

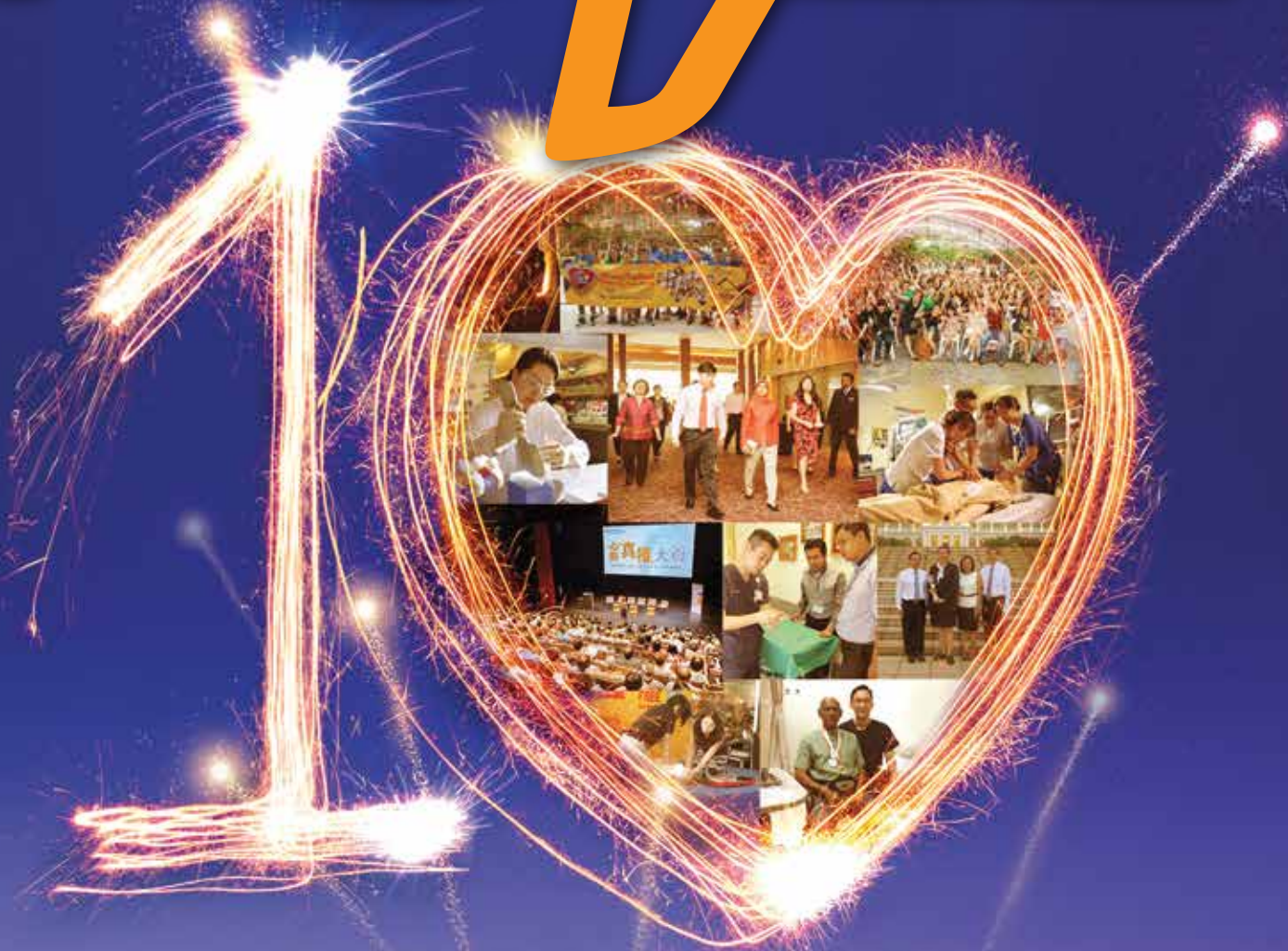
The Heartbeat
of National University
Heart Centre, Singapore

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SPECIAL
EDITION

PULSE

Issue 31 • July 2018



Years of Heart Care

**Dispatcher-Assisted first
REsponder Programme**

Empowering Others
to Save Lives

**Giving Heart Patients
a New Lease of Life**

An Outreach Programme
to Myanmar

**Discovery of
a Key Molecule**

Progress for
Heart Failure Treatment

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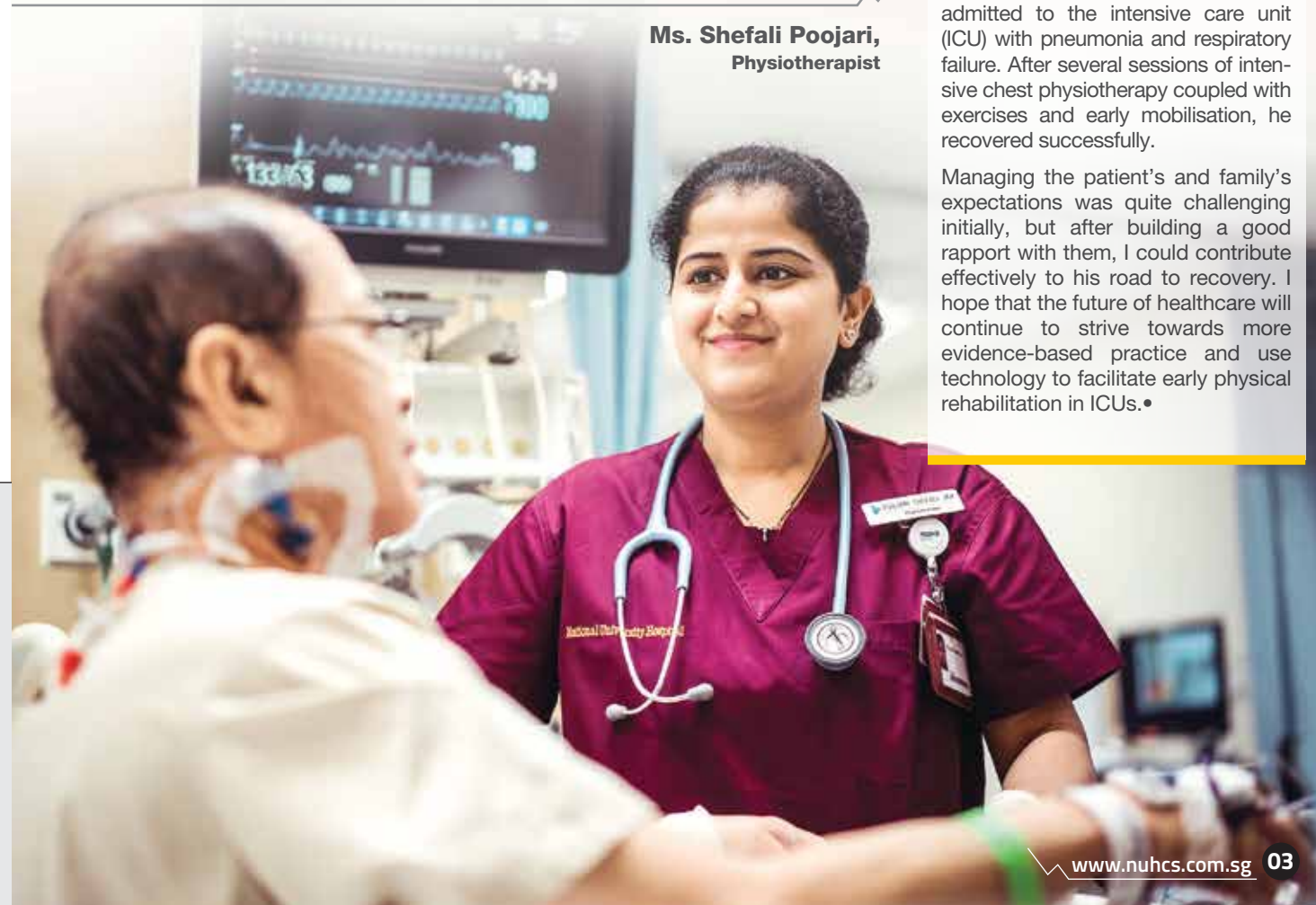
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Meet Our Physiotherapist

While the rest of the medical team works hard to ensure patients receive timely and effective treatment, physiotherapists focus on getting patients back on their feet after their heart surgeries so that they can return to their daily lives. This ensures that patients receive holistic care throughout their journey to recovery.

“It is definitely a great sense of satisfaction to see a critically ill ICU patient recovering from severe physical dysfunction and being able to walk independently through intensive physical rehabilitation.”

Ms. Shefali Poojari, Physiotherapist



I chose physiotherapy as it involves interacting with patients and helping them recover from their disabilities. My day usually begins with screening patients who require physical therapy, specifically acute cardiac rehabilitation. During the treatment sessions, I try to empathise and listen to their problems so that I can better cater to their needs.

I assess and provide chest physiotherapy and early mobilisation for patients immediately after their heart surgeries to prevent early functional decline and ensure they return to their daily activities easily. I also focus on educating patients with risk factors and obesity issues through appropriate exercises and encouraging a healthy lifestyle.

Providing physiotherapy for patients in intensive care is my special area of interest. I remember a patient who was admitted to the intensive care unit (ICU) with pneumonia and respiratory failure. After several sessions of intensive chest physiotherapy coupled with exercises and early mobilisation, he recovered successfully.

