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ENGINEERING

**the Flow of
Healthcare**

Healthcare Administrators



COVER FEATURES

The Team

Editorial Directors
Prof. Tan Huay Cheem
A/Prof. Poh Kian Keong

Editor
Ms. Angeline Tan

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www.youtube.com/user/nuhcs



nuhcs_pulse@nuhs.edu.sg

 **National University
Heart Centre, Singapore**

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For this issue, we see the development of comprehensive nursing and research staff capability that complements the medical manpower and fulfill service needs in the NUHCS, alongside a strong operations and administration support.

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NUHCS pushes the envelope in surgical training with a programme that trains our CTICU team in managing crises.

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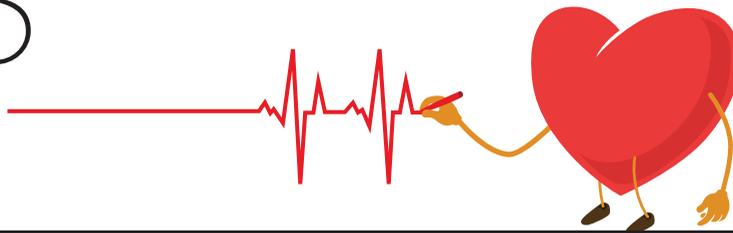
Engineering the Flow of Healthcare

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Tell us what you like and not like about this issue of Pulse and the best entries will stand to win **a pair of 4GB USB wrist band worth \$20!**

Send your entry to nuhcs_pulse@nuhs.edu.sg with your name.

Winning entries will be featured in the next issue of Pulse!



Engineering the Flow of

Healthcare

NUHCS Healthcare Administrators



With a rapidly evolving healthcare landscape and rising patient expectations, administrators play an integral role in healthcare delivery as they work closely with clinical teams to enhance efficiency and quality of care to benefit patients. Dr. Daniel Tan gives us a glimpse into the functions of the Ops & Admin team at NUHCS.



The NUHCS Ops & Admin family comprises Clinical Services, Ambulatory Services, Infrastructure Planning & Development, and Communications & Development teams.





By **Dr. Daniel Tan**
**Assistant Chief
Operating Officer,**
Ops & Admin, NUHCS

Having a double degree in Cell Pathology, Dr. Tan earned his MRCS and subsequently obtained an MBA from the National University of Singapore. His current responsibilities in NUHCS include all clinical operations as well as research administration for Cardiovascular Research Institute (CVRI).

The Ops & Admin team at NUHCS may not interact with patients directly on a day-to-day basis and they may be less visible, but the complex work that they undertake can affect patient care and experience, as well as the reputation of the healthcare organisation.

Striving to Help Patients
Healthcare is often described as a high-touch service, whereby much of the work is done by individuals serving multiple clients or patients. This also holds true for the Ops team at NUHCS, but the clients we serve include both our patients and frontline medical professionals. The team is divided by the areas of responsibilities they cover, such as Outpatient Clinics, Diagnostic Laboratories which includes Cardiac, Nuclear and Vascular Services and Inpatient Wards.

Patient Education and Communications, through our website and YouTube videos, have been great resources for patients to turn to when they face anxiety or need greater clarity about the procedures they are about to undergo.

An often overlooked function is our hardworking Finance colleagues who have the unenviable job of translating national financing policies into

actionable items that can help patients pay for their treatments.

Towards a Common Goal

Beyond just what the Ops team does, it is also about the people who do the job. This is where I should elaborate that most of the Ops staff had little or no previous experience in healthcare prior to their work at NUHCS. Some were fresh out of school, others had work experience in IT, teaching and logistics, at a shipyard, etc., but one thing they have in common is a willing spirit to learn and a shared goal, which is to deliver service that ultimately benefits all our patients.

There is a quote that is apt for healthcare - "Know what your patients want most and what you do best. Focus on where those two meet". This probably sums up what keeps the Ops team going every day. •

NUHCS Workplan Seminar 2016

Reviewing Milestones and Prospects



Prof. Tan Huay Cheem

“2015 was a good year but we always have to look ahead and that is with our vision of becoming one of Asia’s **leading academic health system** by 2020 and one of the world’s leading academic health system by 2030.”

Asst. Prof. Raymond Wong

“The End-to-End Heart Failure Programme aims to provide primary care with opportunities and capabilities to **access non-primary facilities and tools**, as part of our effort to expand cardiovascular disease prevention.”



Asst. Prof. Chan Wan Xian

“Our Transitional Care team aims to coordinate care issues and healthcare services for heart patients so as to reduce hospitalisations and readmissions, and in the long-run **improve quality of life** in a cost-effective manner.”

Asst. Prof. Kristine Teoh

“We hope that the Aortic Centre will serve Singapore with the **latest evidence-based management** of aortic disease and to gain recognition locally and regionally.”



Prof. Arthur Mark Richards

“Centre grants have been a **springboard for the major expansion of our research** at the Cardiovascular Research Institute. In the last three to five years, we have accumulated research grants of about \$15 million and we expect to further succeed.”

The National University Heart Centre, Singapore (NUHCS) Workplan Seminar is a key annual update session for NUHCS staff, where achievements in the previous year are celebrated, challenges that were overcome are shared, and future positive transformations are highlighted. Held on 10 May 2016, this year's seminar had five speakers who shared about our performance and upcoming programmes.

For NUHCS to progress from strength to strength, it was heartening to see an excellent turnout of staff who came to listen, understand and care about what mattered. The session aimed to bring us towards one direction and build a strong sense of identity.

An endeavour that is more important than ever in today's context.



Healing Through Music

Singapore Chinese Orchestra Caring Series

At the National University Heart Centre, Singapore (NUHCS), we believe in bringing live music and performances to patients who are not able to access traditional concert venues and offer relaxation for patients undergoing stressful treatment. Last year, we held a rejuvenating dance performance at the Sculpture Garden. This year, we brought in Singapore Chinese Orchestra to perform on 21 April 2016.

The invigorating experience of a live orchestra not only helped patients, but also their loved ones, to feel more relaxed, joyful and positive in a healthcare environment.





The joyous and infectious good mood resonated with the audience, and some of them even stood up and started singing along from the songbooks given out.



Members of the audience, including Adj. A/Prof. Joe Sim, Chief Executive Officer, National University Hospital (far left) and Prof. Tan Huay Cheem, Director, NUHCS (second from the left), were enthralled by the orchestra and enthusiastic singers.



Go RED for Women

EMPOWERING

Women to Take Care of Their Hearts



Chef Janice Wong demonstrating how to make heart-healthy dishes to the eager participants.

At the National University Heart Centre, Singapore (NUHCS), we champion women's heart health by spearheading educational activities for our female patients, staff and members of the public. Asst. Prof. Chan Wan Xian dishes out highlights of the Go Red for Women event, which had Celebrity Chef Janice Wong of 2am:dessertbar demonstrating heart-healthy and exquisite dessert making to modern women who are health-conscious.

Go Red for Women is an international movement to raise awareness of heart diseases among women and to empower them to lead a heart-healthy lifestyle. To support the movement, NUHCS organises an annual event as part of our Women's Heart Health Programme. **This year, we held our event at 2am:dessertbar at Holland Village, a restaurant headed by celebrity Chef Janice Wong, during the Mother's Day weekend. The event was opened to all of our female patients and staff who entered a contest, sharing memorable moments they had with their mothers.**

Women who attended the event came from all walks of life. They were treated to insightful sessions on women's heart health and stress management

techniques presented by myself and Ms. Jean Nee, Occupational Therapist, NUHCS, followed by a cooking workshop by Chef Janice.

