CV = 20%), respectively.

**CONCLUSION** Our study showed that the performance of Elecsys® fT4 II assay correlates well with the first-generation assay, and that the laboratory-established analytical performance of the assay is comparable with the manufacturer's claims. The upgraded Elecsys® fT4 II assay kit retained the analytical performance characteristics of the first-generation assay kit. Thus, the current population reference ranges can still be applied to this assay kit.

## CATEGORY: CLINICAL RESEARCH (ALLIED HEALTH)

AHF14CA001

## Association of central obesity with renal function in early-onset type 2 diabetes mellitus

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**INTRODUCTION** The age of onset for type 2 diabetes mellitus (T2DM) is decreasing, driven by the rising prevalence of obesity worldwide. Compared to later-onset T2DM, early-onset T2DM (diagnosed at age  $\leq 40$  years) presents an aggressive and higher-risk phenotype that may lead to the premature development of complications, including chronic kidney disease (CKD). The increased susceptibility of young diabetics to complications is not well understood. Given that central obesity is associated with CKD, we hypothesised that central obesity is a determinant of estimated glomerular filtration rate (eGFR), the proxy for kidney function in early-onset T2DM.

**METHODS** This cross-sectional study included 2,051 participants (age  $57 \pm 11$  years; 50.9% male) categorised into early-onset (mean age of onset  $33 \pm 6$  years;  $n = 665$ ) and late-onset (mean age of onset  $52 \pm 8$  years;  $n = 1,386$ ) T2DM. The anthropometric and eGFR measurements were recorded.

**RESULTS** In the total cohort, the measures of central obesity, including the visceral fat area (VFA;  $r = -0.062$ ,  $p = 0.009$ ) and the waist-to-hip ratio (WHR;  $r = -0.087$ ,  $p = 0.001$ ), were significantly correlated with eGFR. Conversely, the body mass index, which reflects global obesity, was not associated with eGFR. Multivariate linear regression analyses revealed that VFA ( $\beta = -0.061$ ,  $p = 0.041$ ) and WHR ( $\beta = -4.438$ ,  $p = 0.030$ ) independently predicted eGFR in subjects with early-onset T2DM rather than late-onset T2DM after adjusting for age, gender, ethnicity, insulin therapy, blood pressure, HbA1c, triglyceride and albumin-to-creatinine ratio.

**CONCLUSION** Central obesity, rather than global obesity, is an effective predictor of renal function in individuals who develop T2DM earlier in life, but not in those diagnosed at a later age, thus suggesting that interventions targeting visceral adiposity may help to prevent renal complications.

## CATEGORY: CLINICAL RESEARCH (ALLIED HEALTH)

AHF14CA002

## Long-term follow-up of cardiovascular outcome in multiethnic Asians with type 2 diabetes mellitus

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**INTRODUCTION** Type 2 diabetes mellitus (T2DM) is an evolving global epidemic, especially among Asians. Cardiovascular disease (CVD) is the leading cause of morbidity and mortality in T2DM. However, limited data are available on long-term CVD outcome among multiethnic Asians with T2DM.

**METHODS** A total of 2,508 patients with T2DM were enrolled between 2002 and 2011 from a secondary hospital. Data linkage was established with the National Registry of Disease Office. CVD was defined as the composite outcome of acute myocardial infarction (AMI), stroke or mortality attributable to AMI. Cox proportional hazards regression was employed to study the clinical and biochemical variables associated with CVD.

**RESULTS** The median follow-up period was 3.8 (IQR 2.8–5.7) years, median duration of diabetes mellitus was  $12.0 \pm 8.6$  years and the median study-entry age was  $58.0 \pm 11.8$  years. About 57.8% of the patients were male, 69% were Chinese, 18% were Malay and 13% were Indian. The incidence of CVD events was

19.5/1,000 person-years. The age- and gender-adjusted hazard ratio (HR) was 1.95 (95% CI 1.35–2.81,  $p < 0.0001$ ) for Malays and 1.66 (95% CI 1.10–2.51,  $p = 0.016$ ) for Indians, both of which were higher than that of their Chinese counterparts. Further analysis revealed that age, duration of diabetes mellitus, HbA1c, systolic blood pressure and low-density lipoprotein cholesterol were also independently associated with CVD events. Notably, the CVD risk conferred by Malays was attenuated after additional adjustment for renal function. However, the risk among Indians remained statistically significant in the fully adjusted model (HR 1.81, 95% CI 1.08–3.04,  $p = 0.025$ ).

**CONCLUSION** Malay and Indian patients with T2DM have higher CVD risk compared to Chinese patients. The higher CVD risk in Malays may be largely attributable to the renal burden. However, the increased CVD in Indians can only be partially explained by conventional vascular risk factors.

## CATEGORY: CLINICAL RESEARCH (NURSING)

AHF14CN001

## Evaluation of the accuracy of point-of-care glucometer in stable haemodialysis patients using different blood samples

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**INTRODUCTION** Accurate glucose reading is essential in diabetic patients on haemodialysis. Samples for glucose monitoring in haemodialysis population are often obtained from haemodialysis bloodline (BL) or capillary prick (CP). However, the use of BL sample in point-of-care glucometer (POCG) has not been validated. This study aimed to determine the reliability of CP and BL glucose measurement using POCG compared to the standard laboratory measurement.

**METHODS** This was a prospective observational study of consecutive inpatient haemodialysis sessions for stable diabetic end-stage renal disease patients. Patients dialysed using temporary dialysis catheter, those requiring intensive care and those unable to provide informed consent were excluded. The haematocrit, mean

arterial pressure, ejection fraction, serum albumin and finger oedema were recorded. Paired samples of blood obtained from CP and BL were concurrently tested on POCG. Concurrent haemodialysis bloodline sample was sent to the laboratory as control.

**RESULTS** A total of 53 patients with 149 dialysis sessions were included in the study. Bland-Altman plot showed that POCG CP and POCG BL had good agreement with laboratory glucose. POCG BL and POCG CP generated 93% and 86% of the results, respectively, within the ISO 15197 margin.

**CONCLUSION** POCG glucose measurement using haemodialysis BL samples showed better precision and less bias compared to CP samples in stable haemodialysis patients.

## CATEGORY: CLINICAL RESEARCH (NURSING)

AHF14CN002

## Prediction and precision of blood glucose levels in diabetic patients

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**INTRODUCTION** Self-blood glucose monitoring (SMBG) is an important tool in helping diabetic patients in their day-to-day management in optimising diabetes care. However, not all diabetic patients are convinced of the need for SMBG due to the barriers of pain, cost and inconvenience. Many diabetic patients often predict their glucose readings as good enough. This study aimed to explore the difference between the predicted and actual blood glucose (BG) readings in diabetic patients.

**METHODS** Our World Diabetes Day celebration (on 13 November 2013) included an activity called 'Guess your blood glucose'. Participants were asked to guess their BG readings before a point-of-care glucose reading was performed. Information on treatment methods such as diet control, anti-hyperglycaemic agents and insulin

were collected. Data were analysed using SPSS version 21 to analyse the difference between the predicted and actual BG readings.

**RESULTS** Of the 120 participants, 55% had diabetes mellitus, of which 67.1% were doing SMBG. Of these, 71% had underestimated their BG levels by a range of 0.1–9.5 mmol/L. The over-estimation range for patients who overestimated their levels was 0.1–4.4 mmol/L. About 2.9% had overestimated their BG levels, when they were actually in the hypoglycaemic range. About 14.9% patients were on diet control, 56.7% were on oral anti-hyperglycaemic agents, 19.4% were on insulin and 9.0%, on both oral anti-hyperglycaemic agents and insulin.

**CONCLUSION** SMBG cannot be replaced by self-prediction of BG levels, as patients tend to underestimate their BG levels. Greater efforts are required to convince more diabetic patients to perform SMBG.

## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP001

## Serum melatonin levels after a single preoperative melatonin dose: associations with perioperative anxiety and pain

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**INTRODUCTION** Melatonin (3–15 mg) has been shown in several studies to be efficacious for perioperative analgesia and anxiolysis, yet most studies did not correlate assayed serum melatonin levels with clinical effects. In comparison to a placebo, we aimed to determine whether oral melatonin resulted in quantitative serum melatonin changes in a patient subset from a prospective blinded randomised placebo-controlled trial (n = 76) for wisdom teeth extraction.

**METHODS** A total of 18 healthy patients were randomised into placebo (n = 9) and intervention (n = 9) groups. Both groups were administered identical-looking 6-mg tablets of placebo and oral melatonin 90 min before surgery. ELISA was performed on 3-mL collected blood samples in order to quantify serum melatonin levels and bioavailability.

Preoperative anxiety and postoperative pain outcomes were determined at nine time intervals.

**RESULTS** Serum melatonin levels were similar in the intervention and placebo groups ( $8.89 \pm 0.28$  pg/mL vs.  $9.30 \pm 0.55$  pg/mL;  $p = 0.100$ ) 90 min post administration. At various time intervals, repeated measure analysis of variance for both groups showed no difference for anxiety ( $p = 0.069$ ) and pain outcomes ( $p = 0.193$ ).

**CONCLUSION** No significant changes in serum melatonin levels were noted 90 min after preoperative oral administration. In this study population, melatonin premedication did not alleviate anxiety and pain despite evidence from systematic reviews regarding the efficacy of melatonin in other surgical populations.

## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP002

## Risk of malignancy in thyroid fine needle aspiration at Khoo Teck Puat Hospital

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**INTRODUCTION** Fine needle aspiration (FNA) of the thyroid gland offers a rapid, safe and cost-effective approach for triaging patients with thyroid nodule. In the past, there was no standard system for reporting thyroid cytopathology. The recently introduced 'The Bethesda system for reporting thyroid cytopathology' (TBSRTC) facilitates report standardisation, reproducibility and improved clinical significance with greater positive predictive value for malignancy.

**METHODS** TBSRTC consists of six diagnostic categories, namely non-diagnostic (Bethesda I), benign (Bethesda II), follicular lesion of undetermined significance (Bethesda III), suspicious for follicular neoplasm (Bethesda IV), suspicious for malignancy (Bethesda V) and malignant (Bethesda VI). A total of 305 FNA cases observed in a 15-month period were categorised according to TBSRTC with an aim

to identify thyroid malignancy in our cohort and compare the results with published landmark studies.

**RESULTS** Of the 305 FNAs, 20.3% were Bethesda I, 60.7% were Bethesda II, 8.9% were Bethesda III, 4.6% were Bethesda IV, 1% were Bethesda V and 3.8% were Bethesda VI. A total of 61 cases had surgical resection available for cytologic-histologic correlation. The malignancy rates for Bethesda Category I–VI were 20%, 4.12%, 37.5%, 27%, 100% and 100%, respectively.

**CONCLUSION** TBSRTC categorises thyroid FNA with increasing risk of malignancy. Our data on case distribution per TBSRTC correlated well with published studies. However, our malignancy rate by TBSRTC differed slightly from that in published studies, with high malignancy rates identified in Bethesda I and III categories.



## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA004

## Safety and outcomes of nephrological tunnelled dialysis catheter placement at KTPH: results from a prospective study

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**INTRODUCTION** Although tunnelled dialysis catheters (TDCs) are not preferred, they are a necessary evil in order to provide rapid dialysis vascular access (VA). In KTPH, the majority of TDC insertions are performed by nephrologists.

**METHODS** In this interim analysis, all TDC insertions performed by nephrologists from November 2013 to May 2014 were included. Kaplan-Meier survival analysis was used to calculate TDC survival.

**RESULTS** A total of 105 TDC placements were performed by nephrologists during the study period. The mean age of the patients (56% male) was 60 years. The indications for TDC placement were dialysis initiation (62%), existing TDC dysfunction (17%), proven or suspected TDC infection (11%) and VA failure (10%). Of all the procedures, 63% were primary TDC placements. The internal jugular vein (94%) was the most common site of placement, with only 9% of patients

having left-sided TDCs. Significant bleeding (requiring transfusion) was observed in 6% of cases within 48 hours. In 5% of cases, bleeding occurred after 48 hours. Only one patient showed TDC dysfunction (poor or no flow) within 48 hours. TDC dysfunction after 48 hours occurred in 11% of patients (n = 12) and required urokinase locks and/or TDC exchange (n = 13) with or without fibrin sheath disruption (n = 4). TDC infection occurred in 8% of patients (< 3 months). *Staphylococcus aureus* (methicillin-sensitive) was the most common pathogen (38%). There was no other procedural mortality or complication requiring intervention.

**CONCLUSION** Procedure-related complications are low and immediate outcomes are satisfactory in keeping with the reported literature. However, a well-known limitation of TDC usage is that catheter outcomes remain less desirable in the longer term.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA005

## Improvement in specimen management and reduction in turnaround time through deployment of real-time dashboard system in a hospital clinical laboratory

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**INTRODUCTION** A rapid turnaround time (TAT) for laboratory results is essential for prompt diagnosis and management. We implemented a real-time dashboard system that monitored specimens received by the Laboratory Medicine Department in order to reduce the number of specimens with delayed turnaround times.

**METHODS** The dashboards were deployed in the Clinical Chemistry, Haematology and Urinalysis sections. The details of pending test requests were displayed on the dashboards for each section after the specimens were received and their details entered into the laboratory information system (LIS). The pending test requests were sorted by order of priority and locations; the urgent requests from A&E and Intensive Care Units appeared at the top of the list, followed by urgent requests from outpatient and inpatient locations and finally, the non-urgent requests. Visual cues were used

to highlight pending requests that had exceeded 70% of target TAT for pre-emptive action, requests that had exceeded target TAT for immediate action, and requests with analysis completed but waiting for manual validation. The daily TAT statistics were reviewed and followed up with actions for systematic errors by the next working day.

**RESULTS** Urgent requests completed within our target TAT of one hour increased from 97.2% in the preceding year to 98.5% a year after implementation of our system despite a 26% increase in workload. Routine requests completed within a one-hour TAT increased from 93.8% to 97.1% despite a 7% increase in workload.

**CONCLUSION** Real-time dashboards have helped laboratory technologists manage routine laboratory operations efficiently, resulting in more requests completed within the target TAT.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA006

## Significance of dedicated inpatient anticoagulation consult service in managing patients requiring anticoagulation

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**INTRODUCTION** This study examined the significance of an inpatient anticoagulation consult (IPAC) service in promoting the safe and efficacious use of warfarin in KTPH.

**METHODS** We retrospectively reviewed hospitalised anticoagulated patients from June to October 2013. Patient demographics, admission-related information, date of IPAC referral and factors affecting warfarin control were recorded. The three arms, namely standard care, IPAC-referred and standard-care-transferred-to-IPAC (Standard-IPAC) patients were compared for the likelihood of achieving international normalised ratio (INR) reading within the therapeutic range on discharge and the first follow-up appointment, and the incidence of INR > 4.0 and bleeding complications.

**RESULTS** Of the 300 cases reviewed, 211 (70.3%), 62 (20.7%) and 27 (9%) were standard care, IPAC and standard-IPAC patients, respectively. IPAC and standard-IPAC arm had more patients who

were newly started on warfarin for high-risk indications compared to standard care (61.3% and 40.7% vs. 13.3%;  $p < 0.001$ ). Standard-IPAC patients had more interacting drugs ( $p < 0.001$ ) and diseases ( $p = 0.008$ ). IPAC-referred (IPAC and standard-IPAC) patients were more likely to achieve therapeutic INR on discharge (OR 1.770, 95% CI 1.020–3.072) and on the first follow-up appointment (OR 1.440, 95% CI 0.804–2.578). Standard care patients had significantly higher incidence of INR > 4.0 (OR 3.721, 95% CI 1.391–9.957). Infection and fluid overload accounted for INR > 4.0 for 45.5% ( $p < 0.001$ ) and 21.2% ( $p < 0.93$ ), respectively.

**CONCLUSION** The KTPH IPAC service received more referrals for newly initiated patients and drug/disease interaction-type patients. All patients managed by IPAC had a significantly lower incidence of INR > 4.0. We recommend that IPAC should manage patients with intercurrent infection or fluid overload for tighter INR control.

## CATEGORY: QUALITY IMPROVEMENT (NURSING)

AHF14QN004

## Cataract Complication Proactive Response protocol in the day surgery centre

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**INTRODUCTION** Cataract surgery is the most common eye surgery in the operating theatre. Intraoperative complications such as posterior capsule rupture, albeit uncommon, may result in compromised visual outcome if not well managed. Hence, we report a quality improvement initiative, the Cataract Complication Proactive Response (CPR) protocol, to optimise the management of cataract complications.

**METHODS** The Cataract CPR protocol was devised after a focused group discussion involving the scrub nurses, nursing manager and the eye surgeon. It consisted of a care path that involved changing the machine settings for phacoemulsification and vitrectomy, modifying the surgical technique using a cataract complication rescue set, a supervisor reporting cascade and mandatory reporting of the complications for auditing. A poster of the protocol is put up in all eye theatres

to serve as a constant visual reminder and reference source. The rescue sets are regularly maintained, each with a photo display of all surgical instruments.

**RESULTS** The protocol was taught to all existing and new staff during orientation. An 'on paper' rehearsal of the protocol was performed as a form of refresher education. A knowledge-based assessment test after staff education showed an improvement in knowledge scores and knowledge retention at three months. A score of 70% or more was required for passing.