Managing the patient's and family's expectations was quite challenging initially, but after building a good rapport with them, I could contribute effectively to his road to recovery. I hope that the future of healthcare will continue to strive towards more evidence-based practice and use technology to facilitate early physical rehabilitation in ICUs.

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Publishing Agency
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Pulse is a biannual publication by
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MCI (P) 094/03/2018. All information is correct at time of print.

NATIONAL UNIVERSITY HEART CENTRE, SINGAPORE

Turns

1



this Year



Reaching a New Milestone

Ten years is a significant milestone for reflections to be made on any accomplishment. As the saying goes, "When climbing mountains, sometimes we need to look back just to know how much we have climbed".

From Humble Beginnings
It all started on 26 August 2007 when the Ministry of Health announced that it would set up a new specialty centre for heart diseases in the National University Hospital (NUH) to meet the rising demand for tertiary services. NUH was chosen as it had substantial progress in many areas of cardiovascular care.

National University Heart Centre, Singapore (NUHCS) started our journey with the set-up of an International Advisory Panel, which led various discussions on strategies to build a world-class academic heart centre. Many of those strategies raised have since been implemented.

From the outset, we were able to capitalise on our unique advantage of access to NUH resources for the development of innovative and value-driven healthcare.

We were also able to gather diversified professionals in both medical and surgical specialties of adult and paediatric cardiology, as well as cardiothoracic and vascular surgical services to be all under one roof.

Tripartite Mission – Clinical, Research and Education

We had streamlined our clinical services into six core clinical programmes. These include the:

(1) **Heart Failure programme** – a chronic disease management programme set up with the goal of improving clinical outcomes and altering the disease pattern of the population residing in the West;

(2) **Acute Coronary Syndrome programme** – a regional heart attack system called the Western STEMI network. Through this programme, the National University Health System (NUHS) cluster organises and consolidates its resources to provide efficient and timely care to patients with heart attacks, in close partnership with the emergency ambulance service;

(3) **Structural and Congenital Heart Disease programme** – a cross spectrum service incorporating antenatal, paediatric and surgical cardiology and surgical services under one roof;

(4) **Heart Rhythm programme** – provides tertiary electrophysiologic and device implantation services; embarks on the design of devices; and introduces community care models for patients with atrial fibrillation;

(5) **Vascular Disease programme** – distinguishes itself locally and regionally through its ‘Aortic Centre’, which provides a multidisciplinary team approach for patients with acute aortic syndromes¹ and abdominal aneurysms². It also positions itself as a centre of education and research; and



(6) **Women’s Heart Health programme** – goes beyond screening and primary prevention to focus on the treatment of unique women’s diseases such as heart disease in pregnancy, rheumatological cardiac diseases³, cardiomyopathy⁴, primary pulmonary hypertension⁵ and microvascular coronary disease⁶.

Our adult surgical team has an established minimally invasive surgical programme which encompasses both coronary and valvular surgical capabilities. It has not only helped to reduce patient hospitalisation stay, but also improved patient experience. The programme has received much international acclaim as seen by the many overseas referrals.

Research is the *raison d’être* of NUHCS. We are committed to creating knowledge and bettering patient care. The formation of the Cardiovascular Research Institute (CVRI) has truly transformed the research landscape at NUHCS by leveraging on existing resources and rapidly building up capacity in technological capabilities, network, database, talent and research funding. It also concentrates efforts on clinician-scientist training and development, device innovation, drug development and biomarker assays.

With more than \$50 million dollars clinched in research grants and another

\$3 million dollars acquired from the industry, the works of our clinician-scientists at CVRI have been published in peer-reviewed journals with more than 200 manuscripts accepted in the last two years. We are proud to announce that the citation rates of our highest-ranking heart failure research contributions are on par with research published by other prominent centres around the world.



Another important mission of NUHCS is to train future-ready cardiovascular professionals through holistic education. This is done through active participation in medical and nursing undergraduate and postgraduate training, development of new training curriculum, creative pedagogy and training of teaching manpower. NUHCS attracts many international clinical and research fellows yearly and has formed a vast network which extends beyond Asia-Pacific to Europe and South America. We also have in our midst many advanced practice nurses who are well-trained and capable of running many essential clinical services.

A Promising Future Ahead

The future remains very exciting for NUHCS as we look forward to the next phase of growth. The strategic thrusts identified will be to provide seamless, fully integrated care within the NUHS cluster; to improve the community health of the population residing in the West through comprehensive end-to-end programmes; to provide cost-effective and value-based

care; to create new models of care using right siting and by adopting new technology; to lead in the development of niche cardiovascular capabilities; and to use research as an enabler of change.

Above all these are our people, our pride at NUHCS. We are fortunate to have a group of dedicated and outstanding individuals including medical doctors, nurses, allied health professionals, operation support staff, as well as researchers, who are committed to the public sector ethos and values, and who are willing to devote their careers and lives to the pursuit of excellence in public healthcare.

Thank you for your support through the past decade and we look forward to a continuous good partnership with all our colleagues in Singapore and beyond.●

**Professor Tan Huay Cheem,
Director,
National University Heart Centre, Singapore**



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 Master of Medicine in Internal Medicine. He is an active clinical researcher, visiting professor at several hospitals in China and invited speaker at many international cardiology meetings.

¹ Severe abnormalities of the aorta.
² An enlarged area in the lower part of the aorta.
³ A complication of rheumatic fever, where the heart valves are damaged.
⁴ Diseases of the heart muscle.
⁵ High blood pressure in the lungs.
⁶ Heart disease that affects the tiny coronary arteries.





Where Learning Comes Alive

Introductory Course in Interventional Cardiology

National University Heart Centre, Singapore (NUHCS) organised yet another successful Introductory Course in Interventional Cardiology, complete with hands-on training using vascular models and virtual-reality simulators.

Imparting Skills and Knowledge

Held on 13 and 14 April 2018, the two-day programme featured intensive practical training and didactic lectures. There were also lively interaction with faculty in the technical and psychomotor skill acquisition, as well as cognitive and stress management training required in interventional cardiology.

Having organised the course for the 13th time with eight NUHCS faculties, the course's founding director, Prof. Tan Huay Cheem, said, "It is ever so fulfilling and satisfying to be able to share our knowledge and experiences with the younger generation of interventional cardiologists from all over the world."

Over the years, the programme has grown from strength to strength in terms of content quality, faculty involvement and the number of participants.

A Longstanding Passion

Since its inception in 2006, the programme has received over 300 participants, many of whom are now opinion leaders and respected cardiologists in their respective countries and regions.



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 Master of Medicine in Internal Medicine. He is an active clinical researcher, visiting professor at several hospitals in China and invited speaker at many international cardiology meetings.

With the support of our partners, SIEMENS and TERUMO, NUHCS aims to continue this tradition of teaching and sharing of our knowledge with fellow cardiologists worldwide.●

Structural Intervention Fellowship in Virginia

A One-Year Journey of Knowledge



National University Heart Centre, Singapore always strives to provide top-notch treatment for heart conditions by awarding our cardiologists opportunities to advance their knowledge and skills in their respective subspecialties. Dr. Ivandito Kuntjoro shares his experience during his one-year Structural Intervention Training in USA.

Pursuing a Growing Field

It was both a privilege and an honour to have completed my structural heart disease (SHD) intervention fellowship at the University of Virginia (UVA) Medical Centre in Virginia, USA. In the last decade, SHD intervention has grown tremendously; fuelled largely by developments in technology and positive outcomes of clinical trials.

I decided to pursue this relatively new field because it involves not only interventional skills but also critical thinking to evaluate various data, including echocardiography, CT imaging and haemodynamic number, in the decision-making process.



Dr. Ivandito Kuntjoro with Dr. Mike Ragosta, MD, Director of Cardiac Catheterisation Lab UVA Medical Centre, and two Advanced Valve Clinic Nurse Practitioners at the weekly Structural/Valvular Intervention Clinic.

My fellowship was conducted mainly at UVA Medical Centre under Dr. Scott Lim and Dr. Mike Ragosta who are pioneers and world leaders in the SHD intervention field. I was trained in a full spectrum of transcatheter structural heart procedures with a particular emphasis on transcatheter aortic valve implantation (TAVI)¹ and percutaneous mitral repair² with mitraclip.

Beyond Catheterisation Lab Work

Although most of my time was spent at the Hybrid Cardiac Catheterisation Lab, I took on major roles in pre-procedure evaluation (weekly Heart Team meeting), complication management post-operative care, and running weekly structural and valve intervention clinic. I also participated in major trials such as PARTNER-3, COAPT, Low Risk Core Valve and S3 for percutaneous pulmonary valve implantation, just to name a few.

I had the opportunity to attend a few major cardiac conferences and special training courses for TAVI operator but the highlight was my two oral presentations at the Transcatheter Valve Therapies Conference 2018 in Chicago, USA.

Surrounded by the natural beauty of Virginia, I spent most of my free time



By Dr. Ivandito Kuntjoro,
Consultant,
Department of
Cardiology

Dr. Kuntjoro is an American Board Certified cardiologist in Internal Medicine and worked as an internal medicine attending physician at Methodist Hospital, Houston, USA before starting his cardiology fellowship at NUHCS. After completing his advanced fellowship in Virginia, USA, he returned to Singapore. As a consultant cardiologist, he performs different types of structural intervention procedures and is also part of the pulmonary hypertension and adult congenital heart disease team.