Chef Janice shared heart-healthy recipes which were endorsed by our dietitian. **She demonstrated her award winning Chocolate H2O dessert which has no added fat or sugar, specially created for modern women who are health-conscious.** Chef Janice also shared her own experiences and tips on healthy eating and cooking.

The event saw women coming together to learn about the importance of early lifestyle modifications on their long-term heart health. It also gave them the opportunity to share their health conditions and care options. We hope to continue our efforts in empowering women with self-care capabilities! •



*By Asst. Prof. Chan Wan Xian
Consultant,
Department of Cardiology
Co-director,
Women's Heart Health
Programme*

Asst. Prof. Chan is a heart failure cardiologist and specialises in the management of heart failure and rare cardiomyopathies. Her other clinical interests include cardiac imaging, heart valve diseases and heart conditions in women.



The new Women Heart Health Clinic team includes (from left) Dietitian Ms. Tricia Teo, Occupational Therapist Ms. Ngooi Bixia, Cardiologists Dr. Low Ting Ting and Asst. Prof. Chan Wan Xian, Physiotherapist Ms. Cammy Tsai and Nurse Ms. Ng Yi Qi.

THE HEART FUND SPECIAL

National University Heart Centre, Singapore

A Passion to Serve

The Unsung Heroes

The Medical Social Workers behind The Heart Fund include (from left): Siti Munawarah Bte Maarof, Lydia Lee and Mitchell Yeo Tze Leng.



Medical social workers (MSWs) not only address financial challenges, but are also required to provide holistic care to a myriad of emotional, psychological and social problems faced by patients and their families. Patients' attempts to return to normal life and emotional well-being could be hindered by factors such as accepting their illness, job instability, financial strain and family discord.

Thus, medical social workers work hand in hand with teams in the hospitals and community bodies to provide patients and their families with continued care, even after discharge. Ms. Angeline Tan speaks with Ms. Lydia Lee, one of the MSWs behind The Heart Fund to find out what truly defines their profession.



By Ms. Angeline Tan
Senior Assistant Manager,
Communications &
Development, Ops &
Admin, NUHCS

Angeline is from the Communications & Development team which oversees the internal and external communications and events for NUHCS. Angeline manages the patient education print collaterals, video production and The Heart Fund. She is also behind the editorial of Pulse.

What is the most memorable story of a patient who benefited from The Heart Fund?

I look up to patients and families who are very resilient and support their loved ones who are ill despite the challenges they face. In one such case, I have a patient who is retired and married with children. He and his family could not bear the costs of a high-cost surgery on top of his existing medical bills.

When a patient is down with a serious illness, the last thing he or she should worry about is how to afford medical treatment and compromise treatment due to the lack of financial resources.

After receiving help from The Heart Fund, the patient and his family not only avoided debts but also experienced less anxiety and could focus on staying strong throughout his recovery journey.

I am in awe of how they are able to weather the storm. It is a reminder that in any situation, people have the ability and strength to cope! However, due to the impact that illnesses have on their finances, they would have to seek assistance in various forms (other than funding) from us. Financial relief from The Heart Fund and other charitable organisations gives them the extra strength to pull through difficult times like this.

What are the most fulfilling aspects of your work?

It is fulfilling to provide financial assistance for patients who have

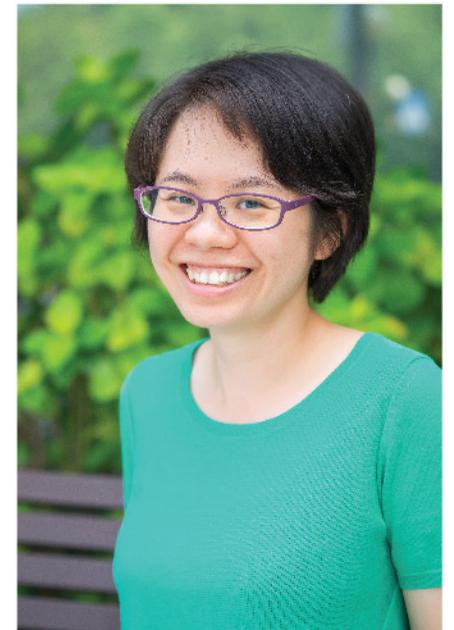
exhausted all options or address unmet gaps not covered by existing government and community assistance schemes so they can continue necessary treatment and care. To encourage them to be more compliant to treatment, I will connect with and understand them as a person and as different individuals with various needs.

What is something that most people don't know about the work you do?

Our assessments and interventions strive to bridge social inequalities. No patient should be denied of treatment due to his or her social or economic disadvantage. We align ourselves with the commitment of The Heart Fund to help those with the greatest challenges. If a patient requires high-cost treatment, we can help the family to get more involved or apply for assistance to meet their medical needs. Many people are also unaware that we need to actively seek for funding from charities, which may have different guidelines.

What keeps you going?

When I see other people's difficulties, it keeps me humble and reminds me that we cannot judge others. I am grateful that patients allow me into their lives even though some of them face very complicated social situations. I am also thankful to have the support and constant guidance of our team leader, Subha Rajaiya. The work is very meaningful when we are able to work together to achieve financial relief and positive outcomes for needy patients.

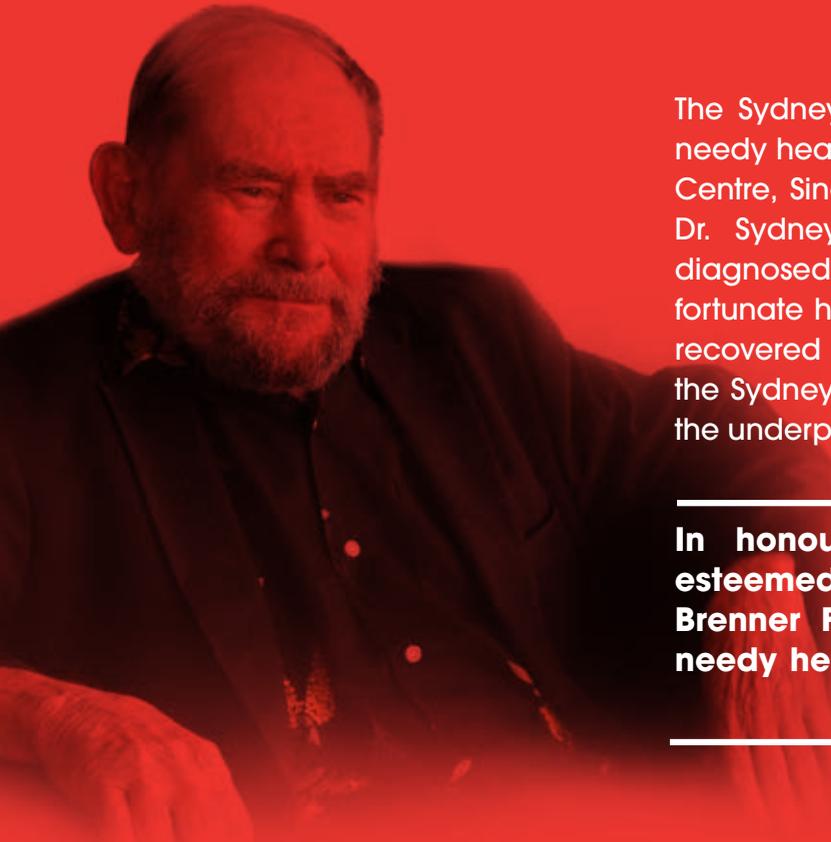


The bubbly Lydia finds it rewarding to be able to offer financial and social assistance to needy heart patients of The Heart Fund.