**CONCLUSION** The Cataract CPR protocol is an important care path in the management of intraoperative complications during cataract surgery where speed and precision in acquiring instrumentation is of significant importance. Acquisition and retention of knowledge on the protocol can be achieved with staff education.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QN005

## Development and evaluation of the nurse-led telephone follow-up programme in post-acute coronary syndrome patients

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**INTRODUCTION** Acute Coronary Syndrome (ACS) is one of the foremost causes of morbidity and mortality worldwide. Nurses play an important role in the preventive measures of ACS by empowering patients to cope with the disease post discharge. The nurse-led telephone follow-up (NLTF) intervention provided an inexpensive and convenient way of extending support to patients.

**METHODS** A 'post-test-only' research design was adopted. Probability sampling with simple randomisation was used to recruit participants from inpatient wards in the cardiology department. A total of 55 participants were recruited based on the inclusion criteria. The interventional group received the NLTF programme in addition to the usual follow-up care, while the control group received only the usual follow-up care. The interventional group received a weekly call from the nurses for four consecutive weeks after discharge. Each call reinforced patients' positive health behaviour

changes and compliance to medication. The effectiveness of the programme was evaluated based on health behaviour changes (physical activities, healthy diet and smoking cessation), medication adherence and patient satisfaction.

**RESULTS** Based on the findings, there were no significant differences between the groups in terms of health behaviour changes. However, medication compliance was significantly ( $p = 0.003$ ) better in the NLTF group compared to the control group. Overall, there were no differences in the levels of satisfaction between the groups.

**CONCLUSION** The NLTF programme proved to be effective in improving patient adherence to medication. However, further studies should be carried out to explore a longer period of intervention to evaluate health behaviour changes and the effectiveness of the programme.

## CATEGORY: QUALITY IMPROVEMENT (PHYSICIAN)

AHF14QP004

## Creating more operating rooms: impact of start times

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**INTRODUCTION** The operating theatre (OT) is a valuable resource due to its high cost of building and running, as well as high demand for both elective and emergency cases. It is important that this resource be maximised for the benefit of patients and the institution. Collaboration was established between KTPH and Accenture to look at optimising OT resources using known operations research methodology.

**METHODS** Data from 3,565 surgeries performed in eight major operating rooms (ORs) was analysed to evaluate the impact of start times on overall utilisation. Structured interviews were also carried out to establish the possible causes. This was done over a four-week period in August 2013.

**RESULTS** While the ORs started functioning from 0830 hr, 96% of

the cases were scheduled after 0840 hr. Only 20% of the surgeries started within 10 min of their scheduled time. As per our analysis, if all surgeries started within 10 min of their scheduled time, an extra four-hour operating session could be obtained per week. Thus, if all surgeries start at 0830 hr, there is a potential saving equivalent of one extra four-hour operating session every day. Most of the delayed starts were due to staff scheduling issues.

**CONCLUSION** Using established business analytic tools, we revealed significant opportunities for OR optimisation. Ensuring that the schedules of the clinical staff and OT are aligned and that all surgeries start on time is equivalent to building half the ORs at no additional cost to the organisation.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QP005

## Automated visual acuity testing in Asian eyes: a pilot study

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**INTRODUCTION** This study aimed to evaluate the feasibility and accuracy of an automated self-administered visual acuity programme (SAVAP) compared to the Snellen chart (SC).

**METHODS** A total of 30 consecutive patients (i.e. 60 eyes) aged  $\leq 40$  years had their mean logMAR visual acuity (VA) tested with SC followed by SAVAP with (VAph+) and without pinhole (VAph-). The latter was monitored for the need for assistance and repeat testing.

**RESULTS** The right VAph- (RVAPh-) was  $0.70 \pm 0.34$  (SAVAP) and  $0.78 \pm 0.28$  (SC). The right VAph+ (RVAPh+) was  $0.81 \pm 0.28$  (SAVAP) and  $0.81 \pm 0.25$  (SC). The left VAph- (LVAPh-) was  $0.71 \pm 0.29$  (SAVAP)

and  $0.72 \pm 0.29$  (SC). The left VAph+ (LVAPh+) were  $0.84 \pm 0.21$  (SAVAP) and  $0.85 \pm 0.19$  (SC). Using student's *t* test, these scores did not significantly differ with both testing methods (RVAPh-  $p = 0.10$ ; RVAPh+  $p = 0.91$ ; LVAPh-  $0.69$ ; LVAPh+  $0.70$ ). The correlation co-efficient for both eyes was high (RVAPh-,  $r = 0.73$ ,  $p = 0.00$ ; RVAPh+,  $r = 0.76$ ,  $p = 0.00$ ; LVAPh-,  $r = 0.84$ ,  $p = 0.00$ , LVAPh+,  $r = 0.55$ ,  $p = 0.00$ ). All patients completed SAVAP with minimal or no help.

**CONCLUSION** SAVAP seems to be a feasible and reliable way of testing VA compared to SC. Further larger-scale studies may be useful to validate the findings.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QP006

## Audit of preoperative fasting practice at Khoo Teck Puat Hospital

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**INTRODUCTION** Preoperative fasting is mandatory before general anaesthesia (GA). The few exceptions are life-threatening emergencies where immediate intubation and surgery may be required. Prevention of gastric regurgitation and aspiration is the aim.

**METHODS** The anaesthesia audit and research committee directed this survey of preoperative fasting as a quality improvement initiative. A prospective audit was conducted in all operating theatres (OTs) to explore patients' views and seek information regarding their fasting experience. The audit spanned over 33 days (from 9 February to 13 March, 2014). The patients were interviewed through a survey form by an OT anaesthetist.

**RESULTS** A total of 1,235 patients received anaesthesia during the audit period. Of these, 253 patients were randomly captured for the survey. The results showed an average fasting time of 13.36 hr (solid food) and 10.37 hr (liquids). A total of eight previously cancelled

patients had a fasting time of 11.6 hr prior to cancellation. About 48% of patients were aware of the reason behind fasting before anaesthesia. Overall, 222 (92.5%) patients were satisfied, 8 (3.3%) were very satisfied, 7 (2.9%) were not satisfied, 3 (0.1%) were unhappy and none expressed distress (0%).

**CONCLUSION** The consensus on 'fasting' allows a minimum of 6 hr fast for solid food and 2 hr for clear transparent drinks. For safety reasons, we recommend a maximum of 8 hr fasting from solid food consumption. On occasions, either short or very long fasting has been reported. Our preliminary data analysis confirmed that in both elective and emergency cases, patients well exceeded the recommended fasting times. Unnecessary prolonged fasting may make patients thirsty, distressed, dehydrated and hypoglycaemic. This may cause serious electrolyte imbalance and affect patient outcomes.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QP007

## A pilot study of nursing home residents' transfers to acute care hospital: a Singapore perspective

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**INTRODUCTION** Nursing home residents are generally frail and have multiple chronic illnesses, resulting in frequent utilisation of hospital services. Although hospitalisations are often necessary, many of them are preventable. This study identified the profile of nursing home residents who were transferred to acute care hospitals and determined which were preventable hospital transfers.

**METHODS** This was a retrospective study of residents transferred to an acute care hospital from four nursing homes in Singapore. We examined the residents' case records from January to December 2013. A modified Quality Improvement Tool from Ouslander et al's INTERACT II programme was used.

**RESULTS** A total of 319 hospital transfers were studied. The average hospitalisation rate was 14.5 per 10,000 resident days. Of all the residents transferred, 55% were female. The age range

of the residents was 75–84 years, and the majority were Chinese. Approximately 61% of the hospitalised residents required maximum assistance in their basic activities of daily living, while 84% did not have any advanced care planning done. The reasons ascribed for the 'preventable' hospitalisations (9%) were lack of advanced care planning, changes in medical conditions not communicated earlier, and non-utilisation of available nursing home resources. About 56% of the preventable hospitalisations occurred after office hours.

**CONCLUSION** This study identified the profile of nursing home residents transferred to the acute care hospitals and the factors that may prevent unnecessary transfers. The latter set the stage for implementing measures to reduce unnecessary hospitalisations among the nursing home population.

## CATEGORY: BASIC SCIENCE RESEARCH

AHF14BS004

## Genotype-guided warfarin dosing in local patients initiating oral anticoagulation (WARFGEN)

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**INTRODUCTION** Genetic polymorphisms have been shown to affect inter-individual response to warfarin. Despite evidence that genotype-guided warfarin dosing improves anticoagulation-related clinical outcomes, it has yet to be widely implemented. Here, we describe the set-up and evaluation of a genotype-guided warfarin dosing service in our hospital.

**METHODS** We enabled genotyping capabilities via a validation phase of comparing three rapid genotyping kits. The genotyping service was successfully integrated into the current hospital workflow, and the majority of the genotype results were obtained within a clinically relevant turnaround time. A clinical outcomes study was performed to track the clinical outcomes of time to stable dose and therapeutic international normalised ratio (INR), and the incidence of adverse events.

**RESULTS** A total of 50 patients who were newly started on warfarin

and who received genotype-guided dosing were compared with a retrospective cohort of 50 patients who were not genotyped. The genotype-guided approach significantly reduced the time required to achieve stable dose, with a median time of 10 days compared to 18 days in the standard care group ( $p = 0.02$ ). This also resulted in fewer outpatient appointments and reduced costs required to reach a stable dose. The time to achieve therapeutic INR did not significantly differ between the groups. There were comparable incidences of INR  $> 5$  in each group, with no bleeding or thromboembolic events noted.

**CONCLUSION** A genotype-guided approach to warfarin dosing appeared to aid patients in achieving stable dosing more quickly, and reduced the number of outpatient appointments required to reach a stable dose, although cost savings were not significant. We intend to report the time-in-therapeutic range after all the patients have completed three months of warfarin therapy.



## CATEGORY: BASIC SCIENCE RESEARCH

AHF14BS005

## Transitioning from a manual nucleic acid extraction method to a fully automated hands-off process in the analysis of Hepatitis B viral loads

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**INTRODUCTION** In our laboratory, hepatitis B virus (HBV) nucleic acid isolation prior to polymerase chain reaction is performed using the Roche High Pure System Viral Nucleic Acid Kit. This multi-step manual specimen preparation process, which requires dedicated skilled personnel, is both time- and labour intensive. In this evaluation, we automated the nucleic acid isolation process by using the QIAGEN QIAasymphony SP instrument with the Virus/Bacteria Mini Kit.

**METHODS** A total of 72 cell-free serum and plasma samples were extracted by both manual and automated extraction methods, and the HBV viral loads were determined on the Roche Cobas® TaqMan® 48 Analyser. Precision study was conducted using quality control materials at HBV viral loads of Log<sub>10</sub>2.20 and Log<sub>10</sub>6.14 IU/mL.

**RESULTS** The automated extraction method yielded a diagnostic

sensitivity and specificity of 92% and 83%, respectively, compared to the manual extraction method. A correlation of  $0.9921 \times -0.0049$  ( $R = 0.9904$ ) was obtained. A difference of  $(-)\text{Log}_{10}0.61$  to  $\text{Log}_{10}0.51$  IU/mL was observed between the two methods. Precision study yielded a coefficient of variation of 3.61% (HBV; Log<sub>10</sub>2.20 IU/mL) and 3.20% (HBV; Log<sub>10</sub>6.14 IU/mL).

**CONCLUSION** Our data suggested that the automated sample extraction on QIAasymphony SP correlates well with the manual extraction method. Imprecision of the two extraction methods was comparable. A shorter processing time, coupled with minimal operator intervention, reduces the risk of contamination and allows for traceability and fidelity of results. The ability for operator walk-away and lower reagent cost increases productivity and manpower savings, and ultimately, savings to the healthcare system.

## CATEGORY: BASIC SCIENCE RESEARCH

AHF14BS006

## Priming pressure and over-priming of the Ahmed glaucoma valve device

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**INTRODUCTION** This study aimed to determine the pressure required to prime an Ahmed Glaucoma Valve (AGV) and whether the valve can be damaged by 'over-priming pressure'.

**METHODS** A total of six AGVs, a syringe pump and a manometer were used to assess the priming pressure. A 20-ml syringe pump was filled with balanced salt solution (BSS) and attached to an AGV and manometer via a three-way stopcock. BSS was pumped through the AGV tube at increasing pressures until a jet of fluid was seen to eject from the AGV, as per the manufacturer's instructions. This was repeated three times for three different virgin AGVs, giving the 'priming pressure'. A second experiment used the same experimental set-up to determine the 'over-priming pressure' on three other AGVs. Fluid was pumped

through the AGV at increasing pressures until evidence of damage was seen.

**RESULTS** The priming pressure in the three AGVs was 2,844 mmHg, 3,154 mmHg and 3,051 mmHg (mean  $3,017 \pm 158$  mmHg). The maximum pressure generated in the three AGVs using the syringe pump was 10,860 mmHg, 10,343 mmHg and 10,860 mmHg (mean  $10,688 \pm 299$  mmHg). No damage was observed in the valve mechanism.

**CONCLUSION** This study demonstrated that the priming pressure is consistent at around 3,000 mmHg. Also, over-priming is not likely to damage or disturb the closing pressure.

## CATEGORY: BASIC SCIENCE RESEARCH

AHF14BS008

## Urinary exosome microRNAs as potential biomarkers of early-stage diabetic nephropathy in patients with type 2 diabetes mellitus

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**INTRODUCTION** Diabetic nephropathy (DN) is characterised by a progressive decline of renal function and associated with an increased risk of morbidity and mortality in type 2 diabetes mellitus (T2DM). Urinary exosome microRNAs have been considered a non-invasive source of specific biomarkers for early detection of kidney diseases. We aimed to profile urinary exosome microRNAs in T2DM patients with and without early DN.

**METHODS** Early DN was defined as microalbuminuria with preserved renal filtration function (estimated glomerular filtration rate  $\geq 60$  ml/min/1.73 m<sup>2</sup>). A total of 13 patients with T2DM (7 normoalbuminuric and 6 microalbuminuric) were recruited in this case-control study. Urinary exosomes were isolated by ExoQuick precipitation reagent. MicroRNAs were purified by column purification and profiled using Affymetrix miRNA array.

**RESULTS** MicroRNA profiling showed that 19 microRNAs are differentially expressed, with more than a two-fold difference in

urinary exosomes from microalbuminuric patients compared to those with normoalbuminuria. Among the 19 microRNAs identified, 16 (miR-1268b, miR-1268a, miR-149-3p, miR-551b-5p, miR-3162-5p, miR-4689, miR-4651, miR-4763-3p, miR-3960, miR-4459, miR-4706, miR-4687-3p, miR-4281, miR-3141, miR-4270 and miR-4459) were downregulated and 3 (miR-99b-5p, miR-103a-3p and miR-4529-3p) were upregulated in the urinary exosomes of T2DM patients with microalbuminuria. Further bioinformatics analysis revealed that these microRNAs were likely to be involved in signalling pathways of stress response and inflammation.

**CONCLUSION** Unique urinary exosome microRNA profiles exist in patients with and without microalbuminuria, suggesting that urinary exosome microRNAs may be explored as novel biomarkers for detection of early renal injury in T2DM. The role of these microRNAs in the pathogenesis of DN warrants further investigation.

## CATEGORY: CLINICAL RESEARCH (ALLIED HEALTH)

AHF14CA003

## How strong is our grip?: Comparison of Singapore community dwellers with consolidated norms

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**INTRODUCTION** Hand grip strength is an indicator for fall risk, quality of life and fitness. Presently, there is no local normative data that could differ from global norms derived from a largely Caucasian population. Therefore, this study aimed to ascertain the normative grip strength value of community-dwelling Singaporeans and compare this value with the available norms.

**METHODS** This was a cross-sectional study of 709 residents (age range 20–85 years; 496 female, 213 male) who attended community health-screening carnivals in northern Singapore over four events in 2013. Grip strength was measured using the JAMAR dynamometer based on a standardised test protocol. The basic demographics and anthropometric measures were also recorded. Percentage difference and 95% confidence intervals were calculated to compare the local value with consolidated norms and Taiwanese Chinese norms.

**RESULTS** The mean grip strength of the overall sample was

29.76  $\pm$  0.7 kg. Our results were lower than the consolidated norms (female 15%, male 17%), but higher than Taiwanese Chinese norms (male 12%, female 17%), a finding that was consistent across age groups. Female grip strength was ~64% that of male grip strength. Grip strength peaked in females aged 25–29 years (29.8  $\pm$  2.1 kg) and in males aged 30–34 years (45.9  $\pm$  4.6 kg). For every year increase in age, grip strength reduced by 0.19 kg in females and 0.32 kg in males.

**CONCLUSION** The mean grip strength of the Singaporeans sampled differed from the available norms, and the rate of decline was sharper in males compared to females. This may have implications when inferring cut-offs and guidelines derived from different populations to the local setting. Establishing local normative values may provide a better appraisal of our local population.

## CATEGORY: CLINICAL RESEARCH (ALLIED HEALTH)

AHF14CA004

## One step nucleic acid detection of breast sentinel lymph node metastasis evaluation at a Khoo Teck Puat Hospital laboratory

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**INTRODUCTION** This is an evaluation of the one step nucleic acid (OSNA) detection of mRNA in breast sentinel lymph node metastasis evaluation, a test recently introduced to Singapore.

**METHODS** The frozen section (FS) of breast sentinel lymph node for histology was divided into two halves; one half for OSNA and the other half for FS testing. Remnant tissue from FS was processed for routine histology and diagnosed with permanent paraffin results.

