

PULSE

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Tackling The
Number One Cause
Of Death In Women

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The Life-Saving
Skill You Need

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Holograms: A
Game-Changer
For Heart Surgery

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Special Feature:

NUHCS Services At Ng Teng Fong General Hospital

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EDITOR'S MESSAGE

Dear readers,

As I pen this editorial for Pulse, it is quite clear that we are seeing some light at the end of the COVID-19 pandemic tunnel. The government has downgraded our disease response system from DORSCON Orange to Yellow, with life returning to 'almost normal'.

Let us not forget the toll that the pandemic has taken on our staff at the National University Heart Centre, Singapore (NUHCS) – many of our colleagues were afflicted with the viral infection, and the strain of the additional workload imposed on those covering their duties. Our colleagues from neighbouring countries have missed their families with the prolonged border closures. We have all experienced much personal stress and burnout from all of this.

But NUHCS soldiers on despite these challenges. The most significant change in the first half of the year has been the challenging migration of our electronic medical record system from the old Computerised Patient Support System 2 (CPSS2) to the newer Epic system which has also posed considerable stress on the entire staff. The good news is that we are all coming through well and medical care for our patients has not been compromised.

We have also welcomed Dr Loh Poay Huan into his new role as Head of the Division of Cardiology at Ng Teng Fong General Hospital (NTFGH). He has already hit the ground running and we are excited with the development of the specialised clinics which will be located closer to patients living on the western side of Singapore.

NUHCS continues to pursue its academic mission with focus and intensity. The number of publications from both the clinical departments and the Cardiovascular Research Institute of Singapore (CVRI) has been most impressive.

A/Prof Theodoros Kofidis, Head and Senior Consultant, Department of Cardiac, Thoracic and Vascular Surgery (CTVS) spearheaded several innovations that have made direct impact on patient care, such as his invention of the Endopsis System and innovative robotic surgery. The aortic valve research consortium has established an international registry led by Asst Prof William Kong Kok Fai, Clinical Director of Echocardiography and Non-invasive Diagnostic Cardiology and Senior Consultant, Department of Cardiology, and has contributed to the collation of data, yielding more insights into the disease. CVRI is further poised to apply for the next big centre grant involving eight themes and 15 platforms of research.

During this tumultuous time, we constantly remind ourselves that the health of our patients and their caregivers remain our *raison d'être*. Yet it is our staff who sets NUHCS apart through our care delivery, training and education, research, and development.

We can never disregard our people who have committed themselves to public service and their desire to play a role in the public healthcare system. Hence, it is only fitting that we celebrate our colleagues with the commemoration of our traditional NUHCS Family Day, albeit virtually, in honour of all our staff.

Tan Huay Cheem

Prof Tan Huay Cheem

Senior Consultant, Department of Cardiology, NUHCS



A NEW CHAPTER UNFOLDS

ARTICLE BY

NUHCS Pulse
Editorial

*Dr Loh Poay Huan helms NUHCS
@ Ng Teng Fong General Hospital*

Dr Loh Poay Huan, Senior Consultant, Department of Cardiology, National University Heart Centre, Singapore (NUHCS), recently took up the role of the new Head of Cardiology at Ng Teng Fong General Hospital (NTFGH), and will be spearheading the management of cardiovascular health services at the hospital.

At NUHCS, he is the Clinical Lead for the Western STEMI Network¹ and Acute Myocardial Infarction² Service which oversees and manages acute cardiac services in the western region of Singapore.

Before Dr Loh took the helm in January 2022, the NUHCS team at NTFGH has already been recognised for achieving a number of firsts.

They established the first Rapid Access Chest Pain Clinic (RACPC) in Asia which won the Excellence Award under the “Patient Experience Improvement” category at the 2020 Asian Hospital Management Award.

RACPC has reduced patients’ waiting time to see a heart specialist from roughly two months to just 24 hours, lowering the number of visits to the hospital by 50%, reducing the need for unnecessary hospitalisations and consequentially, the cost of invasive testing by 20% as well.

In January 2022, the experienced multi-disciplinary divisions across NUHCS campuses came together to plan for a cluster-wide service to treat Pulmonary Embolism (PE)³ with the introduction of two new minimally invasive techniques. The

NTFGH team is the first in Asia to use suction tools, and the first in South-east Asia to use ultrasound, to treat PE.