It is also rewarding that through The Heart Fund, I am able to empower patients to battle heart disease by helping them to continue necessary treatment and care, allowing them to achieve a new lease of life and continue to work again to support their families and spend time on the things or with the people they love. •

Would you
let a heart patient

GIVE UP fighting?



The Sydney Brenner Fund was established to help needy heart patients at the National University Heart Centre, Singapore (NUHCS), where Nobel Laureate Dr. Sydney Brenner was treated after he was diagnosed with heart disease. Realising how fortunate he is in being able to afford treatment, he recovered and resolved to give back by endorsing the Sydney Brenner Fund. This is his way of helping the underprivileged receive the treatment they need.

In honour of this eminent scientist and esteemed patient of NUHCS, the Sydney Brenner Fund was set up to give hope to needy heart patients at NUHCS through your generous donations.

How You Can Help

Simply log on to www.giving.sg/nuhs-fund-limited/sydney_brenner_fund and make a donation. Please email us at nuhcs@nuhs.edu.sg for information on other modes of donation.

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Ultrafiltration in Heart Failure

Relief for Fluid Overload



Asst. Prof. Raymond Wong introduces the launch of a value-added service that helps to treat fluid overload in heart failure patients who do not respond to diuretics.

Madam A is a middle-aged female patient with congestive heart failure. As her heart could not pump enough oxygen-rich blood for her body's needs, she experienced fluid overload (retention of water in the body). Its symptoms include swelling, weight gain, and shortness of breath.

Treating Fluid Overload

Diuretics ('water pills'), a conventional



By **Asst. Prof. Raymond Wong**

Director,
Heart Failure Programme
Cardiac Rehabilitation
Diagnostic Cardiovascular
Laboratory
Nuclear Cardiology

Senior Consultant,
Department of Cardiology

Asst. Prof. Wong had received the Membership of the Royal Colleges of Physicians (United Kingdom) and completed a Cardiology Advance Specialist training. He has special research interests in the fields of heart failure and cardiomyopathy and is involved in many quality improvement projects.



An ultrafiltration equipment used to remove excess water from the blood.

treatment to help produce more urine, failed to treat her. In such cases, ultrafiltration (UF) may be the only treatment option. UF is a procedure where blood with excess fluid is extracted and passes through a filter. It then returns the blood to the body after removing excess salt and water.

After undergoing a UF procedure, "Madam A" initially lost weight. However, she developed the symptoms again. Thus, she went through another round of UF, which was a success. **Her symptoms were resolved and renal function improved dramatically. She was later discharged in good condition.**

Positive Outcomes for Patients

The UNLOAD study was conducted by doctors from Midwest Heart Foundation, a non-profit organisation that elevates the efforts of the American Heart Association (AHA). Results show that patients receiving UF experienced greater net fluid loss than patients treated primarily with diuretics. UF is also a recognised treatment of heart failure under the latest guidelines by the American College of Cardiology and AHA.

The UF service is available at National University Heart Centre, Singapore since December 2015. •

Making Cardiac Anaesthesia **SAFER**

Transesophageal Echocardiography



To operate on the heart, the heart and lungs have to be stopped briefly, potentially causing serious implications to vital organs. Thus, a transesophageal echocardiography (TEE) helps anaesthesiologists in working with the surgical team to ensure the safety of patients by monitoring their heart during and after surgical repair. A/Prof. Ti Lian Kah goes into further details.

TEE uses high-frequency sound waves (ultrasound) to create detailed pictures of the heart. Unlike standard echocardiography, the TEE is a thin tube that passes through the mouth into the esophagus. Because the heart is next to the esophagus, very clear images of the heart structures and valves can be obtained.

Information for a Safe Surgery

This gives the surgical team information about the overall condition of the patient and the health of the heart before surgery. Thus, **they can plan how the anaesthesia and surgery should proceed as well as anticipate and mitigate any potential complications that may arise, including targeted medications and utilisation of medical devices.**

At NUHCS, cardiac anaesthesiologists use TEE in every adult patient undergoing cardiac surgery. A TEE is inserted in the operating room after a patient receives an anaesthesia (medicine to induce sleep). The images of the heart structure and function help guide surgery by giving additional information on the severity of the pathology, involvement of valves, and potential problems after surgical repair.

TEE also helps to identify possible risks, such as atheromatous plaques or

blood clots, which can cause a stroke during surgery. By providing real-time and continuous information during surgery, TEE helps our team make clinical decisions as well as adjust quickly and accurately to any difficulties faced by our team or patient.

At the end of surgery, TEE is used to check how well the surgery worked, whether the valves are working well and if the heart is pumping well. It also helps in estimating the amount and type of support needed after surgery and in the intensive care unit.



TEE is used during heart surgeries to assist the anaesthesiologist and surgical team in monitoring the health of the heart.



By **A/Prof. Ti Lian Kah**

Academic Head,
Department of
Anaesthesia, Yong Loo Lin
School of Medicine
Senior Consultant,
Department of
Anaesthesia,
National University
Hospital

A/Prof. Ti's clinical and research interests are in the fields of cardiothoracic anaesthesia, cardiopulmonary bypass, transesophageal echocardiography, and medical education. He has published more than 50 research papers in peer-reviewed journals. He is also the President of the College of Anaesthesiologists, Singapore.

Leveraging the Latest Innovations

Similar to the best heart centres in the world, all cardiac anaesthesiologists in NUHCS are TEE exam-certified and utilise advanced technologies such as three-dimensional echocardiography, thereby enhancing the safety of heart surgery for patients. •



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From Hospital to Home

Heart Failure Transitional Care Programme



Launched in February 2014, the Heart Failure Transitional Care (TC) Programme was established to facilitate safe, smooth and quality transitions for heart failure patients from hospital to home setting. Ms. Karen Koh and Ms. Lee Choy Yee expound on this integrated care approach to reduce readmission and improve quality of life for heart failure patients.

Integrated Care Approach
Heart failure patients are often rehospitalised as they are unaware of self-care and do not inform their healthcare provider when their symptoms worsen. Due to an overwhelming number of hospital readmissions, efforts such as the TC programme are underway to support and educate them during hospitalisation and after discharge.

Nurse-led intervention programmes have been shown to reduce rehospitalisations and improve quality of life for heart failure patients (National Healthcare Group, 2003).

Our cardiac advanced practice nurses (APNs) and heart failure cardiologists developed the TC Programme under the umbrella of National University Hospital to Home (NUH2H). It aims to reduce readmission rates and rehospitalisation duration, and improve the quality of life for acute, chronic and end-stage heart failure patients. Through the

collaboration of doctors, nurses, allied health professionals and community partners, the programme optimises patients' conditions and empowers them to exercise strategies to cope with their conditions in the comfort of their own homes.