**RESULTS** A total of eight patient cases (17 nodes) were tested. Of these, 13 nodes were negative for metastasis by both OSNA and FS, one node was positive for metastasis by both OSNA and FS, and the remaining three nodes were negative in FS but positive in OSNA;

this later proved to be positive micro-metastasis in paraffin histology sections. The time required was 30 min for single test/single node and an additional 10 min for each subsequent node.

**CONCLUSION** The number of nodes was less than 20 to be statistically accurate. However, correlation was observed in all the nodes tested, which proved to be more accurate in the detection of micro-metastasis; this could be missed in the FS. The implementation of OSNA would depend on clinician acceptance, with the consideration of cost, technical limitations, and additional manpower/time involvement and balance with the workload/demand for breast sentinel lymph node assessment.

## CATEGORY: CLINICAL RESEARCH (ALLIED HEALTH)

AHF14CA005

## A retrospective review of probable refeeding syndrome in patients on parenteral nutrition using NICE guidelines risk assessment

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**INTRODUCTION** Refeeding syndrome (RFS) manifests as a range of life-threatening clinical and biochemical abnormalities. This study aimed to evaluate whether risk assessment according to National Institute for Health and Care Excellence (NICE) guidelines could predict RFS.

**METHODS** A retrospective review of Khoo Teck Puat Hospital patients who were on parenteral nutrition (PN) from February 2011 to January 2012 was performed. The patients were stratified into two groups in accordance with the NICE guidelines. RFS was defined as having one or more of probable manifestations such as drop in potassium, magnesium or phosphate below normal serum values, the presence of fluid overload or arrhythmia within 72 hours after PN initiation.

**RESULTS** A total of 102 patients (mean age 62.4 years) were eligible

for this study. About 65.1% of patients at risk (n = 63) and 59.0% of patients not at risk (n = 39) experienced probable RFS (p > 0.05). Both groups had similar baseline demographics and risk factors, except body mass index (at risk vs. not at risk: 21.0 kg/m<sup>2</sup> vs. 23.6 kg/m<sup>2</sup> p < 0.05) and subjective global assessment (at risk vs. not at risk, Grade A: 28.6% vs. 66.7%, Grade B: 50.8% vs. 28.2%, Grade C: 20.6% vs. 5.1%; p < 0.05). The calories, potassium, magnesium and phosphate provision on Day 1, and the caloric increment rate were similar in both groups. The sensitivity and specificity of the NICE criteria for defining patient risk were 64.1% and 42.1%, respectively. Kappa correlation was 0.06.

**CONCLUSION** The NICE guidelines may not be a reliable risk assessment tool to predict RFS, and patients not considered at risk of RFS should be managed as closely as those at risk.

## CATEGORY: CLINICAL RESEARCH (ALLIED HEALTH)

AHF14CA006

## Evaluation of two molecular methods for the detection of toxigenic strains of *Clostridium difficile* on Roche LightCycler® 2.0

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**INTRODUCTION** In this study, we evaluated two molecular methods targeting different aspects of toxigenic *Clostridium difficile* (*C. difficile*). The Tib Molbiol (Berlin, Germany) LightMix® Kit specifically targets the tcdC toxin regulator gene (TRG), including the rare ribotype 027 strain. The R-Biopharm (Darmstadt, Germany) Rida®Gene *C. difficile* kit targets the 16s-ribosomalDNA (16s-rDNA) and the Toxin A and B genes. Both methods were compared against the *C. diff* Quik Chek (Blacksburg, Netherlands) Complete® test, an immunochromatographic rapid kit.

**METHODS** Stool samples that were sent for *C. difficile* testing were anonymised and tested by two molecular methods. The samples were processed and bacterial DNA was extracted using the Qiagen (Hilden, Germany) QIAamp DNA Stool Mini Kit with a modified protocol. The resulting eluate was then tested in accordance with the respective kit manufacturer's instructions.

**RESULTS** All the 40 samples tested showed 100% concordance between both molecular methods. The presence of the tcdC TRG on the LightMix Kit was supported by the presence of both *C. difficile* 16s-rDNA and Toxin A and B genes using the Rida®Gene assay. However, when compared retrospectively with the Quik Chek rapid test, the immunochromatographic method yielded a low sensitivity of 42%.

**CONCLUSION** The detection of 58% more positive toxin results by molecular methods highlights the significantly higher rate of false negative results by immunochromatographic methods. The superior test performance of molecular assays ensures accurate detection of toxigenic *C. difficile*. This allows for proper patient management and prompt implementation of infection control measures, leading to overall cost-effectiveness.

## CATEGORY: CLINICAL RESEARCH (NURSING)

AHF14CN003

## Comparison of fast peritoneal equilibrium test with the standard method in peritoneal dialysis patients

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**INTRODUCTION** The standard peritoneal equilibrium test (sPET) is usually performed 4–6 weeks after patients start on peritoneal dialysis (PD) to evaluate the transport properties of peritoneal membrane. Fast PET (fPET) is a more cost-effective and less laborious method. This study analysed the reliability of fPET and compared it with that of sPET in PD patients.

**METHODS** This study was performed prospectively in the Renal Centre from March 2013 to February 2014. fPET was performed concurrently with sPET. For sPET, we collected glucose, urea and creatinine dialysate samples at 0 hr, 2 hr and 4 hr, and serum glucose, urea and creatinine at 2 hr. For fPET, we collected plasma and dialysate samples at only 4 hr. Patients were classified as low transporter, low average transporter, high average transporter or high transporter according to

the ratio of dialysate/plasma creatinine ( $D/P_{creat}$ ). The results of both methods were compared with Pearson's correlation for  $D/P_{creat}$  and Kappa tests for transport status. The agreement was assessed by the Bland-Altman technique.

**RESULTS** During the study period, 40 patients were recruited. The correlation coefficient between the fast and standard PET was 0.985 ( $p < 0.0001$ ) for  $D/P_{creat}$ . Kappa analysis was statistically significant (0.96,  $p < 0.0001$ ) when tested for classification of transport status. The Bland-Altman analysis showed a mean over-estimation of fPET  $D/P_{creat}$  of 0.013 compared with sPET, with limits of agreement between -0.026 and 0.029 at 95% confidence interval.

**CONCLUSION** fPET is a suitable alternative method to evaluate the transport properties of the peritoneal membrane in PD patients.

## CATEGORY: CLINICAL RESEARCH (NURSING)

AHF14CN004

## Evaluation of the intensive insulin therapy group education programme in patients with diabetes mellitus

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**INTRODUCTION** The ability to adjust insulin dose based on carbohydrate intake and glucose level is integral to a more flexible lifestyle and better glycaemic control in diabetic patients who are on short- or rapid-acting insulin. The Khoo Teck Puat Hospital Intensive Insulin Therapy Programme (IITP) is a modular group education programme designed to deliver the necessary knowledge for flexible insulin dosing, with subsequent follow-up to intensify glycaemic management in motivated individuals. We aimed to evaluate the effectiveness of Module 1 ('An introduction to flexible insulin dosing and carbohydrate counting') of this programme.

**METHODS** We retrospectively studied participants who attended the IITP Module 1 (a three-hour group education class), which was conducted from July 2012 to April 2014. The patient characteristics and pre- and post-education questionnaires were reviewed.

**RESULTS** A total of 44 patients (80% with type 1 diabetes mellitus and 68% female) with a mean age of  $38 \pm 12$  years had attended the IITP Module 1. Before enrollment, the mean HbA1c was  $8.8 \pm 2.1\%$ ; 6.8% of patients adjusted their insulin dose based on carbohydrate counting and 9.0% based on glucose readings. A mean score of  $81\% \pm 15\%$  was achieved on the post-education knowledge quiz. About 96% of the participants found the course content relevant, and 93% would recommend the course to their friends. About 43% of the participants proceeded to send their glucose and food records to the team, and attended the IITP clinic for intensification of diabetes management.

**CONCLUSION** We conclude that the IITP Module 1 was successful in knowledge delivery, and a substantial proportion of participants opted to continue with the programme after attending the course in order to intensify their diabetes management.

## CATEGORY: CLINICAL RESEARCH (NURSING)

AHF14CN005

## Implications of an intensive case management model for post-discharge high-risk elderly Chinese patients with heart failure in Hong Kong

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**INTRODUCTION** The high prevalence of heart failure in the elderly population and repeated hospital admissions lead to enormous healthcare costs and reduced quality of life. An intensive case management model was developed to improve clinical and financial outcomes.

**METHODS** High-risk elderly patients aged over 65 years with heart failure were selected from July 2012 to September 2012. The selected candidates were assigned to one case manager. The case manager arranged home visits with health workers from the appropriate disciplines, including doctors, nurses, physiotherapists and occupational therapists. The service period was eight weeks after discharge. An ad hoc clinic was arranged for elderly patients with worsened heart failure condition. Modified functional ambulation

categories and Barthel index were used to measure functional mobility and performance of activities of daily living.

**RESULTS** A total of 89 elderly patients were recruited. About 73% were unplanned admissions within 28 days after discharge, while 64.7% were unplanned admissions within 90 days after discharge. About 89.4% and 88.2% of the elderly patients did not need to attend the accident and emergency department within 28 days and 90 days after discharge, respectively. The elderly patients reported significant improvement in functional mobility ( $p < 0.001$ ) and performance of activities of daily living ( $p < 0.001$ ) after completion of the programme.

**CONCLUSION** The intensive case management model had significantly improved the health of high-risk elderly patients with heart failure and reduced their healthcare costs.



## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP003

## Creative music therapy improves mood and engagement in an acute tertiary hospital for older patients with delirium and dementia

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

**METHODS** A total of 25 PtDD (age  $86.5 \pm 5.7$  years, MMSE  $6/30 \pm 5.4$ ) were observed for 90 min (30 min each before, during and after music therapy) for three consecutive days (Day 1: control condition without music; Days 2 and 3: during CMT). The musical interventions included clinical music improvisation, e.g. spontaneous music making with musical instruments with the therapist on the keyboard/guitar, and playing familiar songs of patients' choice. The main outcome measures

were mood and engagement, which were assessed through the Menorah Park Engagement Scale (MPES) and the Observed Emotion Rating Scale (OERS).

**RESULTS** Wilcoxon signed-rank test showed a statistically significant positive change in constructive and passive engagement ( $Z = 3.383$ ,  $p = 0.01$ ) in MPES, and pleasure and general alertness ( $Z = 3.188$ ,  $p = 0.01$ ) in OERS, during CMT. The average pleasure rating of Days 2 and 3 was higher than that of Day 1 ( $Z = 2.466$ ,  $p = 0.014$ ). Negative engagement ( $Z = 2.582$ ,  $p = 0.01$ ) and affect ( $Z = 2.004$ ,  $p = 0.045$ ) were both lower during CMT compared to Day 1 with no music.

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

## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP004

## Serum carotenoids and quantitative changes in retinal vascular parameters

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**INTRODUCTION** Retinal vascular parameters are arteriolosclerosis markers that predict the onset of retinopathy and systemic vascular diseases. This study aimed to examine the relationship between serum carotenoids (lutein, L and zeaxanthin, Z) and quantitative retinal vascular parameters in the elderly Singaporean Chinese population.

**METHODS** In this cross-sectional study, digital colour fundus photographs from 93 healthy Singaporean Chinese subjects aged  $\geq 40$  years were analysed. A range of retinal vascular parameters were measured quantitatively using computer software. Serum levels of L and Z were estimated using high performance liquid chromatography. The association between serum carotenoids and retinal vascular parameters was evaluated using multivariable linear regression models.

**RESULTS** The mean ( $\pm$  SD) age of the study population was  $54.33 \pm 7.25$  (range 40–81) years. There was a preponderance of female

participants (female 61%, male 39%). A positive history of smoking (current and past) was present in 23% of the participants. The mean ( $\pm$  SD) serum levels of L and Z in our population were  $0.28 \pm 0.17$   $\mu\text{g/ml}$  and  $0.08 \pm 0.12$   $\mu\text{g/ml}$ , respectively. In the multivariate linear regression model, serum L demonstrated a significant and positive relationship with the arteriole-venule ratio of zone B measurements ( $p = 0.001$ ) and a significant but inverse relationship with branching coefficient arteriole ( $p = 0.003$ ), after adjusting for confounders.

**CONCLUSION** Serum concentrations of L were significantly associated with an increase in the arteriole-venule ratio and a decrease in the branching coefficient of arteriole. These observations suggest that antioxidant carotenoid L may influence early retinal arteriosclerosis and may contribute to the pathogenesis of retinal diseases.

## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP005

## Comparison of clinical characteristics and complications of youth with type 1 and type 2 diabetes mellitus

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**INTRODUCTION** The prevalence of type 2 diabetes mellitus (T2DM) in youth worldwide is rising, coinciding with the obesity epidemic. Recent publications from the West have shown that youth with T2DM develop diabetes-related complications sooner compared to those with type 1 diabetes mellitus (T1DM).

**METHODS** We performed a cross-sectional review of all patients under the age of 30 years on follow-up at the Khoo Teck Puat Hospital Diabetes Centre. We compared the clinical characteristics, including diabetes-related complications, in these patients.

**RESULTS** A total of 182 subjects (61 T1DM, 121 T2DM) were included in this study. T2DM subjects were older at diagnosis than T1DM subjects (median age 20 [IQR 18–22] years vs. 17 [12–22] years,  $p = 0.007$ ), had higher BMI (median 29.7 [IQR 26.2–34.2] kg/m<sup>2</sup> vs. 21.8 [19.1–25.6] kg/m<sup>2</sup>,  $p < 0.001$ ) and shorter diabetes duration (median 3 [IQR 1–7] years vs. 7 [3–13] years,  $p < 0.001$ ). There was

no difference in HbA1c (median 8.5% [IQR 7.1%–10%] T2DM vs. 8.5% [7.7%–9.6%] T1DM). Diabetic dyslipidaemia was more common in T2DM subjects, with higher triglycerides (median 1.69 [IQR 1.21–2.35] mmol/L vs. 0.72 [0.56–1.00] mmol/L,  $p < 0.001$ ) and lower high-density lipoprotein cholesterol (median 1.09 [IQR 0.96–1.29] mmol/L vs. 1.64 [1.39–2.10] mmol/L,  $p < 0.001$ ). Among the subjects with T2DM, 33.1% were on more than one oral diabetic agent and 26.3% were on insulin. At least one diabetes-related complication was found in 26.1% of T2DM patients compared to 10.2% of T1DM patients ( $p = 0.014$ ).

**CONCLUSION** In our study, youth with T2DM had suboptimal diabetes control, with many of them on complex therapeutic regimens. A higher rate of diabetes-related complications was found in youth with T2DM compared to T1DM. Interventions to prevent/retard diabetes progression and complications in these patients are imperative.

## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP006

## Moderate-to-severe obstructive sleep apnoea (OSA): a predictor of difficult airway

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**INTRODUCTION** The risks of difficult laryngoscopy and tracheal intubation are important considerations in the perioperative management of obstructive sleep apnoea (OSA) patients. Previously published studies in these regard were retrospective or yielded conflicting results. As a secondary aim of the international multicentre Postoperative Vascular Events in Unrecognized Obstructive Sleep Apnoea (POSA) trial, we determined the association between unrecognized OSA and difficult airway in moderate-to-high risk patients undergoing major non-cardiac surgery.

**METHODS** The study was approved by the local research ethics committee (ClinicalTrials.gov Identifier: NCT01494181). Patients aged > 45 years who had a history of atherosclerotic disease received preoperative portable sleep monitoring (ApneaLink, Resmed) to determine the presence and severity of unrecognized OSA before surgery. We compared the incidence of difficult laryngoscopy (Cormack-Lehane Classification 3 and 4) and difficult tracheal

intubation (multiple > 3 or > 10 min) or failed tracheal intubation attempts using conventional laryngoscope) among patients with different OSA severity levels based on the apnoea-hypopnoea-index (AHI) using the  $\chi^2$  test.

**RESULTS** Of the 729 patients in the POSA study, 491 (67.5%) patients received general anaesthesia and 484 (66.4%) patients had tracheal intubation. OSA was found in 302 patients – mild OSA (AHI 5–15) in 33.5% of patients, moderate OSA (AHI 15–30) in 16.7% and severe OSA in 12.2%. Patients with moderate-to-severe OSA (AHI  $\geq 15$ ) had a higher risk for difficult laryngoscopy and tracheal intubation (odds ratio 2.57, 95% CI 1.32–4.98,  $p = 0.0031$  and 2.83, 1.36–5.90,  $p = 0.0035$ , respectively).

**CONCLUSION** Unrecognized OSA is common in moderate-to-high-risk patients undergoing major surgery. Difficult laryngoscopy and tracheal intubation are more common in patients with moderate-to-severe OSA.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA007

## Evaluation of absorbed radiation doses for dual-energy computed tomography

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**INTRODUCTION** Dual-energy computed tomography (DECT) is a novel diagnostic imaging technique that utilises two X-ray sources of different energies to simultaneously acquire images of the patient. The additional image data set provides additional clinical information that improves image quality and material differentiation.