Riding on the wave of achievements by the NTFGH team so far, Dr. Loh hopes to improve efficiency in clinical care delivery. For instance, he intends to establish a “one-stop” clinic, increase accessibility to diagnostic imaging such as the Computed Tomography (CT) angiogram⁴ service and point of care echocardiography.

Dr. Loh believes that these will expedite diagnosis, improve clinical service delivery and standard, and ensure sustainability in the face of meeting healthcare demands with limited resources. However, such efforts would require a new approach to current issues, adopting new concepts and adapting new systems.

“Here at NTFGH, the small team is dynamic and enthusiastic towards innovative ideas,” observed Dr Loh. “With such a driven and progressive team, we will be able to get inputs from everyone and come up with new or improved workflow, embrace and support each other’s ideas, to better the care we render to our patients.”

Dr Loh hopes the NTFGH team can be proud of their achievements thus far and strive to achieve greater

heights in their respective subspecialties, to eventually attain the Centre of Excellence in a relevant area of cardiovascular care. He is motivated to achieve his goals efficiently through sharpening the current systems in place, embracing innovative approaches and enhancing the patient experience.

¹Western STEMI Network – A collaborative protocol system involving NUHCS, NUH Emergency Department, NTFGH as well as Singapore Civil Defence Force.

²Myocardial Infarction – Heart attack.

³PE – A blood clot that is blocking blood flow in an artery in the lungs.

⁴CT angiogram – A non-invasive imaging test that is used to diagnose a number of heart conditions.

We need to rethink healthcare delivery – how to reduce inconveniences, cost and wastage in the process whilst ensuring sustainability and elevating patients’ experience. Done correctly, we should be able to achieve a cost effective and sustainable health service with better patient experience and outcomes.

Dr Loh Poay Huan, Head, Division of Cardiology, NTFGH, and Senior Consultant, Department of Cardiology, NUHCS

Special Feature: NUHCS Services At Ng Teng Fong General Hospital

Under the National University Health System (NUHS), the National University Heart Centre, Singapore (NUHCS) oversees the management and delivery of cardiovascular health services across three different hospitals within the cluster – Ng Teng Fong General Hospital (NTFGH), National University Hospital (NUH), as well as Alexandra Hospital (AH). This means that specialised medical professionals under NUHCS attend to patients across all three campuses.

Within NTFGH, a multi-disciplinary team of cardiologists, cardiothoracic surgeons, specialist nurses and allied healthcare staff work together in managing a wide range of cardiovascular conditions with support from NUH for tertiary level care. While many patients are seen through referrals from polyclinics and private practitioners, patients looking for outpatient specialist care can also choose to visit the Specialist Cardiovascular Clinics at NTFGH.

Some of the conditions treated at NTFGH include the diagnosis and management of:

- Chest pain / Breathlessness / Palpitations
- Coronary heart diseases – the narrowing or blockage of arteries that could lead to heart attacks
- Heart rhythm disorders
- Heart valve diseases
- Heart failure and cardiomyopathy – diseases that affect the heart’s ability to pump blood
- Women’s heart health
- High blood pressure and high cholesterol
- Comprehensive cardiovascular health screening and risk assessment
- Cardiac rehabilitation



NUHCS @ Jurong

Where:

Clinic A34 Cardiology
 Located at NTFGH, Tower A
 (Specialist Outpatient Clinics) Level 3

Opening Hours:

Mon - Fri: 8.30am - 5.30pm
 Sat: 8.30am - 12.30pm
 Closed on Sundays and Public Holidays

To schedule an appointment:

- Email: JHCampus_Appointment@nuhs.edu.sg
- Call: 6908 2222
- OneNUHS App



Remote Cardiac Monitoring Device Check

NTFGH provides heart patients carrying implanted pacemakers or other cardiac devices with remote monitoring services, whereby patients can send their device's signals directly to the heart clinic from the comfort of their homes. This allows the medical team to easily evaluate if the device is functioning well, as well as to quickly access and monitor the patient's heart health without a physical visit to the clinic, boosting the convenience of healthchecks for these patients and their caregivers.