Dr. Ivandito Kuntjoro with his mentor, Dr. Scott Lim, MD, in a Hybrid Cardiac Catheterisation Lab, after a mitraclip procedure.

outdoors and trained for long distance running. During that year, I managed to complete five half marathon races.

The training has shaped my future career and professional life.

The field will continue to grow especially with the advancement of transcatheter therapy for mitral and tricuspid valve. It is exciting to serve our local population with this new form of intervention.●

¹ Transcatheter procedure to replace damaged aortic valve with the new tissue valve without the need of open heart surgery.

² A cardiac catheterisation procedure to repair leaking mitral valve that cause reversal of blood from left ventricle to left atrium.



Dispatcher-Assisted first REsponder Programme

Empowering Others to Save Lives

Did you know that 7 out of every 10 cases of out-of-hospital cardiac arrest occur in residential areas? To educate the public on life-saving cardiopulmonary resuscitation (CPR) skills, National University Heart Centre, Singapore (NUHCS) co-organised a CPR training session.

A Collaborative Programme
NUHCS and the Ministry of Health's Unit for Pre-hospital Emergency Care (UPEC) collaborated with JTC Corporation and conducted the Dispatcher-Assisted first REsponder (DARE) Programme at the JTC LaunchPad on 16 March 2018.

DARE to Save a Life
The 1-hour course aimed to empower participants with hands-on chest compression and Automated External Defibrillator (AED) skills, together with simulated 995 dispatcher instructions to respond to cardiac arrest victims.

The programme attracted 50 proactive and enthusiastic public participants.

We are grateful for the support of Dr. Benjamin Leong, Senior Consultant, National University Hospital, who was at the event to encourage the participants' involvement in DARE, and answer all burning questions that made everyone DARE to save a life. •

Know Your Heart Facts

In Singapore, about 1,800 cardiac arrests occur every year but only about 50 (three per cent) of these patients survive. The chances of survival are better when cardiac arrest victims receive immediate resuscitation. While waiting for an ambulance to arrive, a bystander can initiate treatment to quickly help the victim.

The DARE Programme was initiated to equip participants with the knowledge and confidence to save a life.

- Participants learn to dial 995
- Perform CPR as instructed
- Communicate with the medical dispatcher
- Use an AED with voice prompts to restart a victim's heart

With hands-on guidance, they are empowered to be the first responder.



The organising team of the DARE Programme are all smiles on the event day.

By Ms. Adeline Teo
Nurse Clinician,
Department of Cardiac, Thoracic & Vascular Surgery

Adeline has 18 years of working experience as a Registered Nurse (RN) in the areas of Paediatric, Adult Surgical and Medical Intensive Care Unit (ICU), and as a nurse clinician at NUHCS. Not a stranger to CPR, Adeline learnt CPR during her early school days and it has been almost 28 years today!

The Chia Boon Lock Memorial Fund

Honouring a Legacy

To honour and continue the noble work of the late Prof. Chia Boon Lock, the Chia Boon Lock Memorial Fund is being set up to support doctors and medical students in their education and research.

Singapore's medical fraternity lost an outstanding teacher, mentor, friend and much-respected member of our community with the passing of Emeritus Professor Chia Boon Lock on 26 December 2017.

He is regarded as Singapore's "Father of Cardiology", for his pioneering work in this field. Those who had the privilege of working or learning from him during his illustrious career, saw him bring his hope and vision for the

field to life. He led by example as the Head of National University Hospital's Division of Cardiology, Department of Medicine, 1986-1989 and the Chief of the Cardiac Department, 1996-1999.

But beyond his professional achievements and accolades, Prof. Chia will be remembered as a great teacher, a favourite of National University of Singapore (NUS) medical students and registrars, and as someone who was always willing to listen and give unstinting advice.

Indeed, he once remarked, "although many regard me as a good clinical cardiologist, people remember me best for my teaching".

NUS Medicine is privileged to count him as an alumni and a much-loved

colleague. To honour his legacy and perpetuate his beliefs about medicine and the education of Singapore's doctors, we are establishing the **CHIA BOON LOCK MEMORIAL FUND**.

Funds raised will go to advancing medical education and research, whether with the establishment of a professorship, fellowship or student bursaries. A committee will be established at NUS Medicine to oversee the final use of the gift sums raised. •

If you would like to contribute, please do not hesitate to contact Ms. Valerie Tan from the School's Development Office via **67726685** or email to **valerie.tan@nus.edu.sg**.



Caring Begins with Me

A Voluntary Support Group for Heart Patients

In January 2014, a group of like-minded patient volunteers formed the Caring Hearts Support Group (CHSG) for patients with heart disease. The group lends fellow patients a listening ear and provides comfort and valuable advice to them. Three years later, CHSG welcomed new leaders to their family.

Leadership Changes for CHSG
A revamp of the heart support group in October 2017 saw Mr. Tim Ho relinquishing his position as President of the group. Taking over the reins were Mr. Stewart Chung and Ms. Magdalene Chia who provide a dose of experience, drive and enthusiasm.

On 3 March 2018, Prof. Tan Huay Cheem officially launched CHSG with the tagline "Caring Begins With Me". The volunteer group aims to build a

network of inspiring and caring heart patient support that brings positive changes to the lives of heart patients so that they continue to thrive in the community.

Expanding Outreach

Under the new leadership, CHSG is now working even more closely with National University Heart Centre, Singapore (NUHCS) to increase its outreach. In addition to brochures and structured



By **Asst. Prof. Yeo Tee Joo**
Consultant,
Department of
Cardiology

Asst. Prof. Yeo completed subspecialty fellowship trainings in Cardiovascular Prevention and Rehabilitation at the Toronto Rehabilitation Institute and Sports Cardiology at St George's, University of London. He is now focused on improving the NUHCS Cardiac Rehabilitation experience for patients and establishing the Sports Cardiology service in NUHCS.

activities, collaborative projects with NUHCS are also in the pipeline.

Since its formation, many patients have benefited from the support group.

We wish CHSG all the best as it continues to grow from strength to strength!•



Members of the Caring Hearts Support Group (CHSG) along with Asst. Prof. Yeo Tee Joo and Prof. Tan Huay Cheem at the official launch of CHSG.

AsiaPCR/SingLIVE 2018

Live Transmission of Five Cases

Asst. Prof. Joshua Loh relates the experience of the National University Heart Centre, Singapore (NUHCS) Interventional Cardiology team which showcased five live demonstrations at a regional cardiovascular course.



NUHCS had the privilege to be invited to present live demonstrations at the AsiaPCR/SingLIVE 2018, an important regional Interventional Cardiology course held in Singapore. The course attracted a total of 1,800 local and international delegates.

Five Live Demonstrations

Over two days on 26 and 27 January 2018, NUHCS presented a total of five cases "live" to delegates gathered at Suntec City Convention Centre. The NUHCS Interventional Cardiology team

showcased our work in tackling complex cases of coronary stenosis (heart artery narrowing) including diffuse disease, multi-vessel coronary artery disease, left-main bifurcation disease and heavily calcified vessels.

Presenting Various Procedures

We demonstrated interventional tools and techniques used to open up coronary stenosis (heart artery narrowing) including the use of intracoronary imaging and functional lesion assessment, rotational atherectomy, and the use of wires, balloons and stents.



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

Asst. Prof. Loh is a Council Member of Singapore Cardiac Society and Organising Chairperson for its 27th to 29th Annual Scientific Meeting. He has contributed to more than 40 journal papers and presented at many international scientific meetings. His interests include coronary artery disease and acute coronary syndromes. He supervises the post-myocardial infarction clinic, managing patients after their heart attack.

All the cases presented had educational value, and showed excellent teamwork among the cardiologists, guest operators, nurses, medical technicians and radiographers at the Angiography Centre.

We have received positive feedback about this transmission, and we look forward to future participation.•



(left to right) A/Prof. Ronald Lee, A/Prof. Damras Tresukosol from Thailand, and A/Prof. Mark Chan were also part of the NUHCS participating team at the regional cardiovascular course.

ENHANCING Critical Care Skills

A 12-Month Training Stint



While evidence shows that more intensivist staff are needed in intensive care units (ICUs), most coronary care units (CCUs) in Singapore are still staffed by cardiologists with little training in critical care medicine. To address this, two of our cardiologists embarked on a critical care training programme for a year in Australia.

We were both fortunate enough to do our core ICU training in multi-disciplinary ICUs in Australia, which adopt a “closed” ICU model. In a “closed” ICU, the intensivist is the admitting medical officer and the specialty teams collaborate with the ICU staff.

Receiving In-Depth Training

During our training, we were exposed to critically ill medical and surgical adult patients. This included cardiac patients; patients requiring extracorporeal mechanical support; as well as trauma, heart and lung transplant patients. Both of us benefited from valuable educational programmes which included weekly journal clubs, registrar education, mortality and morbidity audits, regular ultrasound sessions and various specialised education sessions.

This has been a fruitful and unforgettable year in Australia for both of us, and we eagerly anticipate imparting our knowledge and experience to the National University Heart Centre, Singapore's cardiac team.