**METHODS** Dose length product (DLP) values were reviewed for 191 patients who had undergone either computed tomography (CT) of the abdomen and pelvis, the kidney, ureter and bladder (KUB), the thorax or the neck from 1 to 22 December 2013. Out of these patients, 91 were scanned using single-energy CT (SECT) (Siemens Somatom Definition AS) and 100, with DECT (Siemens Somatom Definition Flash). Data were analysed using independent *t*-test.

**RESULTS** Radiation doses were lower when using DECT compared to SECT for CT of the abdomen and pelvis, KUB and neck, with DLP reduction of 9.1%, 12.7% and 7.2%, respectively. DLP values for CT of the thorax increased by 15% when using DECT. Independent *t*-test resulted in comparable DLP values between SECT and DECT ( $p > 0.05$ ).

**CONCLUSION** DLP values indicated comparable absorbed radiation doses between DECT and SECT, with the former having lower mean DLP values for the abdomen and pelvis, KUB and neck scans. The use of an additional X-ray source did not result in higher absorbed radiation dose when using DECT. Improvements in both the scanning techniques, dose reduction algorithms and protocol should further optimise radiation doses when using DECT.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA008

## Survey of the level of confidence and satisfaction among nursing home nurses regarding an intensive telegeriatrics nurse training programme

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**INTRODUCTION** Telemedicine is a tool to provide geriatric care from a distance. Therefore, it is essential that nurses in nursing homes are well-equipped and skilled to assist the doctors in conducting on-site physical examinations. The nine-month Telegeriatrics Nurse Training Course (TNTC) was part of a collaboration between Khoo Teck Puat Hospital and three partnering nursing homes to equip the latter's nurses with a specific set of knowledge and skills. We assessed these nurses' self-reported confidence and satisfaction of the TNTC in preparing them to facilitate telemedicine consultations.

**METHODS** Two separate sets of a five-point Likert Scale questionnaire on self-reported confidence and satisfaction were administered to 17 nurses who had undergone the TNTC.

**RESULTS** Majority of the respondents reported confidence in performing the telemedicine-required clinical behaviours such as taking patient history (94%), conveying patient condition and problems to doctors (88%) and handling telemedicine consultations independently (82%). Responses from the satisfaction questionnaire were generally positive. All the respondents felt that the course had met their expectations and helped them develop their professional competencies.

**CONCLUSION** The findings of this study demonstrated the general acceptability of TNTC among nursing home nurses. Further studies are required to assess the effectiveness of TNTC in improving the quality of care of nursing home residents.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA009

## Effects of hyperglycaemia on mean cell volume in red blood cells analysed using the Sysmex XE-5000 analyser

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**INTRODUCTION** Khoo Teck Puat Hospital excels in geriatric medicine and diabetes care. When providing laboratory testing for this cohort of patients, the laboratory may encounter both *in vivo* and *in vitro* pre-analytical conditions that arise as spurious results. One such condition is the effect of extremely high glucose levels on red cell morphology. The mean cell volume (MCV) is a necessary red cell index for the diagnosis of microcytic, normochromic or macrocytic anaemia. A small study was conducted to show the effect of hyperglycaemia on MCV when analysed using the Sysmex XE-5000 analyser.

**METHODS** A total of 30 anonymised EDTA whole blood samples were collected and split into three categories with low, normal and high MCV. Each sample was spiked with different concentrations of glucose ranging from 10 to 50 mmol/L and incubated at

37°C for 15–240 min. Complete blood count (CBC) was done for each sample using the XE-5000 analyser and the MCV results were recorded. Data were tabulated and analysed using Microsoft Excel. Confidence interval was calculated, and  $p < 0.05$  was considered statistically significant.

**RESULTS** The confidence interval of MCV for all categories showed an increasing trend with increased glucose concentration. Statistical significance was achieved with glucose concentrations ranging from 30 to 50 mmol/L. However, differing incubation times did not show any trend or significant changes in any of the categories.

**CONCLUSION** Hyperglycaemia in diabetic patients may cause falsely elevated MCV when performing CBC using a haematology analyser, consequently leading to false diagnosis of other diseases.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA010

## Comparison of contrast enhancement during arterial phase for computed tomography multiphasic liver studies: a retrospective evaluation of bolus tracking techniques

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**INTRODUCTION** Consistency in imaging acquisition during computed tomography multiphasic liver (CT-MPL) study is essential for ensuring replicable image quality. This was a clinical quality improvement initiative to evaluate the consistency of contrast enhancement during arterial phase of CT-MPL when bolus tracking was applied on fixed landmark at the level of T8/T9, as compared to that at the level of the diaphragm where it may vary based on the patient's underlying conditions.

**METHODS** A total of 40 patients were retrospectively selected. Of these, 20 patients underwent bolus tracking at the diaphragm while the rest, at the level between T8/T9 (above the celiac trunk). Acquisition followed the standard departmental protocol. Hounsfield unit (HU) measurements were made at two regions during the arterial phase (the aorta where the celiac trunk is visualised and at the main portal vein).

Iodine density in the aorta was also measured. Image enhancements were ranked (well-enhanced, enhanced and no enhancement). Statistical analysis was conducted by Pearson's chi-square test, and independent *t*-test at 95% confidence level was used to compare the results.

**RESULTS** Our findings indicated better consistency in contrast enhancement of the portal vein for bolus at T8/T9 compared to bolus at the diaphragm level ( $p = 0.042$ ). Higher HU at the aorta (429.95) was measured for bolus at T8/T9 compared to the diaphragm level (378.24). A slight increase in iodine concentration was observed.

**CONCLUSION** HU measurements showed consistent contrast enhancement for bolus tracking at T8/9. Bolus at T8/T9 indicated a slightly higher iodine concentration. Further refinement of scanning protocol linking the subsequent scanning phases should improve the overall accuracy and diagnosis for patients undergoing CT-MPL.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA011

## Getting ambulatory patients to 'keep walking' during hospitalisation

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**INTRODUCTION** Although patients lose 7% muscle mass with each day of bed rest, studies have shown that majority of ambulatory patients do not walk during hospitalisation. Thus, this project aimed to encourage walking among ambulatory patients during hospitalisation.

**METHODS** This project targeted ambulatory patients requiring nil to minimal assistance in two geriatric wards. Root cause analysis was done using the '5-Whys' strategy. The identified root causes were overprotective relatives and lack of available walking aids. The nurses were also uncertain regarding the patients that were safe for ambulation and about the ways to assist them. To address these factors, physiotherapists assessed and educated patients and their relatives on the ill-effects of immobilisation, and if required, appropriate walking aids were loaned for patient use. The patients' mobility statuses were indicated on their

headboards. In addition, nurses were trained on how to assist patients to walk. All staff were encouraged to ambulate patients as part of their daily routine.

**RESULTS** A total of 80 patients participated in this project. Before intervention, 70% of the observed ambulatory patients were mainly mobilised using the commode chair. After the intervention, 100% of patients in the project ambulated as part of their daily routine at least three times a day. Staff working in the wards were satisfied and found the intervention informative, which optimised patient care. The patients and their relatives were appreciative of the intervention as well.

**CONCLUSION** This intervention helped to address several root causes and resulted in an increase in walking among our patients during hospitalisation. We acknowledge the limitations of our study design, and plan further evaluation and improvement of the intervention.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA012

## Thyroid fine needle aspiration: correlation audit in 86 cases with focus on 'benign' and 'malignant' categories

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**INTRODUCTION** Fine needle aspiration (FNA) is routinely used for triaging patients with thyroid nodule because it offers a rapid, safe and cost-effective approach. This retrospective study aimed to evaluate the correlation rate of thyroid FNA cases with follow-up histology at KTPH.

**METHODS** All thyroid FNA cases reported at KTPH for 28 months were identified. The FNA cases were classified according to The Bethesda system for reporting thyroid cytology. The Bethesda system comprises six reporting categories such as non-diagnostic, benign, atypia of undetermined significance, follicular neoplasm, suspicious for malignancy and malignant. All thyroid patients who underwent thyroidectomy were sought for cytology to histology correlation. The final histological diagnosis was re-classified into benign and malignant.

**RESULTS** Of the 438 FNA cases, 19.6% were non-diagnostic including nonspecific cystic lesion (n = 86), 60% were benign (n = 267), 9.1% were atypia of undetermined significance (n = 40), 3.9% were follicular neoplasm (n = 17), 1.6% were suspicious for malignancy (n = 7) and 4.8% were malignant (n = 21). Thyroidectomy results were available for 86 cases. The cytology-histology correlation rate for benign Category was 93.6% and that for the malignant Category was 100%.

**CONCLUSION** Our study demonstrated that thyroid FNA is an excellent tool for evaluating thyroid nodule, as it shows a high index of cytology to histology correlation and good diagnostic specificity for the 'benign' and 'malignant' categories.



## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA013

## Improving the awareness of age-related macular degeneration with a patient information video

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**INTRODUCTION** Age-related macular degeneration (AMD) is one of the leading causes of blindness among the elderly, with a prevalence of 7% in Singapore. However, a population survey noted that only 7.3% of Singapore residents were aware of AMD. This clinical practice improvement programme aimed to improve the awareness of AMD and assess knowledge retention using a patient information video (PIV). The project mission statement was 'to improve the knowledge scores on AMD amongst KTPH Eye Clinic attendees by at least 20% within one year'.

**METHODS** The Plan-Do-Study-Act methodology was used in this six-month long project (November 2013 to April 2014). The three root causes of poor AMD awareness identified with the Pareto chart included inadequate patient information materials, manpower shortage for patient education and insufficient media coverage. PIV

was assessed to be able to address these causes. Questionnaire surveys on five knowledge domains (nature, risk factor, clinical outcome, management and prevention of AMD) were conducted at baseline, immediately after, one month and three months after PIV presentation.

**RESULTS** The patients (n = 48) showed improvement in the mean knowledge score (MKS) in all domains immediately after PIV presentation (all p < 0.05). Although MKS gradually declined at one and three months, they were still significantly higher than the baseline score (all p < 0.05). The run chart demonstrated sustainable results with repeated surveys.

**CONCLUSION** Video education is effective in increasing AMD awareness, with good knowledge retention for at least up to three months. Further studies on knowledge retention after three months and its comparison with other patient education modalities would be useful.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA014

## Liquid-based cytology 'split sample' comparison with conventional smear in thyroid fine needle aspiration

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**INTRODUCTION** Fine needle aspiration (FNA) is commonly used as a triaging tool for thyroid nodules. Typically, the aspirated material is extruded onto glass slides for direct conventional smears (CS) and rapid staining for cellularity assessment at on-site evaluation by a cytotechnologist. This process is laborious and time consuming in a resource-limited laboratory. The alternative is liquid-based cytology (LBC), which is now widely used in non-gynaecologic cytology specimens for its high diagnostic sensitivity, superior cell preservation quality and cleaner background.

**METHODS** A total of 40 cases were available to evaluate the correlation between CS and LBC in the 'split sample' method. This method required the aspirated material to be smeared onto glass slides for diagnostic purpose, and the remaining material to be rinsed in preservative solution for LBC. The cases were classified according to the Bethesda system for reporting thyroid cytology, comprising

six reporting categories: non-diagnostic; benign; atypia of undetermined significance; follicular neoplasm; suspicious for malignancy; and malignant.

**RESULTS** Of these 40 cases, the correlation rate between CS and LBC was 100% for non-diagnostic, 95% for benign, 83% for atypia of undetermined significance, 100% for follicular neoplasm, 50% for suspicious for malignancy and 100% for malignant. The overall correlation rate was 93%.

**CONCLUSION** Our result showed that LBC is a suitable alternative to CS in classifying thyroid nodules. This is particularly useful when rapid on-site evaluation is unavailable and the aspirated material can be rinsed directly to preservative solution for LBC processing and possible ancillary testing to enhance the diagnostic efficacy of thyroid nodules.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA015

## Nurses' perceptions of the utility of a ward-based activity tool kit in an acute hospital setting

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**INTRODUCTION** During hospitalisation, the elderly are at risk of falling into passivity and dependence. This subsequently results in rapid decline in their functional abilities and psychosocial well-being. Participation in activities has shown to improve the health and well-being of the elderly. In order to improve activity engagement and experience of hospitalisation for the elderly, activity tool kits consisting of physical and cognitive activities were introduced in six acute hospital wards. This study aimed to develop and evaluate the utility of a ward-based activity kit for elderly patients.

**METHODS** About 15–20 nurses from each ward received training by an occupational therapist on the use of the activity tool kit. One month after the implementation of the kit, semi-structured interviews were conducted with 11 ward nurses-in-charge to gather their opinions regarding the activity tool kit.

**RESULTS** Six themes emerged from the interviews, namely, usefulness, practicality, maintenance, context of usage, sustainability and further improvement. Nurses found the kit useful in keeping elderly patients engaged and facilitating better interaction between caregivers and patients. However, the nurses' frequency of use and receptiveness to the implementation of the kit varied across the wards.

**CONCLUSION** Activity tool kits could be useful resources for nurses and caregivers to better engage elderly patients. Training and implementation of the kit needs to be catered towards the needs of patients and nurses in each ward to more effectively encourage the use of the kit. Evaluation of the tool kit is ongoing to aid in the design and implementation of an effective tool kit.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA016

## Project Cuttapillar: a pharmacist-driven initiative for reducing inappropriate polypharmacy and its impact on reducing all-cause hospital readmissions

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**INTRODUCTION** Inappropriate polypharmacy is common in 'frequent flyer' (minimum of three readmissions within six months) patients. We postulate that a reduction in inappropriate polypharmacy results in reduced readmissions, and that a pharmacist-driven, patient-centric interview is effective in reducing inappropriate polypharmacy.

**METHODS** 'Frequent flyers' with a cardiology-related diagnosis between August and October 2013 were recruited and divided into a control and an intervention arm, where pharmacists interviewed the patients. Suggestions on drug therapy modifications were highlighted to the primary team. Success rates of reducing medications and reduction in length of stay (LOS) of re-admissions 90 days pre- and post hospitalisation were measured.

**RESULTS** A total of 68 patients (mean age 65.1 years; 57.4% male) with cardiology-related diagnoses were recruited. The intervention group

recorded a higher proportion of patients with reduced medications (36.7% vs. 18.4%;  $p = 0.23$ ) and a greater reduction in total LOS (–11.70 days vs. –10.60 days). Patients with 'reduced' medications recorded the greatest decrease in LOS (–16.8 days). However, there was no significant difference between the survival functions of the three groups of 'reduced', 'unchanged' and 'increased' number of medications ( $p = 0.34$ ).

**CONCLUSION** A reduction in inappropriate polypharmacy was associated with reduction in the LOS. From here, we gathered that minimal harm was done to patients. However, it was difficult to conclude that reduced inappropriate polypharmacy resulted in improved chronic conditions due to the short follow-up period. The findings also suggested that a pharmacist-driven, patient-centric interview is linked to better reduction in the number of medications and LOS for all-cause readmissions.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA017

## iPML-iPatient medication list

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**INTRODUCTION** Patients are given a patient medication list (PML) upon discharge and at the outpatient pharmacy. With a 90% penetration of smartphones in Singapore, providing PML as an electronic version on an app (iPML) may be the next logical step. This app can be further extended to include other features such as reminder alerts for taking medicines. This study aimed to evaluate whether existing studies in this regard have shown improvement in compliance and health outcomes. We also conducted a survey to determine the usefulness of such an app and the desired features.

**METHODS** A literature review was conducted using various databases with keywords such as 'smartphone', 'apps', 'health outcome' for studies conducted from 2008 to 2014. Survey questions were developed and sample pictures of the currently available apps were shown as part of the survey. This was conducted at the outpatient pharmacy

for one week by random sampling on both patients and caregivers. Patients using smartphones, apps and those on more than three chronic medicines were included in the study.

**RESULTS** A total of five studies were retrieved. Increased medication compliance in the short term was observed. The effects on patients' health outcomes were varied. A total of 50 people were surveyed; the majority were  $\geq 40$  years old (64%) and had at least polytechnic education (74%). About 92% patients felt that the app would be useful, while 96% felt that the medicine reminder alert and medication reconciliation feature would be useful. About 58% wanted other features such as pictures of medicines and 64% wanted food-drug interactions.

**CONCLUSION** Studies have shown that apps/alerts can improve patient compliance. iPML is perceived to be useful, with features such as reminder alerts and medication reconciliation favoured.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA018

## Impact of computerised physician order entry system implementation in an inpatient setting

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**INTRODUCTION** Ordering medications through the computerised physician order entry (CPOE) systems potentially reduces errors from poor handwriting. In this study, we examined CPOE's impact on pharmacist interventions and patient harm, as well as identified the possible areas of medication knowledge gaps.

**METHODS** Pharmacist interventions two months pre- and post-CPOE were compared to evaluate CPOE's effect on the type and frequency of interventions. Medication errors one year pre- and post-CPOE were compared to examine the impact on patient harm. Drug information enquiries three months post-CPOE were analysed to determine medication knowledge gaps.

**RESULTS** A total of 4,269 interventions (pre-CPOE: 1,964, post-CPOE: 2,305) and 732 enquiries were collated. The intervention rates for incomplete dosage regimens and untreated indications decreased by 5.1% and 2.2%, respectively, post-CPOE. Conversely, the intervention rates for therapeutic duplication, incorrect medication history and

dosage adjustments increased by 4.0%, 7.0% and 4.6%, respectively. There were no significant changes in the severity of patient harm due to medication errors and stages of medication use at which the errors occurred. Drug classes with the highest intervention rates and enquiries were quinolones, penicillins, anticonvulsants, minerals, electrolytes and analgesics, which accounted for 699 (29.49%) interventions and 213 (30.79%) drug information enquiries. The most common interventions were dosage adjustments (19.74%), dosage optimisations (17.60%) and therapy conversions (16.60%). The majority of enquiries involved dosage adjustments and suitability of drug choices (49.51%), and the administration and stability of injectables (25.24%).