If the patient's device detects any abnormalities, this information will be sent automatically to the clinic as alert transmissions. Such early detection of abnormalities allows for early treatment, reducing the risks of emergency hospitalisations, stroke or heart failure.



Rapid Access Chest Pain Clinic (RACPC)

RACPC at NTFGH allows patients who are experiencing chest pains to be seen by heart specialists within 24 hours of referral and receive same day, one-stop evaluation and diagnosis of their condition. Specialist cardiac nurses will perform blood tests, and record medical history and treadmill stress tests before the patient consults with a cardiologist for a confirmed diagnosis.

Through RACPC, about 90% of patients with chest pains can be safely and promptly managed through the clinic's comprehensive diagnosis without the need to wait for weeks to receive an analysis. Patients would also not be required to be admitted to a hospital for other invasive tests. Those with coronary artery diseases or other more serious conditions can be identified through the tests at RACPC and recommended for further treatment where necessary.

NTFGH RACPC is the first established clinic of its kind in Asia and has won an Excellence Award under the "Patient Experience Improvement" category at the 2020 Asian Hospital Management Award.

Cardiac Rehabilitation Clinic

The Cardiac Rehabilitation Clinic is a comprehensive, personalised service for patients to achieve their physical and lifestyle goals based on their unique medical condition.

Following the recommendation of a cardiologist, each patient will go through an evaluation before being provided an appropriate rehabilitation programme supported by a multi-disciplinary team that includes a physiotherapist, dietitian, occupational therapist, pharmacist and a psychologist.

Cardiac rehabilitation programme for patients typically begin from the moment they are admitted into the hospital and follows through after their discharge as an outpatient. Depending on the severity of their heart condition, physicians will recommend a therapy plan to help patients regain mobility and increase their functional abilities.

Aside from an exercise programme, patients will also receive education, counseling, and recommendations for making lifestyle adjustments to maintain a healthy heart.



A NOVEL APPROACH TO A COMMON DEADLY PROBLEM

ARTICLE BY

NUHCS Pulse Editorial

NTFGH introduces new response team to treat life-threatening blood clots

National University Heart Centre, Singapore (NUHCS) @ Ng Teng Fong General Hospital (NTFGH) has established a multi-disciplinary team of cardiologists to form the new Pulmonary Embolism Response Team (PERT), which introduced a new approach to treat Pulmonary Embolism (PE), a critical condition whereby blood clots are lodged in one of the arteries in the lungs and block blood flow to the lungs, resulting in an increased survival rate of patients with high-risk PE to more than 98%.

PE is the third leading cause of cardiovascular death in the world, after heart attack and stroke. The seriousness of the condition varies with the size of the blood clots, and their effect on obstructing blood circulation. Patients who also experience a sudden drop in blood pressure can be categorised as high-risk PE, a diagnosis which is life-threatening and requires immediate medical intervention.

Patients who have PE may die within the first few hours, particularly for those with the more severe forms. If left untreated, two out of three patients with severe PE die within two hours after presentation, hence diagnosis and treatment should be rendered promptly.

Conventional treatments of PE include blood thinning or clot-buster medications injected directly into the bloodstream to break down the clots. While waiting for the clots to dissolve, patients would have to be observed in the hospital's Intensive Care Unit (ICU) for seven days or more.

During this period, one in eight patients would have developed further complications such as excessive bleeding in the brain or digestive system. This makes the old method of treating PE risky and resource-intensive.

In addressing the above, PERT has introduced two new minimally invasive techniques to remove the blood clots in patients with high-risk, life-threatening cases of PE.

1. Ultrasound-Assisted Catheter-Directed Thrombolysis¹

This is a relatively novel therapy where the clots are broken up by clot-buster medications, together with high-intensity ultrasound emitted from the catheters² delivered through a vein in the leg to the site of the clots. As a result, a much-reduced dosage of the clot-buster medication is required, greatly reducing the risk of bleeding complications.