Sharing Acquired Knowledge

We look forward to working with a dedicated CCU team to improve care of critically ill cardiac patients including management of non-cardiac diverse ICU problems. We are also working

with other CCU team members to improve the team's education and knowledge of managing critical cardiac patients. As part of the plan, we have recently started “CCU teaching rounds” and in the near future, we will be forming an elite CCU team to establish a fellowship programme in “Cardiac Intensive Care”. •



By **Dr. Lim Shir Lynn**
Consultant,
Department of
Cardiology

Dr. Lim obtained her MBBS from Yong Loo Lin School of Medicine, Singapore. She obtained a Membership of Royal College of Physicians of United Kingdom in 2010 and completed her subspecialty training in cardiology with NUHCS in 2013. She went on to pursue her Master in Clinical Investigation in NUS, completing it in 2016.



By **Dr. Anand Ambhore**
Consultant,
Department of
Cardiology

Dr. Ambhore completed his MBBS from Dr Panjabrao Alias Bhausaheb Deshmukh Memorial Medical College, Amravati, India. He obtained a Membership of Royal College of Physicians of United Kingdom in 2010 and completed his subspecialty training in cardiology from National University Heart Centre, Singapore in 2013.

About the Training Centres

Dr. Lim did her training at The Alfred ICU, which provides state services for heart and lung transplantation, artificial heart technology, extracorporeal membrane oxygenation¹, burns and hyperbaric medicine², adult cystic fibrosis³ and pulmonary hypertension⁴ services.

Dr. Ambhore completed his core intensive care training at Royal Adelaide Hospital. He underwent advanced specialist training, rotations in anaesthesia, respiratory and critical care medicine, medical and surgical ICUs and gained valuable experience in managing critically ill general medical/surgical patients.

¹ Uses a pump to circulate blood through an artificial lung back into the bloodstream.

² Enhances the body's natural healing process by inhalation of 100% oxygen in a total body chamber.

³ An inherited chronic disorder that causes mucus in the body to become thick and sticky.

⁴ High blood pressure in the arteries that carry blood from the heart to the lungs.

Tuesday is the new Monday

Reforming the Coronary Care Unit Roster

Time waits for no one, nor does progress in medicine. To enhance patient care and service delivery, the Coronary Care Unit (CCU) has transformed into a Cardiac Intensive Care Unit, but still keeps its old name. Asst. Prof. Lim Toon Wei shares more about the developments in the CCU for the benefit of patients.

Recently, our CCU has seen a rapidly increasing proportion of complex, seriously ill patients who require critical care. With the return of our CCU consultants from their fellowships (refer to page 14), we thought that it was timely to relook at how consultants covered our CCU as the current roster system was originally devised for general ward coverage.

Committed to the CCU

The rationale was simple. We formed a core team of 11 doctors (instead of approximately 22 doctors) who are committed to developing their skills and knowledge in CCU work, and who will be the only ones to make their rounds there.

Part of this commitment also includes training our junior staff and making rounds for a minimum number of weeks per year.

In recognition of the increased intensity consultants face while on-call for the CCU, they will round a week at a time and always start their duty on a Tuesday. This will reduce the number of weekend and public holiday handovers which previously occurred thrice a month on the 1st, 11th and 21st for our old




By Asst. Prof. Lim Toon Wei
Director,
 Coronary Care Unit
Senior Consultant,
 Department of Cardiology

Asst. Prof. Lim was awarded a PhD from the University of Sydney for his research work, which included one of the largest randomised clinical trials of atrial fibrillation ablation techniques. As part of his practice, he implants pacemakers, implantable cardioverter-defibrillators and performs both conventional and complex ablation procedures for all forms of arrhythmias.

roster. Rosters will also be planned far in advance so that consultants are able to set aside their mornings to concentrate on caring for our patients who require urgent attention.

A Change for the Better

It may seem like a minor administrative tweak to how we work, but this is just a first step to improving care quality and rethinking how we deliver our services as we strive to become a truly academic medical centre. We hope that this will benefit our patients and enhance the learning experience of the junior staff who work with us in the unit. •

Some members of the new CCU Consultants Team: (top left clockwise) Asst. Prof. Raymond Wong, Dr. Anand Ambhore, Asst. Prof. Seow Swee Chong, Asst. Prof. Devinder Singh, Asst. Prof. Chan Wan Xian, Asst. Prof. Lim Toon Wei, Asst. Prof. Yeo Wee Tiong.

Singapore Cardiac Society 30th Annual Scientific Meeting

Future of Cardiology and Beyond

National University Heart Centre, Singapore (NUHCS) once again participated actively at the Singapore Cardiac Society's (SCS) 30th Annual Scientific Meeting (ASM), which was held from 6 to 8 April 2018 with the theme "Future of Cardiology and Beyond".



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

Asst. Prof. Loh is a Council Member of Singapore Cardiac Society and Organising Chairperson for its 27th to 29th Annual Scientific Meeting. He has contributed to more than 40 journal papers and presented at many international scientific meetings. His interests include coronary artery disease and acute coronary syndromes. He supervises the post-myocardial infarction clinic, managing patients after their heart attack.



The winners of the C-factor Jeopardy Challenge: (left to right) Dr. Thet Khaing, Dr. Laureen Wang and Dr. Lim Ying Hao.

Targeted at doctors and allied health professionals involved in the care of cardiac patients, the 30th ASM saw many collaborations with international and local societies of various medical specialties. In his opening speech, the Guest of Honour, Mr. Chee Hong Tat, then-Senior Minister of State, Ministry of Communications and Information & Ministry of Health, addressed the growing burden of cardiovascular diseases in Singapore as well as preventive care and early intervention treatments.

NUHCS's Roles at the ASM

NUHCS was well represented at all levels. Both Asst. Prof. Pipin Kojodjojo and I were part of the organising committee.

Many of our cardiologists served as chairpersons and panelists at various scientific symposiums.

Prof. Tan Huay Cheem, A/Prof. Mark Chan, Asst. Prof. William Kong, Asst. Prof. Yeo Tee Joo and Ms. Karen Koh were invited speakers in their respective expertise.

Our cardiology senior residents did NUHCS proud by winning the inter-cluster C-factor Jeopardy Challenge for the second year running. This year's team comprising Dr. Laureen Wang, Dr. Thet Khaing and Dr. Lim Ying Hao, won by a

large margin. We look forward to this team representing Singapore at another Jeopardy competition at the American College of Cardiology (ACC) meeting in 2019. Their predecessors from NUHCS recently won the competition at ACC.18 (refer to page 27).

A Tribute to the Late Prof. Chia

One of the key segments of the ASM was a tribute to the late Prof. Chia Boon Lock, a former president and active member of SCS. The segment included a video highlighting Prof. Chia's key accomplishments as an academic cardiologist who trained many cardiologists in Singapore; video recordings of his colleagues and friends, with touching expressions of gratitude on how Prof. Chia's teachings and friendship have influenced us all; and his son, Dr. John Chia, giving a very personal account of his life. Through this, we learnt of Prof. Chia's resilience in combating cancer without complaining, and that his life's passion was cardiology.

The SCS Annual General Meeting was held after the ASM concluded. Asst. Prof. Lim Toon Wei was elected as Vice-President of the society; A/Prof. Poh Kian Keong, Asst. Prof. Edgar Tay and I were elected as council members; and Asst. Prof. Yeo Tee Joo was elected as honorary auditor. •

Giving Heart Patients a New Lease of Life

An Outreach Programme to Myanmar

The medical team from National University Heart Centre, Singapore (NUHCS) made a momentous trip to Myanmar to treat patients with severe aortic valve stenosis¹. Asst. Prof. Edgar Tay shares the details of their maiden TAVI operation in the country.



A Privileged Opportunity

I felt privileged to be able to work with the cardiology team at Mandalay General Hospital, Myanmar to provide transcatheter aortic valve implantation (TAVI) to patients with severe aortic valve stenosis¹. Held on 12 and 13 February 2018, the two-day outreach programme was a momentous one as it was the first time the NUHCS team performed TAVI in Myanmar.

A/Prof. Jimmy Hon, Prof. Than Than Kyaing, A/Prof. Kyaw Soe Win and I made up the four-member team that brought the outreach programme to fruition. Together, we spent more than two years planning for the operation which would not have succeeded without the support from National University Health System leaders, the Fung Foundation, as well as generous donation from Edward Lifesciences.

Successful Operations

Before the trip, we screened and evaluated patients who presented high risks for open surgical replacement and were able to identify five who were suitable for the TAVI treatment.

At Mandalay General Hospital, we prepared their cardiology team by conducting didactic sessions and trainings a day before the surgeries. With the support of their cardiac surgeons, echocardiologist and anaesthetists, the team also worked tirelessly to convert their catheterisation laboratory into a hybrid room.



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

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

We were so proud of them for developing team spirit and working well together in such a short span of time.

The TAVI surgery for the five patients went smoothly and we are grateful for this enriching experience where NUHCS was able to contribute to such a meaningful outreach programme. •

¹ A narrowing of heart valve.



The five patients who had successfully received percutaneous aortic valve treatment by the NUHCS TAVI team.

The Heart of the Matter

Effective Management of Atrial Fibrillation

Atrial fibrillation (AF) is an irregular and often rapid heart rate that can lead to blood clots, stroke, heart failure and other heart-related complications. Asst. Prof. Kang Giap Swee gives insights on how the condition can be best managed.

During atrial fibrillation (AF), the heart's two upper chambers (the atria) beat irregularly and are unsynchronised with the two lower chambers (the ventricles). The symptoms often include heart palpitations, shortness of breath and weakness.