Transitional Care - The New Normal
Under the TC programme, the APNs and TC nurses actively provide review, management and education to selected inpatient and outpatient heart failure patients. 47 patients were recruited from February 2014 to 2015 and the team measured the clinical outcomes (results shown in Figure 1). These results support that **TC programmes are the way forward and have become the new normal for heart failure patients as they increase continuity of care and quality of life, and decrease readmissions and healthcare costs for them.**

Figure 1: Findings from February 2014 to 2015

	After 3 months	After 6 months
 Emergency department visits	↓49%	↓32%
 Patients' length of stay	↓59%	↓44%
 Readmission rates	↓58%	↓44%



By **Ms. Karen Koh**
Assistant Director of Nursing (Advanced Practice Nurse), NUHCS

As one of the pioneer APNs certified in Singapore, Karen helps to shape the APN practice framework in NUH and nationally. She uses her clinical expertise to advance nursing via many research projects and a clinical service to improve patient care. Karen is an exemplary leader with 13 APNs/interns and 5 specialty nurses under her charge.



By **Ms. Lee Choy Yee**
Advanced Practice Nurse, Department of Cardiology

Choy Yee graduated with a Masters of Nursing from National University of Singapore in 2010 and became an Acute Care Advanced Practice Nurse in 2012. She is involved in the setting up of both APN-led Cardiac Diabetic Clinic (ACDC) and NUH2H Heart Failure Transitional Care Programme.

Aortic Centre in NUHCS

A One-stop Service for
Managing Aortic Disease

With an increasingly ageing population, Singapore is expected to experience a continued rise in patients suffering from aortic disease, a serious and potentially fatal condition. To propel the management of aortic disease, an Aortic Centre is in the pipeline for NUHCS. Dr. Julian Wong and Asst. Prof. Kristine Teoh share about their joint effort as Directors of the centre.

What is Aortic Disease?
The aorta is the main blood vessel coming out of the heart from the aortic valve to the legs, giving branches to all the organs of the body, the brain and all four limbs. The common diseases of aorta in Singapore are either aortic aneurysm (vessel swelling) or aortic dissection (vessel tearing). Both conditions carry significant morbidity and mortality in elective planned settings and an even much higher life-threatening complication rate when patients are admitted in the emergency department.

Multidisciplinary, Multispecialty and Multimodality Approach
To provide up-to-date and evidence-based management of aortic disease to the nation, a dedicated Aortic Centre will be introduced in NUHCS in 2017. **As a one-stop centre for the diagnosis, screening and management of aortic disease, it will take on a multi-collaborative approach** by bringing together a multidisciplinary team comprising cardiothoracic and vascular surgeons, interventional radiologists and cardiologists.

This team will provide individually tailored treatments to patients via the latest scientific technologies and will continue to achieve good outcomes so patients can resume their everyday activities in the shortest time possible.

The Aortic Centre aims to be a leading centre for the advanced treatment of aortic disease in Southeast Asia and gain recognition as a training and research hub. •



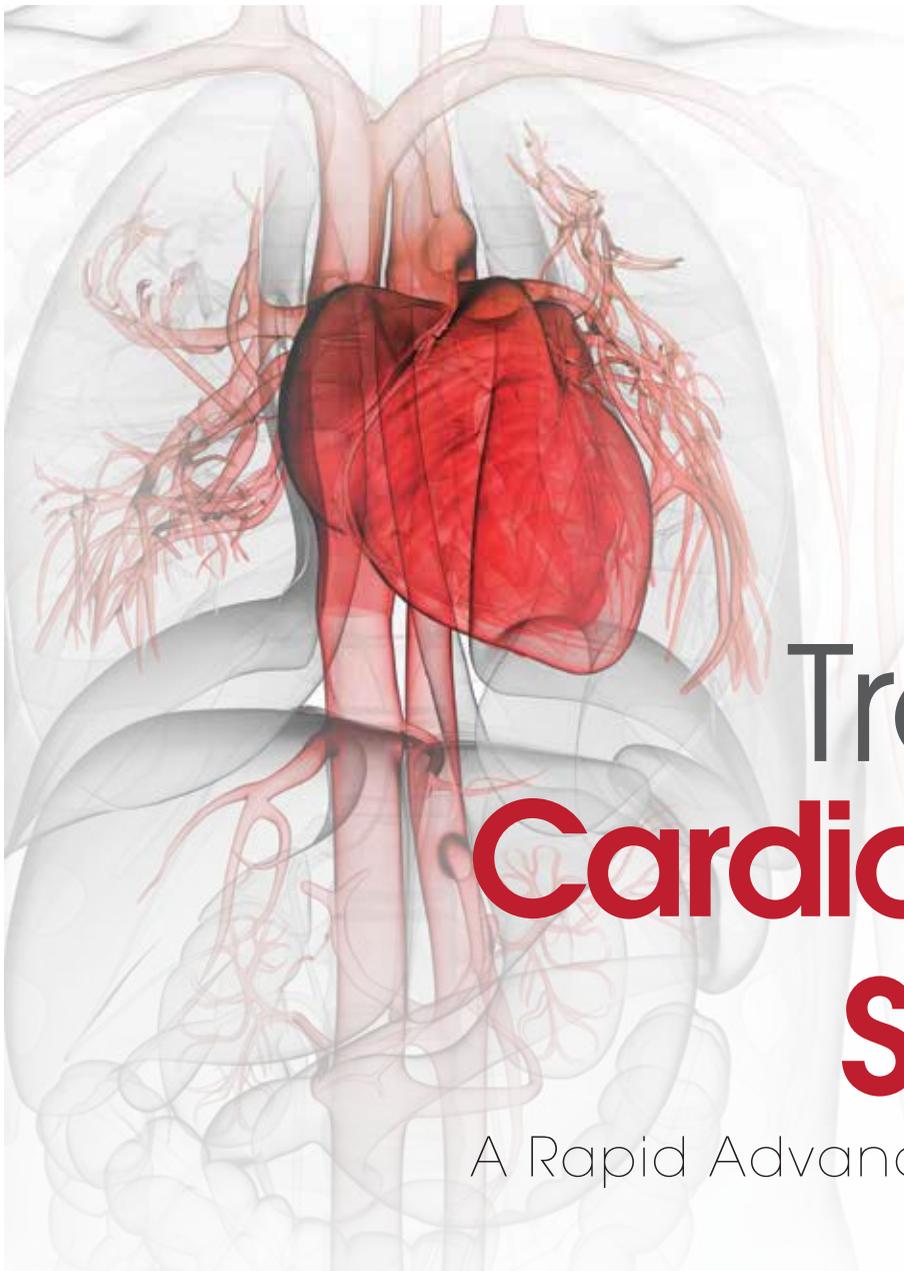
By Dr. Julian Wong
Head and Senior Consultant,
Division of Vascular and Endovascular Surgery
Department of Cardiac, Thoracic & Vascular Surgery

Dr. Wong has vast experience in open and endovascular surgery, including complex aortic aneurysms and carotid and peripheral vascular disease, as well as redo surgery. With over 20 years of endovascular stenting experience, he is a proctor for this technique for Cook Medical and also held training courses in aortic surgery.



By Asst. Prof. Kristine Teoh
Clinical Director & Senior Consultant,
Department of Cardiac, Thoracic and Vascular Surgery

Asst. Prof. Teoh was trained at prestigious cardiothoracic units in London and has a broad experience in adult cardiac surgery. She has since led initiatives to improve patients' experience, with a special interest in improving healthcare provision, quality outcome measures and innovative transcatheter therapies.