**CONCLUSION** CPOE had varying effects on pharmacist intervention rates and was not associated with patient harm. The identified medication knowledge gaps could be addressed by enhancing the CPOE system to facilitate the prescribing process.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA019

## Reviewing the reliability of point-of-care testing international normalised ratio values against venous blood samples: an anticoagulation clinic process improvement initiative

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**INTRODUCTION** Patients who attend the KTPH Anticoagulation Clinic (ACC) have their international normalised ratio (INR) values measured by the Coaguchek® XS meter, a point-of-care testing (POCT) device. POCT values outside the working range of 1.5–3.0 require a repeat venipuncture (VP) blood draw for confirmation, a process that requires up to an additional 60 min. This study aimed to review and compare the accuracy of POCT and VP values with the intention of widening the working range, reducing the number of VPs and consequently, the patient waiting time.

**METHODS** From January to March 2014, a total of 169 paired POCT and VP measurements were extracted. These ranged from 0.9 to 5.8. Correlation between pairs of values and plots of INR deviations (POCT-VP) against POCT value were constructed to assess reliability across various ranges.

**RESULTS** There were no deviations (defined as POCT-VP > 0.5) for POCT < 2.0 or 2.0–3.0. A total of 8 out of 46 samples (82.7%) with POCT 3.0–3.5 showed deviations, which ranged from +0.76 to –0.25. There was an average overestimation of +0.21 with POCT values, and an overall good correlation between POCT and VP values < 3.5 ( $R^2 = 0.96$ ).

**CONCLUSION** The working range can potentially be widened to include values < 1.5 up to 3.5. However, as approximately a fifth of POCT values 3.0–3.5 may show deviation, careful clinical judgement is required to interpret values at this upper range. Implementation of this widened range would result in reduced waiting time and cost savings for KTPH ACC patients.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA020

## A retrospective study on medication non-adherence and incidence of drug-related problems in Khoo Teck Puat Hospital-Pharmacist Outreach Programme/Ageing-In-Place patients in Singapore

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**INTRODUCTION** Medication non-adherence reduces the health benefits of pharmacotherapies. In KTPH, pharmacists provide continuous pharmaceutical care via home visits. This study aimed to report the prevalence of and identify reasons for medication non-adherence, and report acceptance of interventions for drug-related problems (DRPs) and the common drug classes for which the interventions were proposed.

**METHODS** From June 2010 to October 2013, 165 patients were referred to pharmacists for home medication review. The baseline demographics, clinical history and medication use of the patients were obtained through electronic medical records and tested for their association with non-adherence using logistic regression.

**RESULTS** Of the study population, 64% reported medication non-adherence. Patients whose activities of daily living (ADL) were dependent on others were more adherent to medication compared to those who were ADL-independent ( $p = 0.038$ ). Increase in the total

daily dose (TDD) was also associated with non-adherence ( $p = 0.019$ ). Reasons for non-adherence included changes in medication regimen (18.3%), adverse drug reaction (15.7%) and insufficient medication (10.4%). A total of 120 interventions were made, with 103 (85.8%) of them resolved, 15 (12.5%) lost to follow-up and 2 (1.7%) rejected. The common DRPs were failure to receive medications (36.7%), sub-therapeutic dosage (20.4%) and over-dosage (12.3%). Medication interventions were mostly on cardiovascular drugs, nutritional supplements and gastrointestinal drugs.

**CONCLUSION** This study highlighted the high prevalence of medication non-adherence and its close association with patients with high TDD and ADL-independent patients, implying that adherence can be improved by reducing the total number of medications and/or their frequency. Furthermore, pharmacists can add value to this group of patients by resolving their DRPs.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA021

## Optimising the efficiency of an eye clinic with a novel Clinic Ergonomics-Function Reconfiguration Model

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**INTRODUCTION** A typical eye clinic visit is often complex and involves processing at many stations, from registration, visual acuity testing, eye refraction/pressure checking to the consultation room (CR). The registration-to-consultation turnaround time (R-C TAT) is often prolonged from delay at one or more stations, which caused patient dissatisfaction and anxiety. We aimed to reduce the R-C TAT with a Clinic Ergonomics-Function Reconfiguration Model (CEFRM) that involved space, manpower and operational re-organisation.

**METHODS** CEFRM comprised four measures: changing the clinic layout into two smaller sub-clinics with independent payment and registration stations; implementing manpower levelling by 'pushing' CR staff out to help at the visual acuity testing station during off-peak hours; creating a dual slit-lamp consultation room (DSLRL) instead of two separate rooms; and creating an eye patient journey video to

educate patients on the sequence and processes involved during an eye clinic visit.

**RESULTS** DSLRL enabled better CR utilisation, rapid mentoring of a junior doctor by a senior doctor, and faster consultation by both doctors. DSLRL hastened the doctor's consultation, with an increase in the proportion of patients with R-C TAT  $\leq 30$  min (PTAT30min) from 28.1% to 38.0% ( $p < 0.05$ ). With CEFRM, a greater improvement in PTAT30min from 11.3% to 33.8% ( $p < 0.05$ ) was demonstrated; the improved PTAT30min with CEFRM was sustained for the next five consecutive months (35.1%, 33.3%, 36.5%, 34.3% and 29.9%) on run chart plotting.

**CONCLUSION** CEFRM is feasible and effective in reducing R-C TAT to optimise efficiency. Further studies are required to validate its efficacy and sustainability.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA022

## Comparison of methods for lactate measurement between the OPTI Medical CCA-TS blood gas analyser and the Roche Cobas C501 chemistry analyser

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**INTRODUCTION** Blood lactate has been found to significantly correlate with oxygen delivery per minute. Blood lactate measurements are easily performed, with increasing availability of such assays in point-of-care devices. This study aimed to evaluate the performance of lactate measurement in the OPTI<sup>TM</sup> CCA-TS blood gas analyser (OPTI Medical, USA) using the B-Lac cassettes (OPTI Medical, USA) against the lactate method on the Cobas C501 chemistry analyser (Roche Diagnostics, Switzerland) in our laboratory.

**METHODS** Three levels of aqueous controls (concentration means of 1.19 mmol/L, 2.52 mmol/L and 4.25 mmol/L) were analysed in duplicate on each day of the study. Heparinised whole blood samples ( $n = 40$ ) were analysed using the B-Lac cassettes immediately following

lactate measurements of corresponding sodium fluoride plasma on Cobas C501.

**RESULTS** Reproducibility on the three levels of controls gave a CV of 5.55%, 1.49%, and 4.91% respectively, whereas repeatability gave a CV of 2.63%, 1.27% and 5.14%, respectively. The correlation coefficient was 0.96. Linear regression with the Cobas lactate assay was  $y = 1.06x - 0.06$ .

**CONCLUSION** The performance of B-Lac cassettes of the OPTI<sup>TM</sup> CCA-TS system demonstrated good correlation with the laboratory lactate method, and is ideal for urgent blood lactate requests in a point-of-care setting.



## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA023

## Reliability of using Braden Scale score as part of the nutrition screening process upon admission

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**INTRODUCTION** Braden Scale score is a validated screening tool for pressure ulcer prevention score. Dietician assessment and intervention was recommended for patients identified as at risk of developing pressure ulcer (score 16 or below). However, there were no clear recommendations with regard to the point/score that should be the trigger point for dietician referral. In this study, we aimed to assess the reliability of using the Braden Scale score as part of the nutrition screening process upon admission.

**METHODS** A one-month internal audit was conducted in Khoo Teck Puat Hospital, Singapore (November 2013). All patients who were referred to the dietician due to a low Braden Scale score ( $\leq 16$ ) were

reviewed. Subjective global assessment (SGA) was carried out to assess the nutritional status of all the referred patients.

**RESULTS** During the one-month audit period, a total of 109 patients were referred to the dietician due to a low Braden Scale score ( $< 16$ ). Of these, only 31 patients (29%) were classified as malnourished (SGA score B & C) while 75 (71%) were classified as well-nourished (SGA score A).

**CONCLUSION** A Braden Scale score of 16 is found to be too sensitive to identify patients at risk of malnutrition. More studies are required to review the validity and reliability of the Braden Scale score in order to determine the proper scoring system for dietician referral.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA024

## Optimising radiation dose using low-dose scan protocols during CT-guided lung biopsy

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**INTRODUCTION** Literature review has shown that lung cancer is one of the top three prevailing cancers in Singapore. Computed tomography-guided lung biopsy (CT-GLB) has been established as an important tool in obtaining core samples for histological analysis in differentiating benign and malignant lesions detected on routine CT scans. Our study aimed to evaluate the efficacy of low-dose scan protocols (LDSPs) in optimising radiation dose during CT-GLB.

**METHODS** A total of 20 patients were selected retrospectively; 10 of these underwent LDSP, while the remaining underwent routine scan protocols for pre- and post-biopsy scans. Iterative reconstruction (SAFIRE, Siemens Medical Solutions, Germany) was applied for those

who underwent LDSP. The images were rated in terms of noise and contrast, and the average dose length product (DLP) and effective dose for both protocols were calculated.

**RESULTS** Independent observers rated image quality to be consistent between LDSP and routine scans. The radiation dose was significantly reduced (at least 50%) for those who underwent LDSP.

**CONCLUSION** Our study showed that LDSP significantly reduces effective radiation dose for patients undergoing CT-GLB, without interfering with image interpretation for the procedurists. Further refinement and possible introduction of technique on routine scans could further reduce radiation doses to the general population.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA025

## A GIS-based population health management system prototype

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**INTRODUCTION** The Population Health Project is a pilot initiative of the Health Promotion Board and Alexandra Health to develop a three-year population health roadmap for residents in Northern Singapore. The medical and health status, sociodemographic profile and geographical location of the target population highly impact the choice of medical care and lifestyles. In view of this, a research-cum-operation study has been initiated to design and implement a geographic information systems (GIS)-based Population Health Management System. This paper aimed to share the analytical insights from the GIS layers.

**METHODS** Anonymised patient data collected from KTPH specialist clinics in 2013 were used for analysis. This study leveraged on GIS to integrate diverse datasets into a unified geospatial data mart and on GIS analysis methods such as thematic maps, proximity analysis, distance

computation, and hexagon geometrics to derive a series of population health profiles in Northern Singapore.

**RESULTS** The GIS analytics layer revealed a higher presence of chronic patients outside the current health screening location boundary. The use of GIS methods also revealed the visibility of the patients to the various types of chronic diseases such as dementia, and this improved operational planning when conducting population health screenings and location planning of healthcare facilities.

**CONCLUSION** The application of GIS analyses in population health provided location and network dimensions within which the health conditions may differ in communities. The shift towards the use of demographics and environmental data in gaining insights to population health highlighted the importance of data collaboration among public agencies.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA026

## Reducing near misses from packing errors in inpatient pharmacy

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**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 were defined as near misses by Joint Commission International. Hence, a reduction in packing errors would 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 address the root causes. The identified root causes were the lack of a standardised packing process, a high prevalence of risk-taking behaviour and insufficient training of new staff. A standardised packing workflow was introduced in phases

to address different packing lines. The second intervention was to rearrange drug bins stored in the 'fast moving' item shelf in alphabetical order according to drug name. All interventions were implemented by mid-April.

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

**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. The changes proposed should also address specific problems with current processes.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA027

## Comparison of methods for INR measurement between Roche CoaguChek® XS Plus poct meter and Sysmex® CA-1500 coagulation analyser

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**INTRODUCTION** Point-of-care international normalised ratio (INR) testing for patients on oral anticoagulant therapy has been used in anticoagulation clinics in KTPH since 2010. Alert values of INR 1.5 and 3.0 have been adopted. A venous plasma analysis for INR must be sent to the laboratory for confirmation if capillary blood INR is < 1.5 or > 3.0. This study aimed to evaluate the performance of INR measurement on the CoaguChek® XS Plus meter (Roche Diagnostics, Switzerland) against the INR measurement on the Sysmex CA-1500 analyser (Sysmex Corporation, Japan) in our laboratory, with a view to review the cut-off of the alert values, thereby mitigating the need for a venous plasma INR.

**METHODS** Data of patients from the clinics, comprising INR results from the CoaguChek XS and CA-1500, were collated

over two years (2012–2014). A total of 1,295 data points were collected.

**RESULTS** The correlation coefficient was 0.96. Linear regression with Sysmex INR measurement was  $y = 0.93x + 0.22$ . Segmenting the data into two categories of INR < 1.5 and > 3.0 yielded correlation coefficients of 0.76 ( $y = 0.99x + 0.77$ ) and 0.82 ( $y = 0.74x + 1.03$ ), respectively.

**CONCLUSION** The performance of INR measurement on CoaguChek XS correlated with the results from the laboratory analyser. However, the correlation was suboptimal when the data were segmented. Caution is thus required when interpreting data and further studies are required before the cut-off limits may be revised, as this could impact patient care.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA028

## Process re-engineering of Khoo Teck Puat Hospital day surgery operating theatre pharmacy: is the 'virtual pharmacist' model feasible?

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**INTRODUCTION** The conventional model in day surgery operating theatre (DSOT) pharmacy involves dispensing medicines to patients according to the arranged schedule. This leads to time wastage for knowledgeable patients who need to wait for their medicines to be dispensed to them. We studied the effect of implementing a 'virtual pharmacist' model (intervention model) by counselling patients via Skype™. The aim was to reduce waiting time by eliminating the need to follow the dispensing schedule.

**METHODS** A four-week interventional study was conducted at our DSOT pharmacy. English-literate patients aged 22–49 years were recruited. Patients admitted for eye surgery were excluded to avoid confounding due to visual impairment. The primary outcomes of waiting time, satisfaction scores and patients' medication knowledge were compared between the conventional and interventional models. Statistical analysis was performed with SPSS version 20.

**RESULTS** There were 50 patients in the conventional model and 53 in the intervention model. Five patients were lost to follow-up. There was no difference in the baseline demographics between the groups. Patients in the intervention model had shorter waiting time (28.79 min vs. 63.10 min,  $p < 0.0001$ ), better understanding of dosing instructions (0.985 vs. 0.940,  $p = 0.032$ ), better administration sequence with regard to food (0.985 vs. 0.940,  $p = 0.032$ ) and fewer side effects (0.406 vs. 0.357,  $p = 0.005$ ). These patients also had higher satisfaction scores than patients in the conventional model (31.36 vs. 29.47,  $p = 0.004$ ).

**CONCLUSION** Virtual counselling proved to be a feasible method, as it shortened the waiting time without compromising patients' medication knowledge. However, limitations such as unstable internet connection need to be addressed in order to improve patient satisfaction.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA030

# Identifying factors for improving home-care service with interactive exploratory data analysis

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**INTRODUCTION** Ensuring the provision of sufficient resources for home-care patients is crucial for home-care programmes like the aging-in-place (AIP) programme. Using data from the programme, this project aimed to demonstrate how this objective may be achieved by using interactive exploratory data analysis (EDA) techniques.

**METHODS** The study methodology comprised four phases. Firstly, we consulted the domain experts to understand their processes and the different data tracked. The next phase involved cleaning and combining the data from various sources. These sources included internal data from the AIP programme (home assessment visits) and external data from the hospital (patient admission data). In phase three, EDA techniques were used to analyse the data and the results were

presented to the stakeholders for discussion. Lastly, an interactive visual report was prepared for senior management.

**RESULTS** There were three major findings of the study. Firstly, it was found that there were patients with few needs categories (0–3) and yet required a high frequency of contact. Secondly, the median frequency of contact differed across the divisions. Lastly, it was found that there were patients discharged from the AIP programme despite having a high number of admissions ( $\geq 3$  within a six-month period).

**CONCLUSION** Areas of concern, such as the differing frequency of contact across the ten divisions, may be due to different patient needs or unequal resources being deployed. Understanding these factors is important, as it provides clear visibility for management and highlights potential areas for improvement and rectification to the AIP team.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA031

# Improving visual field testing in patients with the help of a visual guide

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**INTRODUCTION** Visual field testing is one of the most commonly performed tests in the eye clinic to test for specific eye conditions. However, patients sometimes have difficulty understanding the test and hence yield unreliable test results. This study aimed to improve patients' understanding of visual field testing with a visual guide (VG) so as to improve the reliability of the visual field test results.

**METHODS** A total of 78 patients above the age of 40 years were recruited. Central 24-2 Threshold Test was performed on both eyes using the Humphrey 750i Visual Field Analyser. The control group was given standard verbal instructions before the test, while the study group was shown the VG in addition to the verbal instructions before the test. Only patients who were new to the test were recruited. The

verbal instructions given to each patient were standardised in order to obtain consistent and reliable findings. The fixation losses (FL), false positive errors (FP), false negative errors (FN) and number of repeats (RPT) were recorded in both groups. The mean FL, FP, FN and RPT of both groups were calculated and analysed.