Episodes of AF can come and go but if episodes become persistent, it may lead to complications such as formation of blood clots in the heart, which may circulate to other organs and lead to blocked blood flow. In such cases, treatments may be required.

Generally, the treatment goals for AF are through:

1) Medication

Most people with AF require medication in order to restore or maintain a normal heart beat in the short- or long-term. In addition, blood-thinning medication may be prescribed to prevent blood clot formation inside the heart chambers.

2) Procedures

There are some recommended procedures which are effective in treating AF:

- Electrical Cardioversion – a process by which the heart is shocked to convert it from an irregular rhythm back into a normal sinus rhythm.

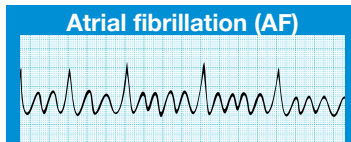
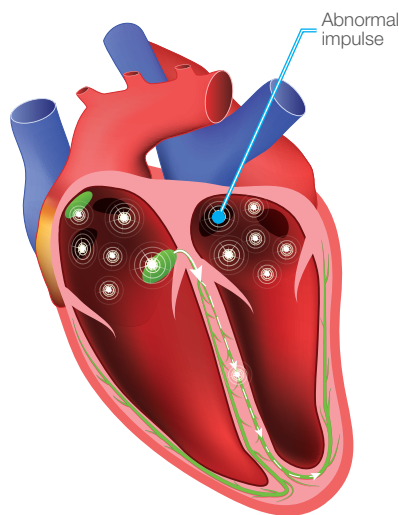
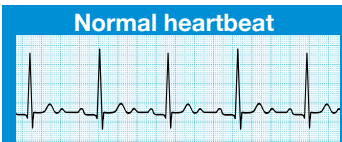
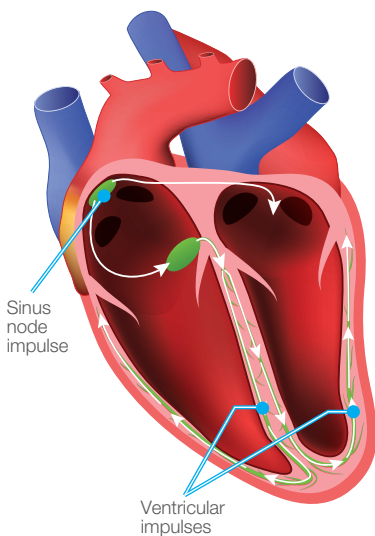
- Catheter Ablation – scarring or destroying tissue in your heart that triggers abnormal heart rhythm.
- Surgical Maze Procedure – creation of a maze of scar tissue on the heart that relays the electrical signals that control your heartbeat.

Your doctor will propose the right treatment; taking into consideration other related heart problems, and if medication is able to control your heart rhythm.

In some cases, you may need more invasive treatment such as medical procedures using catheters or surgery.

By Asst. Prof. Kang Giap Swee
Consultant,
Department of Cardiac, Thoracic and Vascular Surgery

Asst. Prof. Kang is an Assistant Professor with the Department of Surgery at Yong Loo Lin School of Medicine. His interest and specialty lies in Adult Cardiac Surgery (Coronary Artery Bypass Grafting, Heart Valve Repair and Replacement, Arrhythmia Surgery, etc.) and Minimally Invasive Cardiac Surgery.



Discovery of a Key Molecule

Progress for Heart Failure Treatment

The Cardiovascular Research Institute at National University Heart Centre, Singapore (NUHCS) discovered that a group of molecules known as chondroitin sulfate, normally found only in connective tissues such as the cartilage, accumulates in heart tissue and causes chronic inflammation in patients with heart failure. The team discovered that the use of arylsulfatase B (ASB) may be an effective treatment method. The research was recently published in the Circulation journal.

Molecular Nets in Failing Hearts

Cardiovascular disease (CVD) is a leading cause of death worldwide. In Singapore, CVD accounted for 29.6 per cent of all deaths in 2016 and up to 50 per cent of patients with heart failure do not survive beyond five years.

In a rare disease known as mucopolysaccharidosis type VI (MPS VI), patients have a genetic mutation that leads to systemic chondroitin sulfate accumulation, resulting in multi-organ disease including heart failure.

In this current study, researchers at NUHCS found that chondroitin sulfate, attached to other proteins, accumulated as complex molecular nets in diseased failing hearts, even in patients without MPS VI.

Potential Treatment of Heart Failure

In the quest to find alternative treatments for this condition, the research team at NUHCS tested the FDA-approved drug, ASB enzyme, in two animal models of heart failure and the result was encouraging.

The test outcome showed a reduction in fibrosis which slowed down, and even reverses disease progression.

This new treatment potentially adds to current treatment strategies, including long-established medicines such as beta-blockers and ACE-inhibitors.



By A/Prof. Roger Foo
Senior Consultant,
Department of Cardiology

A/Prof. Foo is a graduate of the Medical School at NUS and has nearly 20 years of training and work experience in the UK and USA. He now leads a group of research scientists and clinician-scientists based in the NUS Cardiovascular Research Institute and the Genome Institute of Singapore. He is also a Senior Consultant in the Department of Cardiology in NUHCS.



By Dr. Zhao Rong Rong
Senior Research Fellow,
Cardiovascular Research Institute (CVRI), NUHCS

Dr. Zhao is a Senior Research Fellow in A/Prof. Foo's group at NUS. She did her PhD at University of Cambridge, School of Medicine. Before that, she graduated from NTU under Singapore MOE scholarship.

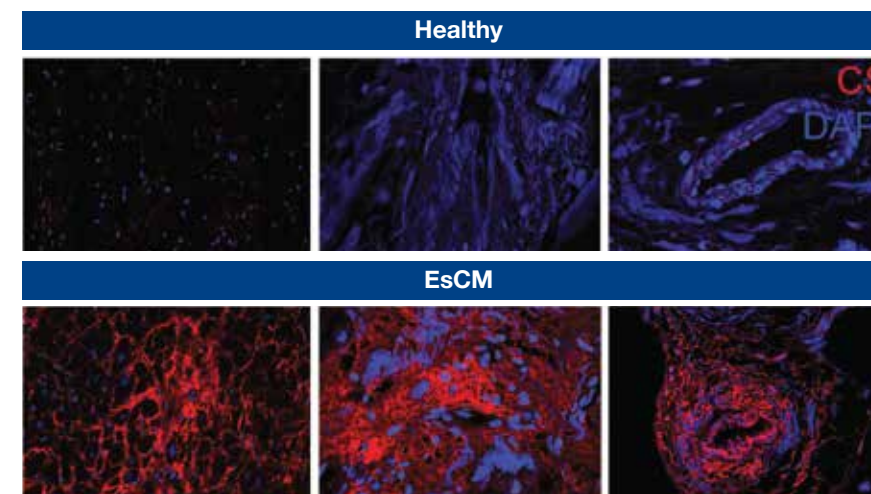


Figure: Abundant and complex chondroitin sulfate molecular nets in the histological heart sections of patients with end-stage heart failure. Scale bars, 50 μ m.

Five Papers Accepted in European Publication

In 2017, Asst. Prof. William Kong's five original manuscripts related to the treatment of bicuspid aortic valve disease¹ were accepted for publication in the European Heart Journal.

2017 was a year of blessings for me. I am deeply honoured to be the first author and co-author of five original manuscripts that were accepted for publication in the European Heart Journal (EHJ), which has the highest impact factor among other recognised cardiology journals.

The manuscripts are related to my PhD thesis, with focuses on bicuspid aortic valve disease¹ and transcatheter therapy for bioprosthetic aortic valve implantation. The titles of the papers are as stated below:

- Inter-ethnic differences in valve morphology, valvular dysfunction, and aortopathy between Asian and European patients with bicuspid aortic valve. Kong WKF, Regeer MV, Poh KK, Yip JW, van Rosendael PJ, Yeo TC, Tay E, Kamperidis V, van der Velde ET, Mertens B, Ajmone Marsan N, Delgado V, Bax JJ. *Eur Heart J.* 2018 Apr 14;39(15):1308-1313.
- Double-orifice Barlow's mitral valve.

Chen Z, Kong WKF, Tay ELW, Petersson F, Poh KK. *Eur Heart J.* 2018 Apr 7; 39(14):1208-1209.

- Transcatheter aortic valve thrombosis: the relation between hypo-attenuated leaflet thickening, abnormal valve haemodynamics, and stroke. Vollema EM, Kong WKF, Katsanos S, Kamperidis V, van Rosendael PJ, van der Kley F, de Weger A, Ajmone Marsan N, Delgado V, Bax JJ. *Eur Heart J.* 2017 Apr 21; 38(16):1207-1217.
- Integrated imaging of echocardiography and computed tomography to grade mitral regurgitation severity in patients undergoing transcatheter aortic valve implantation. van Rosendael PJ, van Wijngaarden SE, Kamperidis V, Kong WKF, Leung M, Ajmone Marsan N, Delgado V, Bax JJ. *Eur Heart J.* 2017 Jul 21;38(28):2221-2226.
- Computed tomography for planning transcatheter tricuspid valve therapy. van Rosendael PJ, Kamperidis V, Kong WKF, van Rosendael AR, van



der Kley F, Ajmone Marsan N, Delgado V, Bax JJ. *Eur Heart J.* 2017 Mar 1;38(9): 665-674.