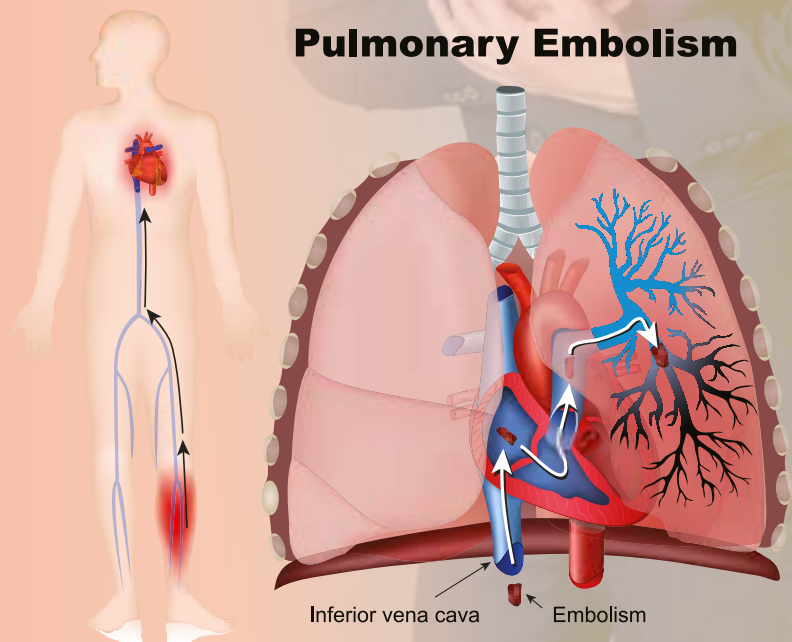
2. Suction Thrombectomy

This technique similarly uses a catheter, but engaged with a vacuum functionality instead to pull the clots out of the body. This technique is used when patients fail to respond to blood thinners or clot-busting medications.

The PERT team is the first in Asia to use suction tools and the first in Southeast Asia to use ultrasound to treat PE. Since Apr 2021, 14 patients have been treated using one of the above two methods and have since fully recovered with no side effects.

¹Thrombolysis – Treatment to break down blood clots using medication.

²catheters – Long, flexible hollow tubes which can be inserted into the body for medical treatments or therapies.



Tackling The Number One Cause Of Death In Women

NUHCS Women's Heart Health Campaign 2022



Joining the world in celebrating females on International Women's Day, the National University Heart Centre Singapore (NUHCS) held its Women's Heart Health Campaign in March to celebrate inspiring life stories from our heart warriors, and raise awareness on the little-known number one cause of death for women in Singapore – Cardiovascular Disease (CVD).

Empowering women to take charge and build up their own heart health, the NUHCS Women's Heart Health Clinic launched a series of educational videos titled #AskTheExperts

on their Facebook, Instagram and YouTube social media platforms.

In these videos, cardiologists from NUHCS covered various topics such as why women are at a greater risk of heart diseases, symptoms to look out for that could signal the onset of heart failure, as well as tips on how to prevent heart failure.

Supporting the campaign, home-grown women-owned lifestyle and activewear brand, Trybe Active, collaborated with NUHCS in a fund-raising campaign where 10% of all apparel sales proceeds in March was donated to the NUHCS Heart Fund, a sub-fund of National University Health System's (NUHS) Fund that provides financial assistance to needy heart patients for their journey back to better health.

To further raise awareness on the importance of Women's Heart Health, NUHCS also collaborated with local women's YouTube channel, ZULA, and invited 29-year-old Ms Yelin Guo to share about her

Did you know?
 Women who had their first period before the age of 12 may have a greater risk of Cardiovascular Diseases (CVD)

Did you know?
 Women with four or more children have a 47% higher risk of developing coronary heart disease, compared to women with no children

Watch Yelin's interview on Zula here:



Yelin, 29



NUHCS Women's Heart Health Clinic
 For an appointment, please
 Email: appointment@nuhs.edu.sg
 Call: 6908 2222



Watch Kailin's and Nancy's stories here:



experience living with a rare form of coronary heart disease, Takayasu Arteritis – a unique autoimmune disorder of inflamed blood vessels that damages her biggest arteries, causing a decreased blood flow to her heart and increasing her risk of organ failure.

As an occupational therapist, Ms Guo believed in leading a balanced lifestyle, always exercising regularly, and eating healthily. Hence, receiving her diagnosis at a young age of 27 came as a shock to her. Yet, Ms Guo worked with her doctors to find a suitable treatment plan and has learnt to make adjustments to her lifestyle, including avoiding strenuous exercise and raw food to manage her condition.