**RESULTS** The FL, FP, FN and RPT recorded did not significantly differ between the two groups (all  $p > 0.1$ ).

**CONCLUSION** The results suggested no significant improvement in the reliability of visual field testing after the introduction of the VG. A larger study population might be required to generate a more significant difference between the groups.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA032

## Nutrition screening process for colorectal cancer patients in Khoo Teck Puat Hospital

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**INTRODUCTION** Over the past three decades, the incidence of colorectal cancer in Singapore has increased dramatically. It is now the commonest cancer in both genders in Singapore, accounting for 17.8% and 14.1% of all cancers in males and females, respectively. Studies have shown the detrimental effect of malnutrition on the overall mortality, morbidity and length of stay in patients. In this study, we aimed to evaluate the nutrition screening process performed by nurses for patients who were admitted for colorectal cancer surgery in KTPH from July 2010 to June 2011.

**METHODS** A retrospective analysis of all subjects admitted to KTPH for colorectal cancer surgery from July 2010 to June 2011 was performed. The baseline characteristics and nutrition screening score

done by nurses upon admission were collected. Nutrition screening was re-scored by a dietician as a comparison.

**RESULTS** From July 2010 to June 2011, a total of 96 patients underwent colorectal surgery. Of the 96 cases, 19 case notes were not available to be reviewed. Based on the 77 cases reviewed, the nutrition screening of 66 (86%) patients was incongruent with the dietician's re-scoring. Of the 66 patients, 30 (45%) were at risk of malnutrition.

**CONCLUSION** The nurses' assessment on nutrition upon admission was found to be incongruent with the dietician's assessment, which implied that the nutrition screening process for colorectal cancer patients could be jeopardised.

## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA033

## Occupational therapists' perceptions of the utility of home visit information leaflets for older adults

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**INTRODUCTION** Insufficient explanation and notification given for home visits results in dissatisfaction among older adults. Before a home visit, it is important for patients to be informed about the home visit process, options and outcomes. The use of well-designed and quality information leaflets may improve communication and facilitate shared decision-making with patients. This qualitative study aimed to explore the perception of occupational therapists (OTs) regarding the utility of existing and newly designed pre-discharge home visit information leaflets for older adults.

**METHODS** Focus groups were conducted to obtain the opinions of ten OTs who have conducted home visits for older adults. All collected data were analysed using thematic analysis.

**RESULTS** Five major themes emerged from the findings, namely, the complexities of home visits, perceptions towards home visits, commu-

nication with patients and their families, the meaning of an ideal information leaflet, and the utility of existing and newly designed information leaflets. The participants recommended a simple, easy to read and appealing information leaflet for older adults. Home visit leaflets that communicated well the purpose and details of the home visits were preferred.

**CONCLUSION** This research demonstrated the importance of involving service users such as healthcare professionals in the development of patient information leaflets in occupational therapy practice. It may be beneficial to apply the recommended design principles to develop and revise home visit information leaflets in order to increase their usefulness. Obtaining the opinions of OTs, patients and their families regarding the utility of home visit information leaflets is recommended.



## CATEGORY: QUALITY IMPROVEMENT (ALLIED HEALTH)

AHF14QA034

## Parenting characteristics of parents of primary school children in Singapore

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**INTRODUCTION** At present, there is limited literature on the parenting attributes of Singapore parents. In addition, clinicians use questionnaires developed in Western countries with children and families, which may not be entirely applicable and relevant to the Singapore population. This study aimed to gather information to better understand the parenting characteristics of local parents while validating three parenting questionnaires for use in Singapore.

**METHODS** A total of 298 parents of primary school children completed a battery of questionnaires, including the modified Parent Behaviour Inventory (PBI; Weis & Toolis, 2010), parent version of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) and Parenting Stress Index, 4th Edition Short Form (PSI-4-SF; Abidin, 2012).

**RESULTS** Singapore parents were found to display less warm parenting

behaviours and were also more controlling than American parents. Local parents perceived boys to be more difficult compared to girls. Living with extended family was found to contribute to parenting stress in comparison to intact nuclear family households. Other parenting information and trends unique to the local parent sample were also found. Exploratory factor analyses supported the factor structure of all three scales. While the subscales of PBI and PSI-4-SF can be used various parenting constructs, it is recommended that the SDQ should be used in its entirety as a total score.

**CONCLUSION** The results were discussed in the context of the local culture. As all three questionnaires were found to be valid for local use, subsequent research with larger samples would be helpful for the determination of local norms.

## CATEGORY: QUALITY IMPROVEMENT (PHYSICIAN)

AHF14QP008

## The 'Eye Gallery App': an innovative application to manage digital ophthalmic images of the slit lamp biomicroscope captured with a smartphone

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**INTRODUCTION** Clinical ophthalmic images (COIs) are conventionally captured with expensive anterior segment cameras and managed with the manufacturer's software that is often not conducive for telemedicine. We report a new Eye Gallery App (EGA) that allows secured storage, archival and transfer of COIs captured on a smartphone (SP) for tele-ophthalmology.

**METHODS** The EGA was designed and jointly created by the Departments of Ophthalmology & Visual Sciences and Innovations & Research at Khoo Teck Puat Hospital to run on both IOS and Android platforms. It utilised the SP camera optics to capture a COI of the external eye, the anterior segment (using a slit lamp adapter) and the fundus (using a retinal adapter). The SP also functioned as an optical reader to automatically register the barcode on the patient's identity label as a named patient folder. The EGA then seamlessly uploaded

the named file (with COI) to the hospital server via a secured Wi-Fi network using Wireless Protected Access 2 (WPA2).

**RESULTS** The COIs captured on the SP were time-stamped and automatically archived into the designated folders in the hospital server. The folders were accessible via the hospital secured local area network (Intranet) for telemedicine usage.

Data security is of utmost importance to protect patient confidentiality. All access to the patients' folders and images was protected through regular password re-settings, controlled authorised access and by removal of all patient identifiers on the COI during tele-ophthalmology interactions.

**CONCLUSION** The EGA facilitated the archival and remote access of COI captured on an SP in a user-friendly, seamless, accurate and secured manner for tele-ophthalmology.

## CATEGORY: QUALITY IMPROVEMENT (PHYSICIAN)

AHF14QP009

## Managing antibiotic therapy in septic shock: how are we doing? An audit on appropriate selection, timing and de-escalation of antibiotics in our ICU

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**INTRODUCTION** Septic shock has a high mortality, even when managed in reputable centres. Severe sepsis and septic shock can rapidly progress into the activation of a cascade of inflammatory markers, resulting in multiorgan failure and death.

**METHODS** The pharmacist and a medical officer helped retrieve the relevant antibiotic and microbiology data as well as the eventual outcome of the patient.

**RESULTS** A total of 33 patients with septic shock were identified in the specified time period with a rate of 35% of all admissions. About 12 (36%) patients were administered the correct choice of initial antibiotic, as determined by a subsequent microbial culture result. Antibiotics were administered in all cases. A total of 9 (27%) patients were administered

broad-spectrum antibiotics for their pathogens, 22 (66%) patients had antibiotics administered within one hour of septic shock, and 11 (33%) patients had antibiotics continued for more than two weeks. However, only 6 (18%) patients had antibiotics de-escalated after results of the cultures showed susceptibility to narrower-spectrum antibiotics. The mortality rate from septic shock in our ICU was 60% (n = 20). About 70% (n = 14) of all those who died had initially been administered an incorrect antibiotic. None of those who died had antibiotics de-escalated after the culture results, and 30% (n = 6) of all patients who died had a delay of more than one hour in initiating antibiotics.

**CONCLUSION** Our mortality rates clearly reflect a need for change in our practice in order to reasonably ascertain the main pathogens.

## CATEGORY: QUALITY IMPROVEMENT (PHYSICIAN)

AHF14QP010

## An audit of outcomes after emergency laparotomy in Khoo Teck Puat Hospital

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**INTRODUCTION** Emergency laparotomy is a common procedure in Singapore and worldwide. The outcomes of this procedure have been known to be poor. In Singapore, there is a scarcity of data reporting the outcomes after emergency laparotomy. Knowledge of our current practice and outcomes would help surgeons and anaesthetists better risk-stratify patients and further improve on our perioperative care.

**METHODS** We aimed to look at the 30-day mortality rate and study the modifiable and non-modifiable variables that may be associated with the outcome. A retrospective clinical audit with our existing database over a period of one year was carried out.

**RESULTS** A total of 184 patients underwent primary emergency laparotomy over one year in our hospital. The 30-day mortality rate was 7.1%. The highest mortality was observed in the group of patients who

had an emergency laparotomy for ischaemic bowel (28.6%). Increased mortality seemed to be associated with age and increased urgency of surgery. The American Society of Anesthesiologists (ASA) status was significantly associated with 30-day mortality (OR 3.62, CI 1.46–9.00, p = 0.006) and longer hospital stay (OR 1.80, CI 1.23–2.64, p = 0.002). Hypothermia was highly associated with a predisposition to surgical intensive care unit admission (OR 3.68, CI 1.4–9.66, p = 0.008).

**CONCLUSIONS** Our data showed a moderate risk of emergency laparotomy in our centre. Age, ASA status, urgency of surgery and indication for surgery were well-recognised risk factors. Modifiable risk factors like delay in surgery and hypothermia are areas that we could maintain or improve on. Future multicentre studies focusing on other modifiable risk factors such as goal-directed fluid management would be useful.

## CATEGORY: QUALITY IMPROVEMENT (PHYSICIAN)

AHF14QP011

## Providing quality palliative care: are our nurses ready?

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**INTRODUCTION** Studies have shown that healthcare professionals are not adequately prepared to care for patients with palliative care needs. One hindrance to providing quality palliative care is educational inadequacies. This study aimed to measure nurses' knowledge of palliative care using the 20-item self-administered Palliative Care Quiz for Nurses (Ross et al, 1996).

**METHODS** A cross-sectional survey of all nurses from Khoo Teck Puat Hospital was conducted. Consent to participate in the study was indicated by completion and return of the questionnaire.

**RESULTS** A total of 966 questionnaires were sent out. The response rate was 76.2% (n = 736). Job locations for the nurses were 2.6%, 7.6% and 89.8% for community, outpatient and inpatient care, respectively. The duration of clinical experience was less than four years for 54.5% of the nurses. The mean knowledge score was  $9.2 \pm 2.7$ .

A total of 342 (46.5%) nurses scored  $\geq 50\%$ . However, only 10 (1.4%) nurses scored  $\geq 75\%$ . There was a significant relationship between the knowledge score and the length of nursing experience ( $p < 0.05$ ). However, there was no significant relationship between the knowledge score and self-perceived adequacy in end-of-life care training or nurses' specialisation in the Geriatrics or Intensive Care subspecialties. The domain with the lowest percentage of correct answers was 'Psychosocial and spiritual aspects of palliative care' (16.6%–41.2%). The domains with higher percentage of correct answers were 'Philosophy of palliative care' (24%–74.7%) and 'Pain and symptom management' (25.8%–79.3%).

**CONCLUSION** Knowledge gaps and misconceptions regarding palliative care do exist among nurses. Therefore, educating healthcare professionals is crucial to providing quality care.

## CATEGORY: QUALITY IMPROVEMENT (PHYSICIAN)

AHF14QP012

## High-dependency bookings: are they needed?

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**INTRODUCTION** High-dependency (HD) and surgical intensive care unit (ICU) beds are scarce in KTPH. Only elective cases are booked in the ICU register. Depending on the bed situation, the beds are assigned at the discretion of the ICU consultant. However, not all booked cases require beds, whereas some unbooked cases may require beds. This creates a burden on the ICU/HD bed allocation system, which is dependent on the overall occupancy rate in the hospital.

**METHODS** We carried out a prospective, observational clinical practice audit to observe the rate of ICU/HD elective case bookings, the reasons for non-utilisation of a booking and the rate of unplanned elective admissions. Using a data collection form, we collected the data over a period of five weeks.

**RESULTS** A total of 131 admissions were reported, with 80% HD and

20% ICU. Elective admissions comprised 48% of admissions, while 52% were emergency admissions. About 49% were booked admissions. The commonest reason for admission was 'patient comorbidities' (77%). Of all admission requests, 63% were accepted and 37% were rejected. The commonest reason for rejection was 'no need after operation' (73%). Of all requests, 92% were for elective cases and 8% were for emergency cases. Of those requested, only 25% were finally admitted. About 6% of elective admissions were unplanned.

**CONCLUSION** There are few standards available in the literature for our aims. Most booking requests are not followed through most often because there is no need felt after operation. Hence, while we recommend a more judicious booking strategy, we should avoid unplanned admissions and continue to monitor our statistics.

## CATEGORY: QUALITY IMPROVEMENT (PHYSICIAN)

AHF14QP013

## A review of ultrasound-guided renal biopsy carried out at Khoo Teck Puat Hospital

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**INTRODUCTION** Real time ultrasound-guided percutaneous renal biopsy is performed to establish the diagnosis and prognosis for patients with kidney disease. This study aimed to assess the indication and outcome of renal biopsy.

**METHODS** Patients who underwent native kidney biopsy from 7 January 2013 to 2 May 2014 were reviewed. The demographic information, clinical data and outcomes of the renal biopsy were obtained. The outcomes were monitored within 48 hours post biopsy. Clinically significant events were macroscopic haematuria, perinephric haematoma, hypotension and intervention.

**RESULTS** A total of 50 renal biopsies were performed. The mean age of the patients was  $45.7 \pm 16.2$  years (50% male, 18% diabetic). The indications were proteinuria and/or microscopic haematuria ( $n = 26$ ) and renal impairment with or without abnormal urine analyses ( $n = 24$ ). The median estimated glomerular filtration rate (GFR) was

38.5 ml/min and urine protein was 2.6 g/d. Urgent renal biopsy was performed in 62% of the cases. Most of the biopsies were done by nephrologists except for four cases. The left kidney was the predominant biopsy site (90%). About 10% of the patients required haemodialysis prior to renal biopsy, where their mean GFR was 8.6 ml/min. The minor complications were haematuria ( $n = 2$ ) and haematoma ( $n = 4$ ). The major events were perinephric haematoma ( $n = 2$ ) and pseudoaneurysm ( $n = 1$ ) that required renal angiogram; two patients had embolisation done. Hypotension developed in two patients with perinephric haematoma and required transfusion. There were no surgical interventions or mortality related to renal biopsy.

**CONCLUSION** Ultrasound-guided renal biopsy is relatively safe in a controlled setting. Periodic audits should be conducted to minimise complications.

## CATEGORY: BASIC SCIENCE RESEARCH

AHF14BS009

## Determinants of elevated high-sensitivity C-reactive protein in a type 2 diabetic multiethnic Asian population (SMART2D)

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**INTRODUCTION** Type 2 diabetes mellitus (T2DM) is associated with systemic low-grade inflammation. However, its key determinants are unclear, especially among Asians. High-sensitivity C-reactive protein (hsCRP) is a well-established biomarker of inflammation. We hypothesise that traditional metabolic risk factors contribute to increased hsCRP in multiethnic Asians with T2DM.

**METHODS** We measured plasma hsCRP concentration in 1,926 individuals with T2DM (mean age  $57 \pm 11$  years; 50.5% male, 53.6% Chinese, 22.6% Malay, 23.8% Indian) using enzyme-linked immunosorbent assay. The cut-off point of  $> 5$  mg/L was used to define elevated hsCRP. The clinical and biochemical characteristics of participants with elevated hsCRP (H-CRP,  $n = 444$ ) were compared to those of the remaining population (N-CRP,  $n = 1,482$ ).

**RESULTS** When compared to N-CRP, H-CRP displayed increased adiposity ( $p < 0.001$  for body mass index [BMI], waist circumference, visceral fat area and body fat percentage), glycaemia (fasting plasma glucose,  $p = 0.001$ ; HbA1c,  $p < 0.001$ ), hyper-

lipidaemia (total cholesterol,  $p = 0.001$ ; HDL,  $p = 0.001$ ; LDL,  $p = 0.003$ ; triglycerides,  $p = 0.001$ ), renal impairment (albuminuria [ACR,  $p = 0.001$ ], estimated glomerular filtration rate,  $p = 0.018$ ), and endothelial dysfunction (vasodilatory response to acetylcholine [ACh,  $p = 0.025$ ]). No significant difference in indices of blood pressure (systolic and diastolic blood pressures), liver function (alanine- and aspartate-aminotransferases) and vascular function (pulse wave velocity, augmentation index, vasodilatory response sodium nitroprusside) was observed between the two subgroups. Binary logistic regression analysis demonstrated that HbA1c (OR = 1.156,  $p = 0.001$ ), log-LDL (OR = 2.597,  $p = 0.049$ ) and BMI (OR = 1.124,  $p < 0.001$ ) rather than log-ACR and ACh were independent risk factors of elevated hsCRP after adjustment for age, gender and ethnicity.

**CONCLUSION** Metabolic risk factors are important determinants of systemic inflammation in Asians with T2DM. Therefore, management of weight, glycaemia and dyslipidaemia may ameliorate inflammation.

## CATEGORY: CLINICAL RESEARCH (ALLIED HEALTH)

AHF14CA007

## Retrospective review of nephrotoxicity of once daily dosing versus extended interval dosing of aminoglycosides in the elderly

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**INTRODUCTION** Elderly patients are more susceptible to nephrotoxicity caused by aminoglycosides. We aimed to compare the nephrotoxicity incidence of once daily and extended interval dosing regimens in the elderly, to observe any relationship between serum trough concentration and nephrotoxicity and to determine whether results from prior overseas studies are relevant to our local elderly population.