I would like to sincerely thank my mentors, Prof. Jeroen J. Bax and Dr. Victoria Delgado from Leiden University Medical Centre, Netherlands, and my colleagues, A/Prof. Yeo Tiong Cheng and A/Prof. Poh Kian Keong, for their support. I also wish to express gratitude to my beloved wife for her loving support and understanding during my research and clinical career.

I hope to produce more impactful researches and meaningful manuscripts that will contribute to the developments of cardiology.

By **Asst. Prof. William KF Kong**
Consultant,
Department of Cardiology

¹ A condition where the aortic valve has only two cusps instead of three, resulting in the narrowing of the heart valve.

Visiting Professorship in Guangzhou

Director of National University Heart Centre, Singapore received his 10th visiting professorship at a Chinese hospital.



Prof. Tan Huay Cheem receiving his 10th visiting professorship at Guangdong Provincial Hospital of Chinese Medicine.

Prof. Tan Huay Cheem was conferred a Visiting Professorship at Guangdong Provincial Hospital of Chinese Medicine on 18 March 2018. This is Prof. Tan's 10th Visiting Professorship at a Chinese University Affiliated Hospital. Prof. Tan hopes to bring his years of experience in cardiology to contribute to and enrich the hospital's clinical and research endeavours.

A visiting professor is a scholar from an institution who visits a host university to teach, lecture, or perform research related to his or her specialty. He or she may be engaged for some months or even a year. Congratulations to Prof. Tan for receiving this visiting professorship.

Modified Technique for Heart Patients

Balloon pulmonary angioplasty (BPA) has become an increasingly well-recognised treatment for selected patients with chronic thromboembolic pulmonary hypertension¹ (CTEPH).

Patients with CTEPH are often short of breath, have very poor quality of life and reduced life expectancy. Traditional treatments such as surgical pulmonary endarterectomy² and medications are costly and have to be taken for life.

BPA was developed several years ago but it has been modified recently by Japanese cardiologists to make it safe and effective. Its ability to reduce patients' symptoms and disease burden has led to an increasing interest in the field.

I first observed the technique in the National Cerebral and Cardiovascular Centre (NCVC), Osaka, Japan. Subsequently, we introduced the BPA programme in National University Heart Centre, Singapore (NUHCS), under the mentorship of

NCVC's Dr. Takeshi Ogo. Three patients were treated successfully with good, sustainable results and we have continued to treat more patients independently.

In September 2018, NUHCS will be organising a CTEPH course to increase regional awareness and to impart this technique to other physicians.



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

¹ Clots that travel from the veins in the body and clog the arteries in the lungs.

² A procedure that cleans out the blockages in the arteries.

Recognising Dedication

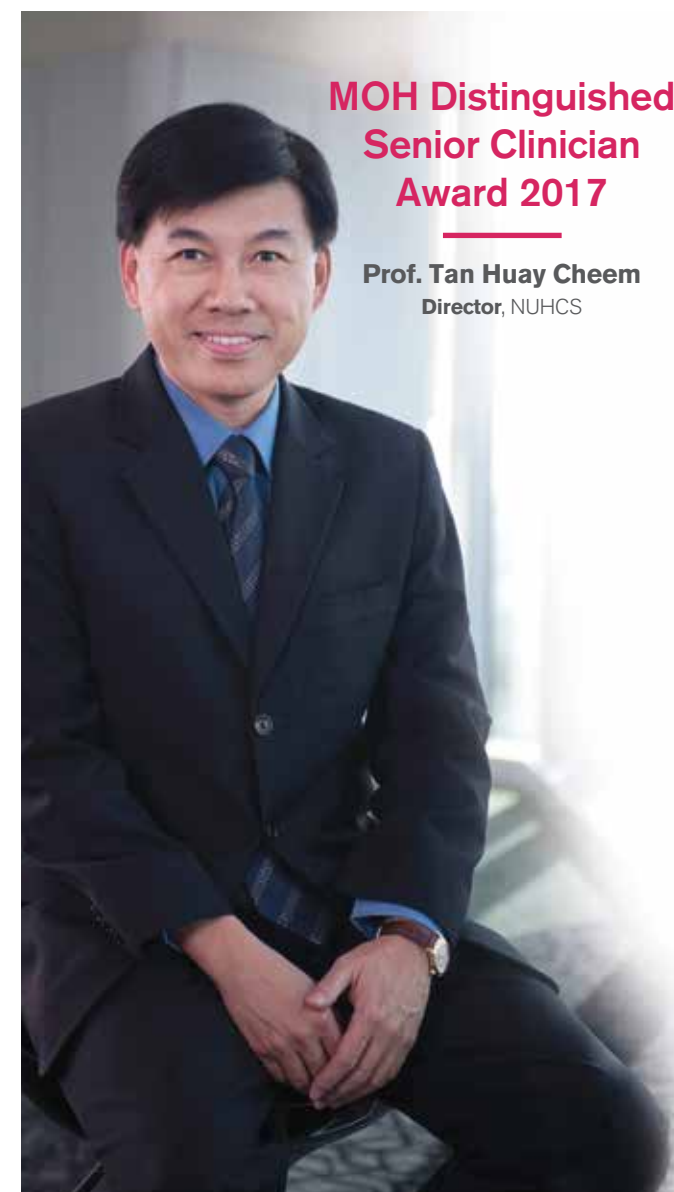
Prof. Tan was awarded the MOH Distinguished Senior Clinician Award 2017 in recognition of his exemplary role model with strong public sector ethos and values, professional integrity and conduct. He has also made outstanding contributions to the medical profession, the Singapore public healthcare sector and international community in areas of clinical service, education and research.

What are your thoughts on achieving this award?

It is a tremendous honour to receive this award. It is a testament to my years of public service, pushing for excellent medical care for all our patients regardless of their financial abilities or background. This award recognises the contribution of senior clinicians who have decided to devote the best part of their careers to pursuing public healthcare and forego the attractive rewards of private practice. I hope this award will inspire younger doctors to join public service.

What are some of the important values that clinicians should possess?

We need to put the patients' needs in the centre of all that we do. We have to engage them in the decision making and empathise with them. Moving forward, I hope to serve as a model to my peers – especially the younger generations of doctors.



MOH Distinguished
Senior Clinician
Award 2017

Prof. Tan Huay Cheem
Director, NUHCS

Maintaining Good Clinical Outcomes

Since the adoption of the value driven outcome (VDO) tool, our centre has seen positive results in reducing treatment costs while maintaining good clinical outcome.

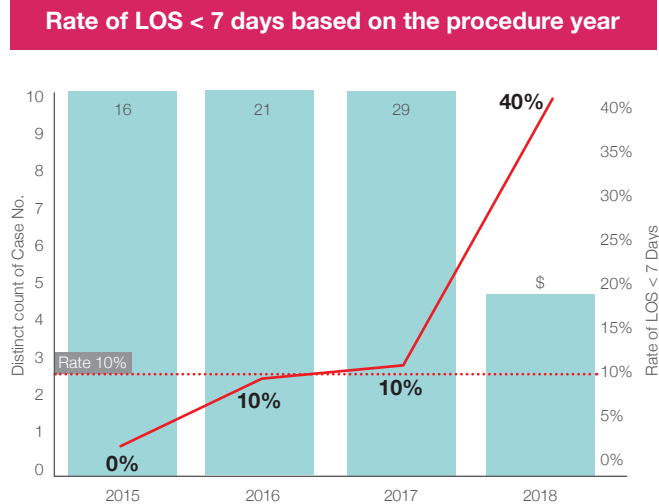
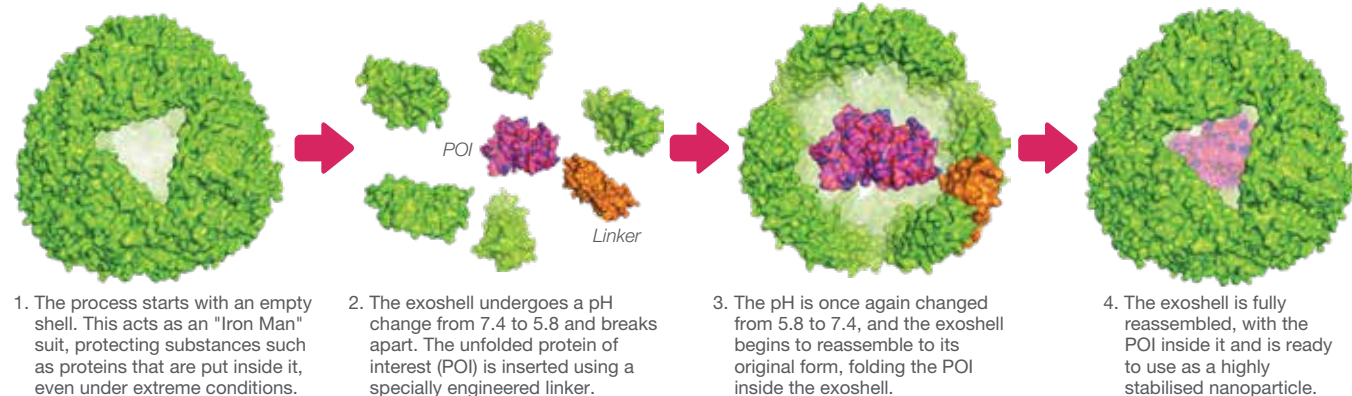
The VDO tool is used to identify the true cost of health-care and compare it with clinical outcomes data. Following the success of VDO in ST-elevation myocardial infarction (STEMI) [featured on page 29 of Pulse 30], a similar approach has been adopted for transcatheter aortic valve implantation (TAVI).