The Women's Heart Health Campaign also featured two other female heart warriors who shared their personal experiences battling heart disease with zeal and positivity.

For 35-year-old Mdm Kailing Yang, her diagnosis of pulmonary hypertension post-pregnancy was just in time to save her from a potentially life-threatening situation. In pulmonary hypertension, blood vessels in the lungs are narrowed, obstructing blood flow and resulting in an alarming increase in blood pressure. This causes the heart to work harder, weakening the muscles over time and may eventually lead to heart failure.

67-year-old Mdm Nancy Tan on the other hand, had always considered herself healthy and initially did not heed her doctor's warning of having high levels of cholesterol. However, after experiencing a dizzy spell while driving, she sought medical help immediately and was diagnosed with coronary artery disease, a progression from her initial diagnosis of high cholesterol. She encourages all to take preventive measures early and shares her wisdom in learning to heed the doctor's advice.

Today, all three women are managing their heart conditions well by making adjustments to their lifestyles with a positive outlook.

Symptoms of heart disease in women are usually more subtle, like breathlessness and fatigue. Although CVDs are the number one cause of death in women, these conditions are usually highly preventable. However, many women tend to seek a diagnosis only at a later stage when the disease has unfortunately progressed to a critical stage.

The NUHCS Women Heart Health Clinic was set up to address the profound gender differences in numerous cardiac diseases, and is the first tertiary centre in Singapore to implement a gender-tailored programme dedicated to providing a one-stop care for ladies at risk or living with heart disease.

Did you know?
 Women who suffer from Polycystic Ovary Syndrome (PCOS) produce an abnormal amount of androgen from the ovaries, causing high blood pressure and cholesterol, increasing the risks of heart diseases

Did you know?
 Women with high blood pressure during pregnancy have a greater risk of developing heart conditions

ARTICLE BY

Dr Ong Shan Yin, Jeanne
 Associate Consultant,
 Division of Cardiology,
 Department of Medicine,
 Ng Teng Fong General
 Hospital (NTFGH)



Dr Ong is an Associate Consultant in Cardiology, practicing at NTFGH and NUHCS. Her subspecialty interests include heart failure, women's heart health, and cardiac rehabilitation. In 2022, she spearheaded the Women's Heart Health Clinic and the Women's Heart Failure with Preserved Ejection Fraction (HFpEF) Clinic at NTFGH.

“
Heart disease in women is quite prevalent in Singapore, but we can change that if we become more aware of our bodies and learn what to look out for.

Asst. Prof. Low Ting Ting, Clinical Director of the Women's Heart Health Programme, Senior Consultant, Department of Cardiology, NUHCS



Did you know?

Estrogen in contraceptives may cause blood clots, which could lead to heart attacks when the clots block blood flow to the heart

Watch the NUHCS #AskTheExperts videos on-demand here:

Follow NUHCS to learn more about women's heart health

@nuhcsofficial

www.facebook.com/nuhcs

Ask the Experts: How Is Heart Attack Different For Men vs Women?



WATCH HERE:



Ask the Experts: Can I Prevent Heart Failure?



WATCH HERE:



Ask the Experts: I Am At Risk Of a Heart Disease – Now What?



WATCH HERE:



A VIRTUAL Summer PARTY

For The
NUHCS Team

NUHCS Family Day 2022

The National University Heart Centre, Singapore (NUHCS) marked its Annual Family Day with a virtual celebration hosted by local celebrity actor, Mr Gurmit Singh, on 23 Apr 2022.

The “summer-party-themed” event commenced with a video montage paying homage to the spirit of NUHCS and the struggles the Centre overcame in the past two years. Encapsulating the challenges and sacrifices our staff and family members experienced during the crisis, the video showcased how everyone persevered through the difficult situation and worked tirelessly as a family to support one another through the pandemic.

A/Prof Yip Wei Luen James, Centre Director and Senior Consultant, NUHCS, expressed his gratitude to every staff in NUHCS for their contribution and efforts in braving the circumstances.

For entertainment, the nursing team performed an energetic dance routine, while the senior residents gave a live rendition of the latest popular songs, showcasing their creative talents. Keeping everyone engaged, several virtual games such

as “Emoji Showdown”, “What’s In The Box”, and charades were played where prizes awaited sporting champions.