By **Asst. Prof. Edgar Tay**
Senior Consultant,
Department of
Cardiology

Asst. Prof. Tay co-leads the transcatheter aortic valve implantation (TAVI) and mitraclip mitral valve repair programme. He subspecialises in the field of adult congenital heart disease, pulmonary hypertension and structural intervention.

Treating Cardiogenic SHOCK

A Rapid Advanced Life Support

The National University Heart Centre, Singapore (NUHCS) is set to unveil the latest circulatory bypass machine that is “no bigger than a suitcase”, making it suitable for both the operating room and emergencies. Asst. Prof. Edgar Tay tells us more.

When the Heart Fails to Pump NUHCS provides an optimised 24/7 procedure that helps to restore blood flow in blocked coronary arteries of heart attack patients. However, patients who develop cardiogenic shock, a life-threatening condition where the heart is unable to pump sufficient blood to meet the body’s needs, require a more advanced support to stimulate blood circulation.

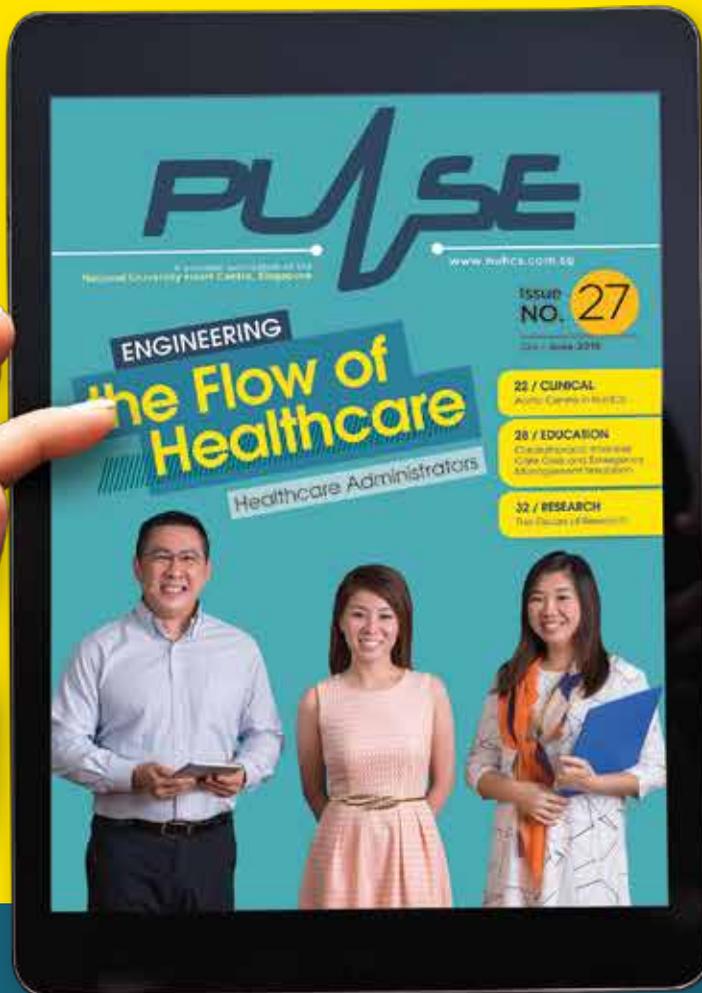
How a New Machine Supports Critical Patients

In view of this need, we have acquired a new portable heart lung assist machine – a lifesaving technique that provides heart and lung support for these critical patients by quickly flowing oxygen-rich blood to their bodies before cardiogenic shock becomes fatal. The machine does this by draining their blood and then adding oxygen to it.

Furthermore, it is handy for emergencies as **it can be rapidly deployed and its small size and light weight makes it easy to be carried in an ambulance. As it is able to run on an internal power supply, the therapy can continue while patients are being moved from the ambulance to the emergency room and then to other locations such as the operating room and intensive care unit.**

The NUHCS team is undergoing intensive training in the use of the device and the service will be offered by the end of the year. As the National Centre for cardiovascular care, we continue our efforts to provide effective and quaternary life-saving therapies for patients to improve our models of care. •

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Healthcare Humanity Awards

Going Beyond the Call of Duty

2014 Award Winner

Mr. Clifford Xu
Specialty Nurse,
Cardiovascular Nursing

2015 Award Winners

Ms. Lo Chew Yong
Advanced Practice Nurse,
Coronary Care Unit

Ms. Juvena Gan
Advanced Practice Nurse,
Coronary Care Unit



For three consecutive years, our nurses from National University Heart Centre, Singapore (NUHCS) have clinched the Healthcare Humanity Awards for exemplifying courage, extraordinary dedication, selflessness and steadfastness in ethics, compassion and humanity.

This year, Ms. Florence Ang received the award for going the extra mile to not only serve patients at our National Centre but also disadvantaged patients across Asia.

2016 Award Winner

Ms. Florence Ang
Assistant Nurse Clinician,
Vascular Nursing



“ I am very honoured to receive the Healthcare Humanity award, the highest form of national tribute accorded to award recipients, particularly in the presence of President Tony Tan. My heartfelt appreciation goes out to my supervisors, colleagues and everyone who has guided and encouraged me forward.

I constantly strive to put my patients first. Seeing the smiles on their faces and hearing their words of gratitude spur me on to volunteer for medical missions to help disadvantaged patients across Asia.

I believe that a good nurse must be compassionate, selfless and courageous. Thus, I will continue to apply these traits to what I love to do – nursing my patients. Nursing is my passion and I look forward to seeing patients every day, as they are both my inspiration and teacher. I also hope to train other nurses in the use of maggots in wound management. I will also continue to serve and provide humanitarian help within and beyond our shores.

Through my nursing journey, I have learnt that I can make a difference to my patients' lives by supporting and comforting them in their time of need and through the various stages of their life. ”

Cardiothoracic Intensive Care Crisis and Emergency Management Simulation

The Step Ahead in Surgical Training



By Ms. Oon Siow Eng
Nurse Clinician,
Cardiothoracic Intensive
Care Unit (CTICU)

Having graduated with a Bachelor's degree from La Trobe University, Melbourne, Australia, Ms. Oon has been working in the CTICU for the past 12 years. In 2013, she won the NUH Nightingale Award, which recognises outstanding nurses for being role models in delivering excellent performance and significant contributions in patient care.

As simulation-based training evidently imparts critical care and management skills better than problem-based learning, our centre has developed the Cardiothoracic Intensive Care Crisis and Emergency Management (CICCEM) programme for training surgical teams. Ms. Oon Siow Eng gives her insights on it.

Patient Safety Comes First
Most patients in the Cardiothoracic Intensive Care Unit (CTICU) have undergone open-heart surgeries. They will be closely monitored during the critical immediate post-operative period, when nurses and doctors play a crucial part in recognising any abnormalities. This is a highly stressful environment with patients who are potentially experiencing post-operative complications that may be life-threatening. Thus, patient safety is paramount and is our day-to-day challenge. The use of high-fidelity simulation (HFS), along with realistic scenarios and effective debriefing sessions, is a promising educational tool in ICU.