**METHODS** This was a retrospective single-centre cross-sectional study analysing the use of amikacin and gentamicin. Data between October 2012 and December 2013 were retrieved from Sunrise Clinical Manager. Patients > 65 years of age who were given  $\geq 2$  aminoglycoside doses, and had urinary tract infection or pneumonia were included in the study. Patients with infective endocarditis and those without baseline and subsequent creatinine data were excluded.

A total of 180 patients were stratified into once daily or extended interval dosing arm. Nephrotoxicity was defined as increases in serum

creatinine of  $\geq 44$  mmol/L from baseline within one week of the last dose.

**RESULTS** A higher nephrotoxicity rate was seen in the extended interval arm compared to the once daily arm; however, it was not statistically significant (11.6% vs. 8.1%,  $p = 0.61$ ). There was no significant difference in the mean amikacin ( $p = 0.360$ ) or gentamicin dose ( $p = 0.531$ ) administered for both arms. Subgroup analysis based on age showed no significant difference in nephrotoxicity in older age groups. Most nephrotoxicity cases had high serum trough levels of  $\geq 2.0$  mg/L (88.9% in once daily arm; 100% in extended interval arm).

**CONCLUSION** An increased rate of nephrotoxicity was observed with extended interval dosing, which was not statistically significant. Most patients who developed nephrotoxicity had high serum aminoglycoside trough levels. Further studies are required to ascertain the correlation between serum trough levels and nephrotoxicity.

## CATEGORY: CLINICAL RESEARCH (ALLIED HEALTH)

AHF14CA008

## Determining the six-month bleeding incidence in patients receiving novel antiplatelets

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**INTRODUCTION** Dual-antiplatelet therapy is a cornerstone in the management of post-percutaneous coronary intervention (PCI) patients. Clopidogrel, in combination with aspirin, was the mainstay of treatment until the advent of prasugrel and ticagrelor. These are faster in onset and may be more likely to cause bleeding. Apart from the two landmark studies which led to their approval, bleeding incidences have not been reported. This retrospective study, conducted at Khoo Teck Puat Hospital, aimed to determine the incidence of clinically significant bleeding in patients taking prasugrel or ticagrelor, and to identify the possible risk factors for bleeding.

**METHODS** Post-PCI patients taking prasugrel or ticagrelor between October 2011 and September 2013 were reviewed. The patients were followed up for a maximum of six months. Bleeding events were classified using the Thrombolysis in Myocardial Infarction (TIMI) and Bleeding Academic Research Consortium definitions. The possible

risk factors for bleeding were evaluated. Efficacy outcomes such as all-cause mortality, myocardial infarction and repeat revascularisation were also recorded.

**RESULTS** The study included data from 304 patients (prasugrel,  $n = 119$ ; ticagrelor,  $n = 185$ ). The cumulative incidences of significant bleeding events (TIMI requiring medical attention and above) in patients receiving prasugrel and ticagrelor were estimated to be 6.12% and 3.72%, respectively, over six months. Female gender, history of gastrointestinal diseases and concomitant oral anticoagulant use were the risk factors for bleeding.

**CONCLUSION** A six-month incidence of significant bleeding for patients receiving prasugrel and ticagrelor was determined. Prasugrel and ticagrelor should be used with caution in patients at higher risk of bleeding.



## CATEGORY: CLINICAL RESEARCH (ALLIED HEALTH)

AHF14CA010

## Alternative ankle brachial index predicts arterial compliance in patients with type 2 diabetes mellitus

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**INTRODUCTION** Peripheral arterial disease (PAD) is diagnosed when ankle brachial index (ABI) is  $\leq 0.90$ . ABI is the ratio of ankle pressure (measured at the dorsalis pedis [DP] and posterior tibial [PTA] arteries) to the brachial systolic pressure. Traditionally, the higher figure between the DP and PTA is used as the numerator. Using the lower of the two as numerator to calculate ABI ('Alternative-ABI') is likely to identify at-risk patients earlier and has been reported to be associated with increased 5-year risk of cardiovascular mortality. We hypothesised that even before established PAD, arterial dysfunction had already existed in Pre-PAD (Classical-ABI  $> 0.9$  but Alternative-ABI  $\leq 0.90$ ).

**METHODS** We consecutively recruited patients ( $n = 2,058$ ) with type 2 diabetes mellitus (August 2011 to April 2014). Their demographics and anthropometric, arterial compliance indices (by Augmentation Index) were collected. Ankle pressures were measured by Doppler ultrasound. ABI (classical and alternative) was calculated as described above. Patients with borderline Classical-ABI ( $0.91-0.99$ ) and

non-compressible vessels ABI  $> 1.4$  were excluded. Chi-square and ANOVA were used to compare the differences between Classical-PAD, Pre-PAD and controls with no PAD.

**RESULTS** The mean age of the patients was  $57.5 \pm 10.8$  years. The patients were classified into Controls (Classical-ABI =  $1.0-1.4$ ;  $n = 1,110$ ), 'Pre-PAD' ( $n = 164$ ), and Classical-PAD ( $n = 244$ ). Like Classical-PAD, Pre-PAD was more common in females ( $p < 0.0001$ ). Augmentation index (AI) ( $p < 0.0001$ ) was significantly higher in Classical-PAD ( $29.50 \pm 9.92\%$ ) and 'Pre-PAD' ( $27.98 \pm 10.85\%$ ) compared to controls ( $25.06 \pm 10.22\%$ ). Age and serum creatinine were significantly higher in Classical-PAD compared to 'Pre-PAD' and no-PAD. Even after adjusting for age, gender, height and creatinine, AI remained an independent predictor of Pre-PAD ( $p = 0.046$ ).

**CONCLUSION** Patients with Pre-PAD showed increased arterial stiffness and reduced compliance. Alternative-ABI may potentially be useful to identify at-risk individuals with pre-clinical vascular disease.

## CATEGORY: CLINICAL RESEARCH (NURSING)

AHF14CN006

## A retrospective audit: comparison of below- and above-knee amputation using oral analgesia vs. single infusion peripheral nerve device vs. continuous peripheral nerve infusion

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**INTRODUCTION** Below- and above-knee amputations (BKAs, AKAs) are painful operations that involve physical, psychological and emotional components; thus, adequate analgesia is an important intervention that can facilitate early rehabilitation and recovery. The use of continuous peripheral nerve block (PNB) has proven to reduce pain in the amputated limb. PNB infusions with local anaesthetic agents enable patients to have adequate analgesia whenever they experience pain. Having good pain control would help patients alleviate their fears of having lost their limb. Amputee patients on oral analgesia alone have suboptimal pain control with an increased incidence of uncontrolled stump and phantom limb pain, as compared to those with PNB.

**METHODS** A total of 17 patients who underwent BKA and AKA from

December 2013 to June 2014 received continuous PNB infusion while six patients received single PNB. This was compared to our historical data of 17 patients who had received only oral analgesia after BKA/ AKA from January to November 2013.

**RESULTS** Successful continuous nerve blockade was achieved in 12 patients. Our data showed that stump pain is better controlled and tolerable at rest and movement, facilitating better participation of the amputee patients in their rehabilitation. The regime used was 0.1% ropivacaine infusion of 7 ml/h.

**CONCLUSION** The use of a continuous PNB is potentially an efficacious and safe technique for postoperative analgesia in patients undergoing amputation. Further research into this area would be valuable to establish its validity over other techniques in these patients.

## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP007

## Melatonin premedication reduces postoperative pain and preoperative anxiety for wisdom teeth extraction: a randomised placebo-controlled trial suggests possible gender dimorphism

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**INTRODUCTION** Pain after wisdom teeth extraction can be moderate in severity, and is compounded by preoperative anxiety in young patients presenting for surgery. Melatonin possesses sedative, anti-inflammatory, antioxidative and chronobiotic effects. We aimed to study the effect of melatonin premedication on postoperative pain and preoperative anxiety in patients undergoing elective extractions of all four wisdom teeth.

**METHODS** A total of 76 patients were randomised to receive either melatonin 6 mg or placebo 90 min preoperatively. General anaesthesia and perioperative analgesia regime were standardised. Visual analogue scale (VAS) for postoperative pain was assessed at six time intervals, while preoperative anxiety was assessed at three time intervals. Patient satisfaction scores and postoperative sleep quality on the first night were also determined. Mixed effect regression models were used for

longitudinal analysis of VAS pain, anxiety and satisfaction scores.

**RESULTS** The baseline demographic factors were comparable between the groups. The maximum VAS pain and anxiety scores were  $18.6 \pm 19.1$  mm at 60 min postoperatively and  $26.2 \pm 23.4$  mm at 90 min preoperatively. After adjusting for gender, female patients who were administered melatonin had a faster rate of reduction of VAS pain scores ( $p = 0.02$ ) and VAS anxiety scores ( $p = 0.003$ ) over time compared to placebo. No such effect was demonstrated in male patients. There was no significant difference in the sleep quality on the first night or satisfaction scores between the groups.

**CONCLUSION** Gender-specific effects of melatonin premedication were observed. Female rather than male patients may benefit from analgesic and anxiolytic effects of melatonin in wisdom teeth surgery under general anaesthesia.

## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP008

## Effect of cooling proparacaine 0.5% eye drops on patient comfort during instillation

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**INTRODUCTION** This study aimed to determine the difference, if any, in pain score and duration of pain between cooled proparacaine eye drops and room temperature proparacaine eye drops in a prospective, randomised, double-blinded clinical trial.

**METHODS** A total of 25 subjects were recruited from the adult clinic staff at our institution. All volunteers were healthy subjects with no pre-existing ocular disease, surgery, pregnancy or eye drop usage. Each subject received one drop of refrigerated ( $4^{\circ}\text{C}/39.2^{\circ}\text{F}$ ) proparacaine hydrochloride 0.5% in one eye and one drop of proparacaine hydrochloride 0.5% at room temperature ( $23^{\circ}\text{C}$ – $25^{\circ}\text{C}$  /  $73.4^{\circ}\text{F}$ – $77^{\circ}\text{F}$ ) in the other eye in a double-blinded, randomised manner. The subjects were asked to rate their pain score using a previously validated visual analogue

scale (VAS), and the duration of stinging was timed after each drop. The results were analysed using Student's *t*-test on SPSS version 21.

**RESULTS** The mean pain score was slightly lower in cooled proparacaine ( $13.16 \pm 9.96$  mm) than that at room temperature ( $14.22 \pm 10.31$  mm). The difference of 1 mm was not statistically significant ( $p = 0.549$ ). However, the mean duration of stinging for cooled proparacaine was  $10.68 \pm 7.14$  seconds compared to  $12.79 \pm 8.60$  seconds for room temperature proparacaine, which was found to be statistically significant ( $p = 0.036$ ).

**CONCLUSION** We found that cooling proparacaine eye drops reduces the duration of pain associated with instillation but not the severity.

## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP009

## Combining subjective informant and objective cognitive measures improves diagnostic accuracy for dementia

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**INTRODUCTION** Dementia diagnosis is best achieved by combining a detailed history with objective cognitive tests. However, this can be time- and manpower-intensive in the primary care setting. This study investigates the diagnostic utility of a brief screening tool incorporating a short informant interview (AD8) with a brief cognitive measure comprising sub-components of the Mini-Mental State Examination (MMSE).

**METHODS** Patients with early dementia (PWD) (Clinical Dementia Rating [CDR] = 0.5/1, N = 159) were matched with community-dwelling, cognitively intact controls (CDR = 0, N = 86). All subjects underwent cognitive testing and clinical evaluation for dementia with the CDR scale and the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria. Receiver operator characteristic curves were generated to compare the diagnostic performance of AD8 with MMSE. The combination of AD8 and MMSE and its various sub-components was also explored with

stepwise logistic regression to determine the combination that best discriminated PWD and controls.

**RESULTS** The mean age of the subjects was 73.6 ± 8.7 years (64.1% female, 60.4% had ≤ 6 years of education). PWD had lower MMSE (20.83 vs. 26.76,  $p < 0.001$ ) and higher AD8 scores (5.13 vs. 0.77,  $p < 0.001$ ) than controls. AD8 combined with MMSE yielded an area under the curve (AUC) of 0.95 (95% CI 0.92–0.98), which was superior to that using either test alone. Combining AD8 with the 3-item recall and intersecting pentagon of the MMSE was comparable to AD8 with the full MMSE, with an AUC of 0.946 (95% CI 0.919–0.973), and good sensitivity (87.2%) and specificity (88.1%).

**CONCLUSION** AD8 combined with three-item recall and intersecting pentagon has high diagnostic utility for dementia and holds promise as a brief (5-min) screening tool for dementia in the busy primary care setting.

## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP010

## PROSPECT guidelines incorporating continuous femoral nerve block improve postoperative pain and ambulation after knee arthroplasty

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**INTRODUCTION** PROSPECT recommends multimodal analgesia and continuous femoral nerve block for managing postoperative pain after total knee arthroplasty. The guidelines were implemented in KTPH, and postoperative pain control and ambulation after knee arthroplasty were assessed.

**METHODS** After approval from the department audit committee, prospective evaluation of the usefulness of PROSPECT guidelines with continuous femoral nerve was conducted over three months. Irrespective of anaesthesia (GA or spinal) a femoral nerve catheter was placed preoperatively and a bolus of 20 ml 0.1% ropivacaine was administered. Postoperatively, all patients received paracetamol (1 g) three hourly, etoricoxib (90–120 mg) once daily and oxycodone 5 mg six hourly, as required (if pain score > 3) for five days as recommended by PROSPECT. Femoral nerve catheter infusion included 0.1% ropivacaine (7 ml/h on the first day and 5 ml/h on the second day) for

48 hours, and the catheter was removed on the third day.

**RESULTS** A total of 50 patients (GA 31, spinal 19) were evaluated for pain (see Table) and ambulation. Of these, 46 were able to ambulate independently by Day 3 and all, by Day 5. A total of 34 patients were discharged by Day 4 and a further 14 patients, by Day 5.

**CONCLUSION** PROSPECT guidelines with continuous femoral nerve block helped achieve satisfactory pain relief and ambulation by the third day in majority of the patients.

Day	Pain score					
	Rest			Dynamic		
	Mild	Moderate	Severe	Mild	Moderate	Severe
1	44	5	1	13	29	8
2	45	5	0	33	14	3
3	50	0	0	41	9	0

## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP011

## A descriptive profile of patients under transitional care service

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**INTRODUCTION** Transitional care (TC) service ensures continuity of care as patients transfer between hospital and home, and is based on comprehensive management of medical, nursing and rehabilitation issues, and education of patients and their families. This study describes the characteristics of patients seen by the KTPH TC Service.

**METHODS** A retrospective analysis of the characteristics of patients referred to the TC service from 1 April 2012 to 30 April 2014 was conducted. Data collected included sources of referral, patients' socio-demographic, functional and cognitive status, length of stay in TC and post-TC discharge destination.

**RESULTS** Out of 1,516 referrals, 975 (64%) were actualised. The commonest reason for non-actualisation was rejection by families due to cost factor (23%). The average age of the patients was 84 years, with a predominance of female (64%) and Chinese (71%) patients.

About 74% of the referrals were inpatients, the commonest referring speciality being Geriatric Medicine (70%), followed by General Medicine (15%) and Orthopaedic Surgery (4%). About 52% of patients were dependent in at least three activities of daily living, and 50% had Abbreviated Mental Test scores of 6 or less, indicating cognitive impairment. The average duration of TC service was 29 days, after which patients were mostly discharged to Specialist Outpatient Clinics (49%) or home care services (38%). Of the 70 patients who died, 61 died at home.

**CONCLUSION** Patients under the TC service tend to be elderly who are functionally dependent and cognitively impaired. Challenges faced by the service include reducing the cost to make it more acceptable to families, creating awareness and increasing referrals from other departments (besides Geriatrics).

## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP012

## Quantitative analysis of perfusion defects on dual-energy CT pulmonary angiography in patients with acute pulmonary embolism: correlation with biochemical markers, echocardiographic findings and adverse clinical outcomes

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**INTRODUCTION** This is a continuous clinical quality improvement endeavour aimed to investigate the prognostic value of perfusion defect volume measurements in patients with acute pulmonary embolism (PE) using dual-energy computed tomography lung technique.

**METHODS** A total of 34 cases were included in the study and their hospital records were reviewed. The images were analysed on SyngoVia™ Workflow clinical imaging solutions. The association of large perfusion defects with right ventricular dilatation and abnormal troponin was determined using the chi square test. A binomial logistic regression with adverse clinical outcome as outcome variable was performed, and ROC curves were drawn for models with and without perfusion defects (PD) vol%.

**RESULTS** The PD vol% range was 0.9–29.2 (median 6.0). The mean

PD vol with raised troponins was 14.8% against 4.1% in normal levels. Similarly, in patients with right ventricular dilatation (RVD), the PD vol was 17.4% compared to 5.9% in those without it. Large perfusion defects (PD vol > 10%) were more likely to have RVD and raised troponin levels (odds ratio 21.3 vs. 13.3). PD vol% improved the overall diagnostic accuracy when combined with troponin levels and echocardiographic finding of RVD (area under the curve increased from 0.71 to 0.91). There were four adverse clinical events, with two patients who died of acute PE (PD vol%: range 17.2–26.9; mean 22.9).