Winning the popular vote, Dr Ivandito Kuntjoro, Director of Structural Heart Disease and Consultant, Department of Cardiology, NUHCS won the “Best Dressed” Contest; and the team of cardiac doctors won the TikTok contest for their parody of the popular local music video “*The Caifan Song*”, originally produced by local duo, Benjamin Kheng and Annette Lee.

The event ended with the announcement of lucky draw winners.

“NUHCS Family Day has always been a great time for everyone to come together and have fun, helping us to bond and discover more about our colleagues whom we work with side by side, every day,” said Asst Prof Robin Cherian, Consultant, Department of Cardiology, NUHCS.

“I am looking forward to next year’s event when we will finally be able to host a physical event and have much more fun!”



Cast your Vote!
Vote for your favourite best dressed!



ARTICLE BY

Asst Prof Robin Cherian
*Consultant,
Department of
Cardiology, NUHCS*



Asst Prof Cherian is a cardiologist with a special interest in critical care cardiology, heart failure, valvular heart disease and cardiac imaging. He is a core faculty of the Cardiology Senior Residency Programme and is an assistant professor at the Yong Loo Lin School of Medicine, National University of Singapore.

NEW APPROACHES IN CARDIAC AMYLOIDOSIS

The inaugural NUHCS Cardiac Amyloidosis Masterclass 2021

In view of recent rapid developments in the field of cardiac amyloidosis, the National University Heart Centre, Singapore (NUHCS) organised its inaugural Cardiac Amyloidosis Masterclass on 6 November 2021. The session brought practitioners up-to-date with the latest developments on amyloidosis diagnosis, care and treatment options available in Singapore.

Amyloidosis is a disease characterised by the formation of abnormal proteins. These abnormal proteins, termed 'amyloid proteins', are being deposited in various body organs which in turn affects their normal function and leads to organ dysfunction. The heart is one of the more common sites for amyloidosis.

In the heart, amyloidosis results in abnormal thickening of the heart walls, eventually causing heart failure. This condition is more commonly seen in older men.

"Early diagnosis and timely treatment can potentially improve long term outcomes for patients. Therefore, it is important for physicians to be informed about the latest developments on this particular condition. In particular, new medical diagnostic tools promises better accuracy which could be considered for patients at risk," said Asst Prof Lin Weiqin, Clinical Director, Heart Failure Programme and Consultant, Department of Cardiology, NUHCS.

In recent years, new and effective medications are now available for the treatment of cardiac amyloidosis.

The masterclass was a virtual webi-

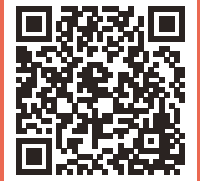
nar which featured panelists from the multi-disciplinary amyloidosis team across the National University Health System (NUHS) cluster. More than 150 participants around the world, predominantly from the Asia Pacific region, attended the webinar.

Doctors from the Department of Cardiology, NUHCS including Asst. Prof. Raymond Wong, Asst Prof Lim Yoke Ching, Prof Roger Foo, Asst Prof Tan Li Ling, Asst Prof Chai Ping, and Asst Prof Lin Weiqin were speakers on the panel who presented on the science of amyloidosis, the diagnostic modalities available for cardiac amyloidosis, as well as current treatment options available.

Dr Sanjay de Mel, Consultant, Division of Haematology, National University Cancer Institute, Singapore, Dr Kay Ng, Senior Consultant, Division of Neurology, National University Hospital (NUH), and Dr Loi Hoi Yin, Senior Consultant, Department of Diagnostic Imaging, NUH joined the panel as well, to provide multi-disciplinary input which was essential for any amyloidosis programme to be complete.

Recent developments in this field have provided opportunities for eligible patients to experience better recovery outcomes. If we could identify these patients early, we now have a window to save and treat these patients, giving them a better quality of life.

Asst Prof Lin Weiqin, Clinical Director, Heart Failure Programme and Consultant, Department of Cardiology, NUHCS



To watch a replay of the event, please visit NUHCS' YouTube Channel at www.youtube.com/NUHCS



ARTICLE BY

Asst Prof Lin Weiqin
Clinical Director, Heart
Failure Programme and
Consultant, Department of
Cardiology, NUHCS



Asst Prof Lin is trained in the management of acute heart failure with temporary mechanical circulatory support, as well as caring for advanced heart failure patients with implanted durable left ventricular assist devices (LVADs) or heart transplantation. Aside from heart failure, his other subspecialty interests include cardiomyopathies and echocardiography. Asst Prof Lin was the course director of the NUHCS Cardiac Amyloidosis Masterclass 2021.