Benefits to the Performance of CTICU Teams

The CICCEM programme was formed in 2013 to establish the impact of HFS on improving technical competencies (theoretical knowledge and procedural skills) and non-technical skills (teamwork, leadership and communication) of the CTICU team in managing crises.

Simulation training opens up their minds to new possibilities, broadens their understanding of medical procedures and offers them a reliable option to practise new technologies and advance procedures without putting patients at risk.

Taking on a teaching and facilitating role, I am actively involved in this programme, which was spearheaded by Dr. Ramanathan K.R., Consultant, CTICU, and Pauline Oh Seok Lee, Senior Nurse Manager. With their strong support and guidance, we conducted the simulation fortnightly.

Although it can be labour-intensive, learners' feedback were positive, with marked improvement in inter-professional team management and teamwork during clinical crises. We have included more complex cases and involved other professional groups, such as operative theatre nurses, cardiac surgeons, perfusionists and respiratory therapists, and will continue to evolve to raise inter-professional learning so we can achieve the gold-standard in patient safety and medical teaching. •

11th Introductory Course in Interventional Cardiology

Taking education to the next level



The National University Heart Centre, Singapore (NUHCS) continues to build on its strong position as a local and global training centre. Prof. Tan Huay Cheem recounts an annual course that offers budding interventionists and industry rookies hands-on practical experience and improvement in their skills retention.



By Prof. Tan Huay Cheem
Director,
NUHCS

Senior Consultant,
Department of
Cardiology

Prof. Tan is a Professor of Medicine, Yong Loo Lin School of Medicine, National University of Singapore and has a Masters of Medicine in Internal Medicine. He is an active clinical researcher, visiting professor to several hospitals in China and invited speaker to many international cardiology meetings.

N UHCS has successfully organised our 11th Percutaneous Coronary Intervention (PCI) Simulator Course on 23 and 24 April 2016 yet again. Since establishing its entry training course for budding interventionists and industry rookies, more than 260 participants have been trained in the last 12 years.

This year's meeting attracted participants from Indonesia, Malaysia, China, Myanmar and local doctors who were exposed to two days of intensive interactive hands-on training on a simulator system, transracial system and National University's Hospital all-new interventional imaging system, as well as a series of didactic lectures.

A participant shared, "The course was sophisticated and informative, instructors were friendly and helpful, and the environment was conducive to learning."

The course was supported by NUHCS's long-term partners, including Siemens Singapore, Terumo Medical Corporation, Boston Scientific Asia Pacific Pte. Ltd., St. Jude Medical, OrbusNeich Medical Pte. Ltd. and Biosensors International Pte. Ltd.

Participants also received a special gift in the form of an electrocardiogram (ECG) book written by one of the early pioneers of cardiology in Singapore, Prof. Chia Boon Lock. The book provides a quick and easy-to-understand guide on ECG to help one become a proficient ECG interpreter.

As an Academic Medical Centre, NUHCS strives to provide high-quality medical education with an emphasis on simulation training to further enhance the quality of training programmes we deliver. •

65th American College of Cardiology Scientific Sessions 2016

Breakthroughs in Cardiology



Formed in 1949, the American College of Cardiology (ACC) has since grown into a network of more than 50,000 medical professionals striving to advance cardiology globally. Dr. Gavin Ng and Asst. Prof. Joshua Loh present our key highlights at this year's ACC Scientific Session.



By **Dr. Gavin Ng**
Senior Resident,
Department of Cardiology

Dr. Ng joined NUH in 2010 and is currently in his second year of cardiology senior residency training at NUHCS. He remains committed to realising his dream of becoming a cardiologist and is actively trying to balance his busy work schedule with family life.



By **Asst. Prof. Joshua Loh**
Consultant,
Department of Cardiology

Asst. Prof. Loh has authored and co-authored more than 40 articles in peer-reviewed journals and has presented many abstracts in international scientific meetings. His specialty interests include coronary artery disease and acute coronary syndromes. He supervises the post-myocardial infarction clinic, focusing on patient care after their heart attack.

Sharing the Latest Cardiology Findings

The ACC Scientific Session 2016 was held in Chicago, United States, on 2-4 April and was attended by a large National University Heart Centre, Singapore (NUHCS) delegation. A/Prof. James Yip and Asst. Prof. Edgar Tay gave their insights, from an Asian perspective, in a joint ACC-Singapore Cardiac Society (SCS) session on pulmonary hypertension.

NUHCS presenters included Dr. Tan Li Ling, Dr. William Kong, Asst. Prof. Joshua Loh, A/Prof. Mark Chan, Dr. Aruni Seneviratna and Dr. Gavin Ng (refer to page 39 for the full list of abstracts presented). Dr. Tan Li Ling's research papers were based on nationwide data, with A/Prof. Chan as the senior investigator, while Dr. William Kong's presentation was based on a NUHCS- Leiden University Medical Centre collaborative valve registry, which garnered much interest.

The International Stage

Dr. Elaine Boey, Dr. Robin Cherian, Dr. William Kristanto and Dr. Chan Po Fun presented interesting posters showcasing

fascinating cases. Dr. Eugene Tan also presented his collaborative work and both he and Dr. Elaine Boey did NUHCS proud by winning best posters for their individual categories.

NUHCS has made a mark on the international stage, **demonstrating our strength in education and our dedication to grooming our young talent pool of doctors.**

Asst. Prof. Joshua Loh was proudly elected as a Fellow during the Annual Convocation Ceremony, with A/Prof. Poh Kian Keong attending as the President of SCS. We also discovered the latest developments in cardiology through recent trials, special lectures and symposiums by eminent cardiologists worldwide.

In summary, the ACC Scientific Sessions 2016 was an excellent platform for our NUHCS doctors to showcase their work on the diagnosis, management and prevention of cardiovascular disease to an international audience. We look forward to next year's meeting in Washington, D.C., United States. •

The Sleep and Cardiovascular Connection

Propelling Developments in Cardiosleep

Cardiosleep explores the complex relationship between the cardiovascular system and sleep-disordered breathing (SDB). However, it remains largely under-recognised by patients and clinicians alike. A/Prof. Ronald Lee presents the efforts made to develop this area.

Cardiosleep is still considered an emerging field as progress has been incredibly slow. One reason is the lack of public awareness. Most people perceive snoring to be common, especially with an increasing prevalence of obesity globally, and a social nuisance rather than a treatable medical disease caused by SDB. Another reason is the lack of research funding. There are only two international companies supporting research in SDB and the scale and commitment is limited.

Uncovering the Cardio-Sleep Relationship

I recently presented the Sleep and Stent Study at the American Thoracic Society International Conference in San Francisco, United States. The presentation was well-received and the audience raised many interesting questions. Indeed, a sleep physician thought that percutaneous coronary intervention requires general anaesthesia. I was delighted that our centre received local

news coverage and that this study was published in a reputable cardiology journal. During the conference, I also discussed on future research collaborations and data sharing with other international industry partners and clinician scientists.

Committed to Advancing Cardiosleep

It will also be exciting when the results of the Sleep Apnoea and Vascular Endpoints (SAVE) trial are released at the upcoming European Society of Cardiology Congress in Rome. The trial is the largest multicentre randomised clinical trial evaluating the use of continuous positive airway pressure therapy for cardiac patients with obstructive sleep apnoea. The recent formation of the European Cardiosleep Society **also signifies the dedication of the cardiovascular community to intensify research and development in Cardiosleep.** I hope we will play a leading role in this.