While the adoption of the updated device, as well as experience growth and technical refinement in TAVI have led to good clinical outcomes, reducing high upfront costs of the procedure remains a major challenge.

'Iron Man' Suit Protects and Transports Proteins to Disease Sites

Asst. Prof. Chester Drum and his research team recently demonstrated a new way to wrap and protect proteins to facilitate their transport to disease sites in the body.

In 29 December 2017, the Straits Times featured a recent research finding that may aid in the treatment of diseases by encapsulating proteins inside a thermostable protein shell. The modified protein, obtained



The data analysis showed that the length of stay was a key limiting factor, thus an improvement project involving medical and non-medical staff was initiated to minimise unnecessary hospital stay. This would hopefully produce a more cost-effective procedure while maintaining positive clinical outcomes.

By **Dr. Ivandito Kuntjoro**
Consultant,
Department of Cardiology

from an unusual bacterium *Archaeoglobus fulgidus*, was reengineered to wrap around the unfolded substrate, moulding it like hands mould clay and protecting it from harsh chemicals or extreme heat.

"It's like an armour that protects and transports the protein-like an 'Iron Man' suit," said Asst. Prof. Chester Drum.

The research was first published in the Nature Communications journal in November 2017 and demonstrates the application of this technology to specifically guide the process of protein folding even in a test tube. The team is now engineering a therapeutic transport molecule to treat cancer.

By **Asst. Prof. Chester Drum**
Consultant,
Department of Cardiology

Gaining Recognition as a Training Centre

The National University Hospital (NUH) was accredited as a training centre by the Asia Pacific Heart Rhythm Society (APHRS), marking an important milestone for the hospital.

Since 2008, APHRS has been performing a pivotal role in promoting the study and care of patients with cardiac rhythm disorders in the Asia-Pacific region. Comprising members from 20 countries, APHRS brings together physicians and allied health professionals who manage patients with arrhythmias and cardiac devices, and provides them with a platform for education, research, training and collaboration.

It is therefore a great honour for NUH to be the first in South East Asia to receive the status of an accredited training centre by the APHRS. This title recognises the high-quality education and training courses in cardiac electrophysiology and pacing that we have been organising since 2008.

It was timely that NUH received the accreditation on the 10th Anniversary of National University Heart Centre, Singapore



(NUHCS), which also coincides with the 10th Anniversary of our first international cardiac resynchronisation therapy (CRT) course and the inception of APHRS.

By **Asst. Prof. Seow Swee-Chong**
Director,
Cardiac Electrophysiology and Pacing
Heart Rhythm Programme
Senior Consultant,
Department of Cardiology

International Fellow-in-training Jeopardy Competition

Senior Residents from National University Heart Centre, Singapore, Dr. Sim Hui Wen, Dr. Christopher Koo and Dr. Eugene Tan, represented Singapore in an international fellow-in-training (FIT) jeopardy competition.



Doctors involved are Dr. Christopher Koo, Dr. Sim Hui Wen and Dr. Eugene Tan.

The inaugural FIT Jeopardy competition was held during the American College of Cardiology (ACC.18) Scientific Sessions in Orlando, USA from 10 to 12 March 2018. The FIT Jeopardy is a competition that promotes a healthy rivalry between the FIT teams, fosters FIT engagement in their local chapters and provides educational value to the contestants and audience.

Our Singapore FIT team participated in the event, along with three other teams from Malaysia, Italy and Mexico. We were tested on the areas of valvular heart disease¹, pericardial disease², electrophysiology³, cardiomyopathy⁴ and coronary artery disease⁵. Our team emerged as the winner of the competition. We look forward to participating in the next FIT Jeopardy Competition in 2019.



¹ The damage to or a defect in one of the four heart valves.
² A disease that affects the sac that envelops the heart.
³ The biomedical field that studies electric activity in the body.
⁴ Diseases that affect the heart muscle.
⁵ Narrowing of arteries that supply blood to the heart muscle.

By **Dr. Sim Hui Wen**
Senior Resident,
Department of Cardiology

cardiovascular outcomes: A population-based study in healthy Asians
Yap J, Jin AZ, Nyunt SZ, Ng To, **Richards AM**, Lam SP.

Society for Cardiothoracic Surgery in Great Britain and Ireland Annual Meeting 2018, Glasgow, Scotland, UK, 18-20 March 2018

Low ejection fraction in coronary artery bypass grafting. Predictors of operative complications and mortality
Vickneson K, Chan SP, Li Y, Dinie MN, Luo HD, **Caleb MG, Sorokin V.**

ASE ASEAN Manila 2018, Manila, Philippines, 22-24 March 2018

CHA2DS2-VASc scores predict all-cause mortality and congestive cardiac failure admissions in patients with moderate to severe aortic stenosis
Ang YY, **Sia CH, Sim HW**, Ngiam N, Tan YQ, **Yeo TC, Kong WKF, Poh KK.**

The obesity paradox: Improved survival in obese compared to non-obese patients with medically-managed severe aortic stenosis and preserved left ventricular ejection fraction
Ngiam N, Chew N, Tan B, Sia CH, Sim HW, Kong WKF, Yeo TC, **Poh KK.**

Singapore Cardiac Society 30th Annual Scientific Meeting, Singapore, 7-8 April 2018

A meta-summary of case reports of non-vitamin K antagonist oral anticoagulant use in patients with left ventricular thrombus
Leow ST, **Sia CH**, Tan YQ, **Loh JP.**

Accelerated accrual of ischaemic events after stopping dual antiplatelet therapy at 12 months in a real-world acute myocardial infarction cohort
Tan ES, Chan SP, Shoban K Krishnan, **Tan HC, Yeo TC, Low AF, Lee CH, Loh JP, Loh PH, Tay EL, Chan KH, Richards AM, Chan MY.**

An Asian perspective on left ventricular outflow tract cut-offs and the resulting discrepancy in severity grading of aortic stenosis
Chew N, Ngiam N, Tan YQ, **Sia CH, Sim HW, Kong WKF, Yeo TC, Poh KK.**

Comparing the impact of concomitant significant mitral regurgitation on the echocardiographic profile of patients with low-flow versus normal-flow severe aortic stenosis and preserved left ventricular ejection fraction
Ngiam N, Chew N, Teng R, Tan YQ, **Sia CH, Sim HW, Kong WKF, Yeo TC, Poh KK.**

CHA2DS2-VASc scores predict all-cause mortality and congestive cardiac failure admission in patients with moderate to severe aortic stenosis
Ang YY, **Sia CH, Sim HW**, Ngiam N, Tan YQ, **Yeo TC, Kong WKF, Poh KK.**

Characterisation of ST elevation myocardial infarction and non-ST elevation myocardial infarction patients with acute left ventricular thrombus
Leow ST, **Sia CH**, Tan YQ, **Kaur R, Sim HW, Yeo TC, Chan MY, Tay EL, Loh JP.**

Characterizing inflammatory and cholesterol risks in the community
Tan LW, Tai BC, **Lee CH.**

Clinical characteristic and outcomes of primary percutaneous coronary intervention for

ST-segment elevation myocardial infarction in elderly patients (65-79 years) versus very elderly patients (80 years and above)
Sim HW, Thong E, Andie Hartanto Djohan, **Tay EL, Loh PH, Chan KH, Chan MY, Lee CH, Low AF, Tan HC, Loh JP.**

Comparison of bleeding outcomes of different D2Y12 inhibitors in a real-world acute myocardial infarction cohort
Tan ES, Chan SP, Shoban K Krishnan, **Tan HC, Yeo TC, Low AF, Lee CH, Loh JP, Loh PH, Tay EL, Chan KH, Richards AM, Chan MY.**

Diabetes mellitus is associated with high sleep-time blood pressure and non-dipping pattern
Aung AT, Chan SP, Kyaing TT, **Lee CH.**

Differences in clinical outcomes and echocardiographic profiles of patients with atrial fibrillation in medically-managed severe aortic stenosis and preserved left-ventricular ejection fraction
Ngiam N, Chew N, Tan YQ, **Sia CH, Sim HW, Kong WKF, Yeo TC, Poh KK.**

Divergent associations of anthropometric parameters with electrocardiographic versus echocardiographic detection of left ventricular hypertrophy
Sia CH, Lee CY, Tan YQ, Wang KJ, Shen XY, Mayank D, Chow WE, Shalini A, Chua SJ, Yeo KK, Chong TT, Lam SP, Tan RS.