**CONCLUSION** Large PDs measured on dual-energy computed tomography pulmonary angiography are associated with raised troponins and right heart strain. Patients with adverse clinical outcomes have a larger PD vol%. PD vol% can serve as an additional parameter to stratify patients into different risk categories.

## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP013

# Changing profile of first-time hearing aid users managed by a tertiary medical institution over the past decade

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**INTRODUCTION** We hypothesised that better awareness of the disability of hearing impairment in Singapore may result in hearing aids (HAs) being fitted earlier and at milder hearing loss.

**METHODS** Records from the Department of Otorhinolaryngology, Tan Tock Seng Hospital, Singapore were analysed retrospectively. A total of 1,064 users were stratified into four cohorts by the year of first fitting of HAs (Cohort 1: 2003–2008, n = 217; Cohort 2: 2009–2010, n = 283; Cohort 3: 2011–2012, n = 351, Cohort 4: 2013, n = 211). Complete yearly data were available from 2009 onwards.

**RESULTS** The absolute number of users increased by 45.5% from 2009 to 2013, as opposed to a population increase of 8.2%. The mean age of users generally increased (67.7–71.1–70.1–69.9, p = 0.047). Furthermore, the age ranges also widened across the cohorts (24–90 to 11–109 to 10–95 to 0–92). Despite this increase in age, which was positively correlated with hearing thresholds (Spearman's rho

0.115, p < 0.001), the mean hearing threshold actually decreased (61.6 dB–64.1 dB–64.6 dB–60.3 dB, p = 0.047). The lowest threshold for fitting HAs dropped (35.0 dB–22.5 dB–21.3 dB–10.0 dB), with more users being fitted at mild (21–40 dB) hearing loss (2.8%–3.5%–4.0%–6.2%, p = 0.009). More users were fitted bilaterally (11.5%–9.2%–21.9%–28.4%, p < 0.001). After adjusting for inflation, it was observed that users were spending more on hearing aids (\$1,096–\$2,212–\$2,594–\$2,728, p < 0.001).

**CONCLUSION** HAs are gaining greater acceptance in Singapore. More users are fitting HAs and are willing to spend more or be fitted bilaterally. The increase in elderly patients likely reflects the ageing local population. Nevertheless, more users with mild hearing loss are seeking HAs, especially the elderly. This reflects better awareness of hearing disability and handicap in Singapore, which will continue to rise in the future.

## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP014

# Management of pathological femoral shaft fracture using pulsed radiofrequency of femoral nerve: a case report

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We report a conundrum of pain secondary to a pathological fracture of the femoral shaft from bony metastases in a terminal 60-year-old female cancer patient. The patient was not keen on surgical fixation due to a limited lifespan and a desire to be comfortable, and initially settled for a femoral nerve catheter with a continuous infusion of 0.1% ropivacaine 5 ml/hr. This afforded a few days of adequate analgesia; however, it was impractical to continue this for weeks due to logistical constraints. Hence, she opted for a trial of pulsed radiofrequency (PRF) of the femoral nerve.

Under ultrasound guidance, a 22-gauge 10-mm tip radiofrequency needle was inserted transverse to the femoral nerve posteriorly and anteriorly. In each position, sensory stimulation of 0.3–0.5 mA ascertained the proximity to the femoral nerve. Using a NeuroTherm

NT2000 machine, PRF was applied for 2 min in two positions anteriorly and another two positions posteriorly, always transverse to the femoral nerve. A total of 8 min of PRF was applied and 20 ml of 0.25% plain bupivacaine was injected before the final PRF to alleviate discomfort.

Up to three weeks post procedure, the patient reported adequate analgesia and satisfaction. Pain scores on an 11-point numerical rating scale dropped from 5/10 to 0–2/10 at rest and from 9/10 to 3–4/10 on movement, and was associated with decreased usage of breakthrough oral morphine.

PRF has been used to treat surgically unfit patients with chronic hip pain, which is unlike our case. PRF of the femoral nerve in well-informed, terminally ill patients with pathological fractures of the femur could be considered.



## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP015

## Ondansetron-induced oculogyric crisis: a case report

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A 41-year-old woman with an unremarkable medical history underwent a volar ganglion cyst excision on the left wrist under general anaesthesia. She denied any history of allergy or previous reaction to medications. General anaesthesia with fentanyl, propofol and sevoflurane and 50% O<sub>2</sub> in air via a laryngeal mask airway was used. About 10 min before emergence, the patient was administered PONV prophylaxis with 4 mg ondansetron.

On emergence, she opened her eyes on command, but manifested upward and outward deviation of the eyeballs. She was oriented but unable to see. The patient had intermittent, conjugate, spasmodic eye movements in lateral and vertical directions to each side, consistent with an oculogyric crisis, and presented with limb dystonia with plantar flexion. The vital signs were stable. An internet search for medications that could trigger an oculogyric crisis was made and ondansetron

was the only temporally related drug. Other causes of central nervous disturbances such as hypoxia, epilepsy, hypoglycaemia and cardiovascular disturbances were excluded.

As the patient was distressed, midazolam 2 mg was given. Two doses of benztropine 1 mg were given intravenously. The whites of the patient's eyes were visible for the next three hours. The eyeballs returned to normal position in the third hour.

Ondansetron has an excellent safety record; however, the extrapyramidal side effects are not mentioned in the package insert. Although ondansetron has no affinity for dopamine receptors, it may produce dopamine receptor-mediated side effects in certain patients by an unknown mechanism. We are trying to increase awareness regarding this side effect.

## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP016

## Wound infection rate in minimally invasive spine fracture fixation

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**INTRODUCTION** Polytrauma patients have increased susceptibility to post-surgical wound complications due to prolonged recumbence and physiological compromise. We believe that minimally invasive surgery (MIS) of the spine may reduce the incidence of deep wound infections through smaller and less traumatic surgical incisions, as compared to open surgery for thoracolumbar fractures. This study aimed to assess the incidence of postoperative wound infection following MIS for thoracolumbar fractures.

**METHODS** A total of 30 consecutive patients who underwent MIS surgery for thoracic and lumbar spine fractures at our unit were studied. These patients were monitored for signs of both superficial and deep infection. Wound infection was graded according to the Centers for

Disease Control and Prevention (CDC) classification.

**RESULTS** There were 4 (13%) patients with postoperative wound infections, of which one was a deep infection (3%) requiring a wound debridement and prolonged antibiotics. The duration of surgery, age and comorbidities were not associated with a higher wound infection rate ( $p > 0.05$ ). These results were much lower when compared to open fixation rates in the published literature (3% vs. 75%).

**CONCLUSION** With a low incidence of wound infection, MIS for thoracolumbar spine fractures provides a strong and validated alternative to open surgery, especially for patients who are more susceptible to wound infections.

## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP017

## Glycaemic control in patients undergoing cataract surgery under local anaesthesia: practice survey of Singapore ophthalmologists and anaesthetists

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**INTRODUCTION** Perioperative glycaemic control is considered an important aspect of managing diabetes mellitus during cataract surgery under local anaesthesia. Long-term glycaemic control has significant general implications, but perioperative hypoglycaemia or hyperglycaemia may compromise patient safety as well as surgical outcome. We aimed to survey the practice of Singapore ophthalmologists and anaesthetists regarding perioperative management of diabetes mellitus during cataract surgery.

**METHODS** A cross-sectional questionnaire-based survey of ophthalmologists and anaesthetists working in Singapore public hospitals was conducted. The respondents were approached individually and asked to complete self-administered questionnaires comprising questions related to practice, clinical scenarios and awareness of pre-existing guidelines on perioperative diabetes management in patients undergoing cataract surgery under local anaesthesia.

**RESULTS** Among a total of 139 participants, 76 (58.9%) ophthalmologists and 53 (41.1%) anaesthetists responded to the questionnaires. A majority but similar number of ophthalmologists and anaesthetists chose to withhold oral hypoglycaemic agents (82.9%) and/or insulin (69.8%), and fast the patient preoperatively. A blood glucose level > 17 mmol/L would prompt 86.0%–93.8% of respondents to adopt a 'treat and defer' strategy, while a level > 23 mmol/L would prompt 86.0%–96.9% of respondents to cancel cataract surgery. The respondents were consistently more concerned about perioperative hyperglycaemia (n = 99, 76.7%) than intraoperative hypoglycaemia (n = 83, 64.3%).

**CONCLUSION** The survey identified the preferred practice pattern of Singapore ophthalmologists and anaesthetists on perioperative diabetes management in patients undergoing cataract surgery under local anaesthesia. Further research, which would help in formulating formal guidelines and protocols, is required.

## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP019

## Survey on the knowledge and attitudes of anaesthetists regarding control and accountability of controlled drugs in the operating room and substance abuse in anaesthesia

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**INTRODUCTION** A survey of anaesthetists in public and private practice in Singapore was conducted to determine their knowledge of rules and regulations regarding controlled drug distribution, usage and disposal in the operation room and their attitudes towards substance abuse in anaesthesia.

**METHODS** An online survey was created (SurveyMonkey®, Palo Alto, CA, USA), and the link to the online questionnaire was sent via email to all anaesthetists working in the private hospitals and the seven public hospitals in Singapore.

**RESULTS** A total of 585 surveys were sent and only 108 completed surveys were received, giving a response rate of 18.5%. Based on this survey, the majority of anaesthetists in Singapore were aware of the procedures pertaining to the control and accountability of controlled

substances. However, more than half of the respondents (53%) disagreed that substance abuse was common in anaesthesia. About two-thirds of the respondents mentioned that they did not receive formal education on substance abuse during their anaesthesia training in Singapore. A large majority (92%) of survey respondents were not aware of treatment programmes for physicians with controlled drug addiction.

**CONCLUSION** Although the overall response rate of the survey was poor, we believe that raising awareness about controlled drugs and substance abuse will be a worthwhile exercise and might help initiate the formation of a service or facility for the prevention, treatment and counselling of affected anaesthetists.

## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP020

## Audit of KTPH pain protocol and rescue analgesia requirement after total knee arthroplasty

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**INTRODUCTION** All patients undergoing total knee arthroplasty (TKA) in KTPH have received PROSPECT-recommended analgesia regimen since January 2012. PROSPECT recommends preoperative femoral nerve block (FNB), postoperative oral/IV analgesics and continuous FNB. Some anaesthetists perform additional sciatic nerve block (SNB). We audited the effectiveness of the PROSPECT regimen and rescue analgesia requirements after TKA between January and December 2013.

**METHODS** Ultrasound-guided FNB with catheter (0.5% ropivacaine 20 ml) and/or single SNB (0.5% ropivacaine 20 ml) was performed before anaesthesia. The primary anaesthesia (spinal or general anaesthesia [GA]) depended on the patient's wish, comorbidities and the anaesthetist's preference. Postoperatively, all patients received the PROSPECT regimen and continuous FNB (0.1% ropivacaine infusion 7 ml/hr on Day 1, 5 ml/hr on Day 2), and the catheter was removed on Day 3. If the visual analogue score (VAS) was > 4, ropivacaine infusion 7 ml/hr on Day 1, 5 ml/hr on Day 2), and the catheter was removed on

Day 3. If the visual analogue score (VAS) was > 4, ropivacaine infusion was increased to 12 ml/hr. If VAS was > 6, ultrasound-guided SNB was performed for rescue analgesia.

**RESULTS** A total of 176 patients underwent TKA (1 GA, 85 GA + FNB, 5 GA + FNB + SNB, 2 spinal, 81 spinal + FNB, 2 spinal + FNB + SNB). The GA patient had no nerve block and required patient-controlled analgesia with morphine. About 12% of the patients (GA + FNB) had VAS > 6 and required rescue analgesia. None of the patients with GA + FNB + SNB (n = 5) required further analgesia. Surprisingly, two spinal (no nerve block) patients did not require further analgesia. About 19% of the patients (spinal + FNB) required rescue analgesia. Two patients (spinal + FNB + SNB) did not require further analgesia.

**CONCLUSION** More than 81% of the patients who received PROSPECT and continuous FNB reported good postoperative pain relief after TKA. SNB was helpful as a rescue analgesia if VAS was > 6. None of the patients who had SNB and FNB required further analgesia.

## CATEGORY: CLINICAL RESEARCH (ALLIED HEALTH)

AHF14CA013

## Implementation of an individualised neuromuscular blockade protocol: a single-centre observational study

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**INTRODUCTION** This observational study aimed to compare outcomes in patients whose atracurium doses were individualised by a standardised neuromuscular blockade dosing protocol using Train-Of-Four (TOF) monitoring (Post-P: post-protocol) versus standard care (Pre-P: pre-protocol) in critically ill, mechanically ventilated medical patients.

**METHODS** This was a single-centre, retrospective cohort study where patients who required a continuous infusion of atracurium were recruited. The mean infusion doses, duration of patients at goal TOF (2/4) and duration of patients' over paralysis (TOF 0/4) were compared. Analysis was performed by two-tailed, unpaired *t* test and Fisher's exact test.

**RESULTS** A total of 42 subjects were recruited, with 21 patients in Pre-P arm and 21 in Post-P arm. The mean atracurium infusion

dose was higher in the Pre-P arm ( $7.1 \pm 3.6$  mcg/kg/min) than that in the Post-P arm ( $5.8 \pm 1.8$  mcg/kg/min); however, this difference was not statistically significant ( $p = 0.140$ ). A higher amount of bolus doses was administered in the Post-P arm ( $0.2 \pm 0.6$  mg/kg/24 hr vs.  $0.8 \pm 1.1$  mg/kg/24 hr,  $p = 0.03$ ). Post-P patients were at goal TOF for a higher percentage duration compared to Pre-P patients ( $5.69\% \pm 11\%$  vs.  $9.82\% \pm 18.6\%$ ,  $p = 0.387$ ). Post-P patients also had a shorter percentage duration of over paralysis as compared to Pre-P patients ( $18.4\% \pm 23.9\%$  vs.  $16.0\% \pm 18.5\%$ ,  $p = 0.726$ ).

**CONCLUSION** The use of an individualised, standardised neuromuscular blockade dosing protocol using TOF did not result in significant dose reduction, but did show promising results in maintaining patients at goal TOF without over paralysis.

## CATEGORY: CLINICAL RESEARCH (PHYSICIAN)

AHF14CP022

# Profile of hearing aid users in Singapore: difference between single and multiple fittings

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<sup>1</sup>Ministry of Health Holdings (MOHH), Singapore

**INTRODUCTION** With an ageing population, more users may require multiple hearing aids (HAs), and it is important to understand the differences in user characteristics between single and multiple users.

**METHODS** Existing audiological records (2003–2013) from Tan Tock Seng Hospital, Singapore were analysed retrospectively.

**RESULTS** A total of 1,153 HAs were fitted on 1,065 users. Two cohorts were identified, namely single fitting, in which users were fitted with HAs only once ( $n = 995$ , 93.4%), and multiple or successive fittings, where users were fitted with subsequent HAs ( $n = 70$ , 6.6%) at a mean interval of 3.39 years. Of the latter, 43.7% were sequential bilateral fittings (mean interval 3.03 years) and the rest were ipsilateral replacements (mean interval 3.67 years). The differences between the two cohorts were as follows: (1) Successive fittings were generally done

at a younger age as compared to single fittings (mean 67.1 years vs. 70.0 years;  $p = 0.083$ ); (2) Although the difference was not statistically significant, multiple fittings began at milder hearing loss as compared to single fittings (61.0 dB vs. 63.1 dB;  $p = 0.186$ ); (3) Users who fitted multiple HAs spent less per fitting session (S\$1,798 vs. S\$2,417,  $p = 0.001$ ), possibly because single fitting users purchased bilateral HAs immediately (18.4% vs. 8.6%,  $p = 0.046$ ); and (4) Multiple HA users were more regular in their device usage based on self-reported usage at one month (1.4% vs. 11.4%;  $p < 0.001$ ).

**CONCLUSION** Age and degree of hearing loss at the time of acquisition of the first HA could possibly predict subsequent acquisition of HAs. However, in Singapore, there is no formal government funding for HAs; hence, financial ability would also likely influence the timing of subsequent HA acquisitions.

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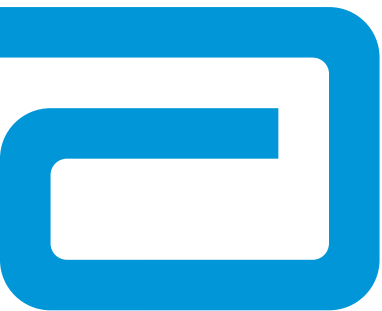
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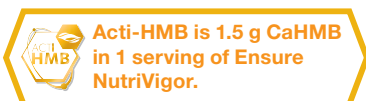




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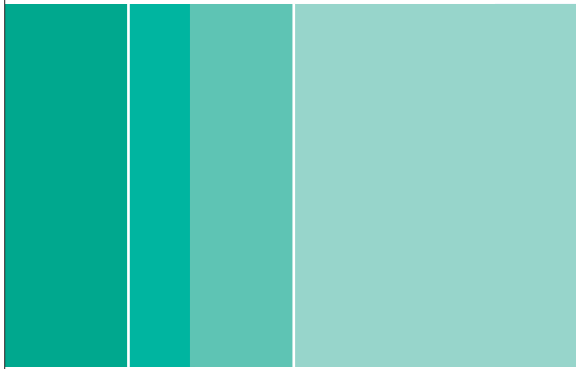
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