By A/Prof. Ronald Lee
Senior Consultant,
Department of Cardiology

A/Prof. Lee's research interests include percutaneous coronary intervention, intravascular imaging, and sleep-disordered breathing. He has authored or co-authored more than 130 articles in peer-reviewed journals or medical textbooks. He also reviews and edits the former and holds local and international research grants.

Development of Sleep-Disordered Breathing in NUHCS

The Department of Cardiology at NUHCS has introduced an inpatient SDB screening service for patients in wards 63 and 64. In time to come, NUHCS will also be planning for an outpatient Cardiosleep service.

The Oscars of Research

National Medical Research Council (NMRC) Awards

Creating new knowledge through research to bring about better care and outcomes for our patients is a key mission of the National University Heart Centre, Singapore (NUHCS). We are proud to be expanding our pool of clinician-scientists winning the NMRC Awards for **3 consecutive years**, reflecting an advanced standing of our research arm and our focus on cardiovascular research in Singapore and beyond.

2016 Award Winner

A/Prof. Mark Chan

Senior Consultant,
Department of Cardiology

Clinician Scientist Award – Investigator, 2016

“ This award is a renewal of a previous CSA-I award, where I have been studying the late consequences of coronary atherosclerosis – acute coronary syndromes and their outcomes – for the last six years. In this renewal, we have turned back the clock to pre-symptomatic coronary heart disease and its non-cholesterol lipid biomarkers.

Initially, I was unsure about renewing this award, as it has been gruelling to balance clinical work, interventional calls, running a wet lab and multi-centre clinical studies, but with modest returns. Meanwhile, the private sector promises spectacular returns with far lower effort.

Then one day, I walked past a sign that said ‘**Bloom where you are planted**’. It struck me that much needs to be done for cardiovascular research at NUHCS. Like many clinician scientists returning to Singapore, I am very blessed to have access to enviable levels of funding. I also had the good fortune of working with incredibly talented clinical and basic science colleagues globally.

My basic science colleagues taught me that academics is truly 24/7. I also took on administrative roles as they are vital to scientific leadership. I was also fortunate to lead a team of more than 10 researchers and mentor several young scientists and clinician scientists. I am also very grateful to my life partner, Wern Miin, for her unwavering support.

I learnt, from top clinician scientists, that doing research is like running a business. To excel in it, four attributes are necessary – you need to know your organisation well; be a superb decision maker; know the industry landscape well; and form close relationships. I first deepened my understanding of our organisation, even down to nitty-gritty matters, so I could move more nimbly and my team could identify the cause of and rectify systemic delays quickly. With their sound advice, I also learnt to make logical decisions, while never ignoring the heart. Like my research career, the third and fourth attributes are still a work in progress. ”



2014 Award Winners

2015 Award Winners



A/Prof. Roger Foo
Senior Consultant,
Department of Cardiology
*Clinician Scientist Award -
Senior Investigator, 2014*



Dr. Yeo Tee Joo
Consultant,
Department of Cardiology
*NRF-MOH Healthcare
Research Scholarship, 2014*



Prof. Arthur Mark Richards
Director of Research,
Cardiovascular
Research Institute, NUHS
*STaR Investigator
Award, 2015*



Dr. Lim Shir Lynn
Consultant,
Department of Cardiology
*MOH Healthcare Research
Scholarship, 2015*

2016 Award Winners



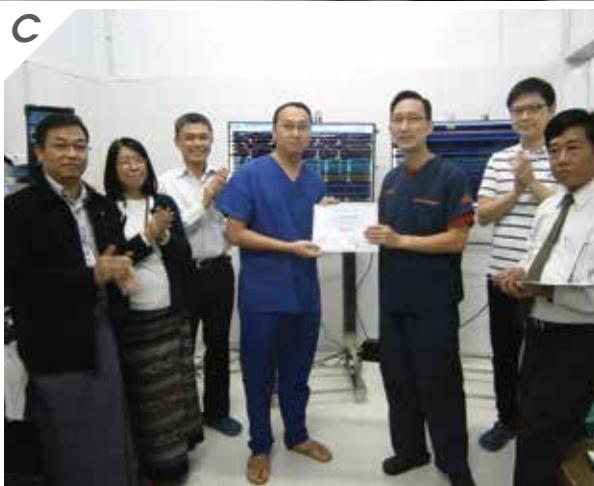
A/Prof. Ronald Lee
Senior Consultant,
Department of Cardiology
*Clinician Scientist Award -
Investigator, 2014 and 2016*

“ I am very delighted to receive the award for my research on sleep apnoea (featured in Pulse Issue 25), especially because this is my second attempt. I would like to thank my role models and advisors from our department and hope to motivate more young colleagues to pursue an academic career so we can advance our research capabilities. ”

A/Prof. Poh Kian Keong
Senior Consultant,
Department of Cardiology
Transition Award, 2016

“ I am pleasantly surprised to receive this NMRC award as it is quite competitive, but with our internal grant, I could set up my lab and gather important pilot data. Through this research, we hope to find out how weight lost through a change in lifestyle may improve the heart's function. The project will take several years to execute but may have significant and relevant impact in the future. ”





HAPPENINGS at NUHCS

A - C

In a bid to share our knowledge with other medical centres in the region, NUHCS has collaborated with Mandalay General Hospital (MGH), Myanmar, to organise a new educational programme on electrophysiology and ablation of supraventricular tachycardia (SVT) for the treatment of heart rhythm disorders at MGH on 13-15 January 2016. The event was organised by Asst. Prof. Seow Swee-Chong, Asst. Prof. Lim Toon Wei and Asst. Prof. Pipin Kojodjojo from NUHCS in partnership with Prof. Than Than Kyang from MGH.

D - E

Held on 17 and 18 November 2015, the **Heart Failure Symposium** aims to provide multidisciplinary team members with continuing professional development and to discuss emerging strategies and trends in heart failure care via lectures, case-based discussions, and a patient's personal reflection.

The reflection, which sought to provide the audience with a more effective learning experience, drew an enthusiastic round of applause. The patient shared on his life journey - from surviving the illness to feeling hopeless due to its symptoms and to finally overcoming its debilitating effects.

F - G

In recognition of our interventional cardiology standing in the international community, NUHCS was invited to participate in two live satellite transmissions - the **AsiaPCR/SingLIVE Course** held in Singapore on 21-23 January 2016 and the **Transcatheter Cardiovascular Therapeutics Angioplasty (TCTAP) Summit** held in Seoul, Korea on 26-29 April 2016. These reinforced NUHCS's position as a prominent Heart Centre in Asia in the field of interventional cardiology.

In photo G, Prof. Tan Huay Cheem and Asst. Prof. Joshua Loh are performing a complex rotablation case in a patient with two diffuse calcified arteries at the former event. Prof. Tan was also featured in a video clip by PCR regarding his mentoring experience, together with Dr. Leonardus Timmers who shared his fellowship experience at NUHCS. Watch the video at youtu.be/LuRoXg-rcTU.