Emergency coronary angiogram and percutaneous coronary intervention practice in out of hospital cardiac arrest patients in a tertiary academic medical centre
Gu JW, Sia CH, Loh JP, Leong B, **Lim SL.**

Ethnic differences in ischaemic and bleeding events following acute myocardial infarction in a multi-ethnic Southeast Asian population
Tan ES, Chan SP, Shoban K Krishnan, **Tan HC, Yeo TC, Low AF, Lee CH, Loh JP, Loh PH, Tay EL, Chan KH, Richards AM, Chan MY.**

Intermediate and long-term outcome of the combination sirolimus-eluting endothelial progenitor cell capture stents in ST-segment elevation acute myocardial infarction during primary percutaneous coronary intervention
Sim HW, Ananthakrishna R, Thong E, Andie Hartanto Djohan, **Tay EL, Loh PH, Chan KH, Chan MY, Lee CH, Low AF, Tan HC, Loh JP.**

One-year outcome of single long 48mm drug eluting stent versus overlapping drug eluting stents in the treatment of diffuse coronary artery disease
Sim HW, Tong W, **Tay EL, Loh PH, Chan KH, Chan MY, Lee CH, Low AF, Tan HC, Loh JP.**

Predictors of major adverse cardiac and cerebrovascular events in patients newly diagnosed with colorectal carcinoma after surgical resection
Koo CY, Tai BC, Chan KH, Tan KK, **Lee CH.**

Sleep study-guided multidisciplinary therapy (SGMT) for patients with acute coronary syndrome: trial rationale and design
Chua AP, **Koo CY**, Kristanto W, Parot MVJM, Tan ES, Koh EH, Abd Gani MB, **Kojodjojo P**, Han TO, **Chan SP**, Chong JP, Frampton C, **Richards AM, Lee CH.**

Severe functional tricuspid valve regurgitation: Predictors or mortality and heart failure admission

Ng LF, Tay EL, Chan SP, Ling LH, Yeo TC, Wong RC, Poh KK, Kong WKF, Cherian R.

Sex difference in in-hospital and long-term outcome of cardiac mortality and ischemic stroke after primary percutaneous coronary intervention for ST-segment elevation myocardial infarction
Sim HW, Thong E, Andie Hartanto Djohan, **Tay EL, Loh PH, Chan KH, Chan MY, Lee CH, Low AF, Tan HC, Loh JP.**

The impact of body weight on all-cause mortality of a multi-ethnic Asian population with moderate and severe aortic stenosis
Sia CH, Ngiam N, Chew N, Teng R, **Sim HW**, Tan YQ, Ang YY, **Kong WKF, Yeo TC, Poh KK.**

American Association of Thoracic Surgery Aortic Symposium, New York, USA, 26-27 April 2018

Chimney parallel grafts and thoracic endovascular aortic repair for blunt traumatic thoracic aortic injuries: A systematic review
Wee I, Carter R, Petrie K, **Choong A.**

Forecasting aortic aneurysm rupture: A systematic review of seasonal and atmospheric associations
Wee I, Marjot J, Marjot T, Brightwell R, Walker P, **Choong A.**

The safety and efficacy of endovascular repair of Stanford type A aortic dissections: A systematic review and meta-analysis
Chin B, Lim Z, Syn N, Wee I, **Choong A.**

The endovascular repair of blunt traumatic thoracic aortic injury in Asia: A systematic review
Wee I, Ho X, Harrison M, Wilson L, **Choong A.**

Thoracic aortic aneurysm and diabetes mellitus
D'cruz R, Syn N, Wee I, **Choong A.**

Transcaval approach for endovascular aortic interventions: A systematic review
Wee I, **Choong A.**

86th European Atherosclerosis Society Congress, Lisbon, Portugal, 5-8 May 2018

The miRNA 30b-5p targeting mRNA MBNL1 leads to pro-myogenic VSMC phenotype modulation in myocardial infarction patients
Woo CC, Wongsurawat T, Lin XY, **Sorokin V.**

CSAMM 2018 - Annual Scientific Congress, College of Surgeons, AMM, Ipoh, Malaysia, 11-13 May 2018

Chronic obstructive airway disease and aortic aneurysms
D'cruz R, **Choong A.**

5th SG-ANZICS Asia Pacific Intensive Care Forum, Singapore, 17-21 May 2018

ECMO for takotsubo cardiomyopathy: 2 case reports
Kabra A, MacLaren G, Ramanathan KR.

ECMO in adult disseminated adenoviral disease – A case series from Singapore
Murughan K, MacLaren G, Ramanathan KR.

EuroPCR, Paris, France, 22-25 May 2018

One-year outcome of single long 48mm drug eluting stent versus overlapping drug eluting stents in the treatment of diffuse coronary artery disease
Sim HW, Thong E, **Tay EL, Loh PH, Chan KH, Chan MY, Lee CH, Low AF, Tan HC, Loh JP.**

7th EuroELSO Congress on ECMO-ECLS, Prague, Czech Republic, 23-26 May 2018

Extracorporeal membrane oxygenation for adenoviral pneumonia in adults and children: survival and predictors of mortality
Ramanathan KR, Tan CS, Rycus P, **MacLaren G.**

Extracorporeal membrane oxygenation in pregnancy and postpartum women: a systematic review and meta-regression analysis
Zhang J, Ong J, Syn N, Lorusso R, **MacLaren G, Ramanathan KR.**

Extracorporeal membrane oxygenation in pregnancy and the postpartum period: a systematic review of case reports
Ong J, Zhang J, Lorusso R, **MacLaren G, Ramanathan KR.**

Vascular complications of extracorporeal membrane oxygenation: a systematic review and meta-regression analysis
Jia D, Syn N, **Murghan K, Choong A, MacLaren G, Ramanathan KR.**

26th Annual Meeting of the Asian Society for Cardiovascular and Thoracic Surgery, Moscow, Russia, 24-27 May 2018

Glomus tumor of trachea: two interesting case reports and management
Sampath HK, Santosham R, Santosham R.

Minimally invasive mitral valve replacement for double outlet mitral valve
Leow L, Chang G, Rahman MZ, Kofidis T.

Prediction of aortic-related complications after acute type A dissection surgery with CT-based volumetric measurements
Papadimas E, Ge J, Chan SP, Wee B, **Wong J, Teoh K, Kofidis T, Sorokin V.**

18th International Society for Minimally Invasive Cardiothoracic Surgery Annual Scientific Meeting, Vancouver, Canada, 13-16 Jun 2018

Trans-atrial mitral valve-in-valve implantation: Experimental feasibility study in a short-term survival porcine model
Vu TD, Nguyen DV, Oo MZ, Ocampo EM, Tan HQH, Cheong RHE, Alaa M, Gklotsou MT, Ti LK, **Kofidis T.**

Trans-jugular tricuspid valve-in-a-ring implantation: Experimental feasibility study in short-term survival porcine model
Vu TD, Nguyen DV, Ocampo EM, Tan HQH, Ja'afar D, Alaa M, Gklotsou MT, Ti LK, **Kofidis T.**

ASE 2018, Nashville, US, 22-26 June 2018

The obesity paradox: Improved survival in obese compared to non-obese patients with medically-managed severe aortic stenosis and preserved left ventricular ejection fraction

Ngiam N, Chew N, Tan B, **Sia CH, Sim HW, Kong WKF, Yeo TC, Poh KK.**

European Society of Cardiology, Munich, Germany, 25-29 August 2018

Accelerated accrual of ischaemic events after stopping dual antiplatelet therapy at 12 months in a real-world acute myocardial infarction cohort
Tan SJ, Chan SP, Shoban K Krishnan, **Tan HC, Yeo TC, Low AF, Lee CH, Loh JP, Loh PH, Tay EL, Chan KH, Richards AM, Chan MY.**

Diabetes mellitus is associated with high sleep time blood pressure and non-dipping pattern
AT Aung, SP Chan, TT Kyaing, **Lee CH.**

MicroRNA Let-7d-3p contributes to cardiac protection via targeting HMGA2
Wong LL, Saw EL, Lim JY, Zhou Y, **Richards AM**, Wang PP.

Optimal configuration for bipolar catheter ablation in ventricular myocardium
Zhang FX, **Kojodjojo P.**

Post-operative chemotherapy protects against cardiovascular events in patients with colorectal carcinoma
Koo CY, Tai BC, Chan D, Tan KK, **Lee CH.**

Severe functional tricuspid valve regurgitation: Predictors of mortality at 1 and 2 years and heart failure admission
Ng P, Tay EL, Soo WM, Chan SP, Ling LH, Yeo TC, Wong RC, Poh KK, Kong WKF, Cherian R.

Congratulations on Your Promotion!



Dr. Darren Lee
Consultant,
Department of Cardiac,
Thoracic and Vascular Surgery
January 2018

Dr. Senthil Kumar Subbian
Consultant,
Department of Cardiac,
Thoracic and Vascular Surgery
January 2018

Dr. Ivandito Kuntjoro
Consultant,
Department of Cardiology
January 2018



Asst. Prof. Joshua Loh
Senior Consultant,
Department of Cardiology
January 2018



Dr. Devinder Singh
Senior Consultant,
Department of Cardiology
January 2018



Ms. Karen Koh, Assistant Director of Nursing, took over as the Head of National University Heart Centre, Singapore, Nursing, with effect from January 2018.

**National University Heart Centre,
Singapore (NUHCS) is celebrating
our 10th anniversary!** Thank you for
walking the journey with us. Join us
as we have an exciting lineup of
activities in 2018!

September
**GoRed @ World
Heart Day**

July
**PULSE 10th
Anniversary
Special Edition**

August
**NUHCS 10th
Anniversary
Public Symposium
& Book Signing**

And More!
October
**NUHCS 10th
Anniversary Memento**
June
**Facade & Sculpture
Garden**

November
**NUHCS 10th
Anniversary
Thanksgiving
Dinner**

10TH
Anniversary



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NUHCS activities by following us on Facebook
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