H - I

Asst. Prof. Seow Swee-Chong conducted the **first Cardiac Resynchronisation Therapy (CRT) Workshop in Dehradun, India**, together with Dr. Preeti Sharma, Head, Department of Cardiology, Max Super Speciality Hospital, Dehradun, on 26 April 2016. **At NUHCS, we remain committed to exploring future potential collaborations with other tertiary institutions in the pursuit of knowledge sharing.**

J - K

NUHCS values and fosters excellent relationships with all our Medical Officers (MOs) during their learning journey with us. A farewell dinner is held twice a year to **thank and bid farewell to all MOs** who have been with us. This year's farewell dinner was organised on 12 January 2016 by our Senior Residents, Dr. Gavin Ng and Dr. Jeanette Ting, and was attended by our Director and Head, Prof. Tan Huay Cheem and A/Prof. Yeo Tiong Cheng, as well as our Senior Consultants.

L

The **China Interventional Therapeutics (CIT) Conference**, the largest interventional cardiology meeting held in China, was organised on 17-20 March 2016 in Beijing, China. The event is attended by about 5,000 delegates each year. They include most interventionalists from China. It was also a great opportunity for **our NUHCS alumni to gather and reminisce on their working experience with us.**

Congratulations on your Promotion!

Dr. Lim Shir Lynn
Consultant,
Department of Cardiology
16 Jan 2016

Dr. Hardip Singh
Consultant,
Department of Cardiac,
Thoracic & Vascular Surgery
16 Jan 2016

Dr. Yeo Tee Joo
Consultant,
Department of Cardiology
16 Jan 2016



Publications

By doctors of **National University Heart Centre, Singapore**

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Abstracts

By doctors of **National University Heart Centre, Singapore**

L **Leipzig Interventional Course (LINC), Leipzig, Germany, 26 – 29 January 2016**

Flow assessment of lower extremity endovascular interventions: A feasibility study using quantitative digital subtraction angiogram analysis
Dharmaraj RB.

American College of Cardiology 65th Annual Scientific Session & Expo, Chicago, United States, 2 – 4 April 2016

An unusual cause of recurrent cardiac arrest
Kristanto W.

Bicuspid aortic valve: Gender difference in prevalence, valve morphology and bicuspid aortopathy
Kong W, Regeer M, Poh KK, Yip J, Ng A, Kamperidis V, Shanks M, Marsan NA, Delgado V, Bax JJ.

Door-to-balloon time correlates better with patients outcomes than symptom-to-balloon time
Tan LL, Zheng H, Chow KY, Loh J, Chua T, Tan HC, Foo D, Ong HY, Tong KL, Richards AM, Chan MY.

Heart rate complexity may predict adverse cardiovascular outcomes in patients with acute coronary syndrome
Ng G, Kaur R, Feng L, Lim TW.

Management of concurrent cortical stroke and ST elevation myocardial infarction when presentation is within the window period: A clinical conundrum
Cherian R, Tay E, Yeo L.

Not all heart failure post pregnancy is due to peri-partum cardiomyopathy
Boey E.

Obstructive sleep apnea is associated with visit-to-visit variability in low density lipoprotein-cholesterol in patients with coronary artery disease
Ng G, Boey E, Frampton C, Richards AM, Yeo TC, Lee CH.

Safety and efficacy of the combination sirolimus-eluting endothelial progenitor cell capture stent in patients with ST-segment elevation acute myocardial infarction: One year follow up
Loh J, Carvalho L, Tay E, Lee CH, Chan KH, Chan MY, Low A, Loh PH, Tan HC.

Shorter door-to-balloon time is accompanied by reduced heart failure after primary percutaneous coronary intervention despite a temporal increase in heart failure before primary percutaneous coronary intervention
Tan LL, Zheng H, Chow KY, Loh J, Chua T, Tan HC, Foo D, Ong HY, Tong KL, Richards AM, Chan MY.

The conundrum of managing a giant right atria thrombus
Chan PF, Lin W, Kristanto W, Lim TW.

24th Annual Meeting of Asian Society for Cardiovascular and Thoracic Surgery (ASCVTS), Taipei, Taiwan, 6 – 10 April 2016

The McGinn and Hybrid coronary revascularization procedure are valid alternatives to median sternotomy in mixed Asian population
Sazzad F, Kofidis T, et al.

Charing Cross Symposium (CX), London, United Kingdom, 26 – 29 April 2016

Flow assessment of lower extremity endovascular interventions: A feasibility study using quantitative digital subtraction angiogram analysis
Dharmaraj RB.

10th Asian Society of Cardiovascular Imaging Congress, Singapore, 4 – 6 Aug 2016

A rare cause of dilated right heart chambers
Jong SC and Wong SS.

European Society of Cardiology Congress, Rome, Italy, 27 – 31 August 2016

Assessment of mitral inflow and annular velocities using cine cardiovascular magnetic resonance imaging
Marchesseau S, Parknezhad M, Richards AM, Ling LH, Totman JJ.

Bariatric surgery improved plasma NTproANP natriuretic response, endothelial progenitor cells and myocardial strain in response to BNP infusion in morbid obese
Lee PS, Shabbir A, Yeo TC, Tan HC, Richards AM, Poh KK.

Cardiac magnetic resonance imaging T1 mapping: possible indices of degenerative mitral valve regurgitation
Marchesseau S, Richards AM, Totman JJ, Ling LH.

Ethnic and regional variation in diabetes among Asian patients with heart failure
Teng KT, Tay WT, Yap J, Anand I, Zhang S, Shimizu W, Narasimhan C, Park SW, Yu CM, Ngarmukos T, Omar R, Reyes EB, Siswanto B, Hung CL, Ling LH, Richards AM, Lam SP.

Influence of the left ventricular measurements for right ventricular analysis
Ho XM, Totman JJ, Chan MY, Richards AM, Marchesseau S.

Lean diabetic phenotype of heart failure in Asia

Teng KT, Tay WT, Yap J, Anand I, Zhang S, Shimizu S, Narasimhan C, Park SW, Yu CM, Ngarmukos T, Omar R, Reyes EB, Siswanto B, Hung CL, Ling LH, Richards AM, Lam SP.

Novel left ventricle contractility index is a predictor of a deterioration of ejection fraction in patients with severe aortic stenosis and preserved left ventricular ejection fraction
Boey E, Sim HW, Tan YQ, Ngiam NJ, Lin W, Zhong L, Tan RS, Kong W, Poh KK.

Primary prevention implantable cardioverter-defibrillator devices in men and women in a multi-ethnic Southeast Asian population with heart failure
Boey E, Chan SP, Lam SP, Sim D, Yeo PS, Jaufeerally F, Leong G, Ong HY, Richards AM, Ling LH, Lim TW.

Relationship between visit-to-visit variability of LDL cholesterol and clinical outcomes after primary percutaneous coronary intervention: A 7-year follow up study
Boey E, Gay GM, Poh KK, Yeo TC, Tan HC, Lee R.

Short and medium-term outcomes after primary percutaneous coronary intervention in an Asian elderly population
Chen R, Chan SP, Loh PH, Loh J, Chan MY, Lee R, Low A, Tan HC, Chan KH.

Standardized reporting of right heart strain parameters of computed tomographic angiography: A quality improvement program to enhance risk stratification of patients with pulmonary emboli
Kristanto W, Kojodjojo P, Ong CC, Teo L, Ying JW, Leong J, Goh V, Pei BC.

The cardioprotective effects of miRNA-125b in ischemia/reperfusion(I/R) reflect inhibition of autophagy through targeting tp53inp2 but not Tp53inp1
Chen Q, Zhou Y, Richards AM, Wang P.