**CARING HEARTS
SUPPORT GROUP
(CHSG)**

Membership is open to heart patients who have completed Basic Cardiac Rehabilitation at the National University Heart Centre, Singapore (NUHCS). Please contact our Coordinator, Magdalene Chia, at mchia@kucinta.com for more information or to be a member.



CHSG: STAYING *Connected* DURING COVID-19

*A lookback on the member events organised by
Caring Hearts Support Group (CHSG) in 2021*

It was a challenging 2021 for Caring Hearts Support Group (CHSG) members to be kept physically apart during the time of the COVID-19 pandemic but yet it was a year of triumph for the group.

CHSG has successfully carried out more than 100 virtual sessions, comprising of Exercise and Sharing Sessions twice weekly, and key events such as Chinese New Year, Mother's Day, Father's Day, National Day, CHSG Retreat and a combined Deepvali/Christmas/Year End Celebrations in 2021.

It was a feat for CHSG, to conscientiously commit to stay connected when apart.

"We felt that it was important not to be isolated and maintain good mental health during the pandemic times. While we may have encountered technological setbacks from time to time, that didn't deter us from implementing our virtual activities," said Ms Magdalene Chia, Programme Coordinator, CHSG.

Recounting the year, Ms Chia concluded, "Looking back at our virtual screenshots for 2021, we smile and feel grateful, that it was yet another good and healthy year accomplished, with our commitment to care for each other and keeping our motto, "Caring Begins With Me", true to its objectives, virtually or otherwise."

ARTICLE BY

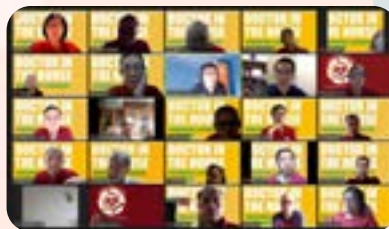
Ms Magdalene Chia
Programme Coordinator,
CHSG



Magdalene Chia is a patient of NUHCS and a volunteer member of CHSG. Together with CHSG members, she helps lead CHSG with meaningful activities and steer CHSG forward to bring forth positive changes to heart patient members' lives. Her passion in CHSG is to spread care and kindness to all whom the Group meets.

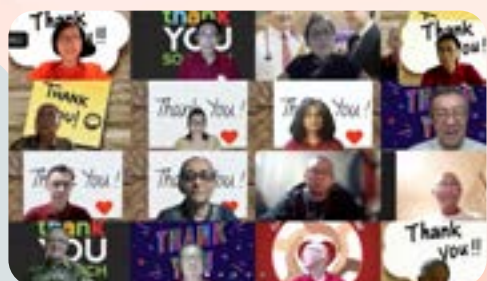
"I treasure our CHSG Virtual Events and all our videos. Especially memorable was my role as Santa Claus. I also love our twice weekly workout sessions on zoom."

Freddy, 65 years, member with two blocked arteries



"CHSG virtual events gave me the opportunity to help with video editing. This keeps me occupied and gives me immense joy when I see members happily bonding together."

Melvyn, 75 years, member with a stent





THE *Life-Saving* SKILL YOU NEED

Brothers' CPR skills saved youngest in time

ARTICLE BY
NUHCS Pulse
Editorial

One 16-year-old teenager owes his life to his two older brothers who helped to save him through Cardiopulmonary Resuscitation (CPR) when he suffered a sudden heart attack at home.

Adam* was the youngest of three brothers and also the fittest in his family – adopting a healthy lifestyle by playing sports, going to the gym regularly, and choosing to eat a healthy diet. Hence, it was a shock for the family when he suddenly collapsed at home on a weekend afternoon after a session at the gym.

Fortunately for Adam, his brothers, John* and Michael*, happened to

be home at that time and had learnt CPR from their school and work respectively. 22-year-old Michael had completed the basic certification the year before, during his national service training, while 19-year-old John completed a basic course a few years back as part of his school's extracurricular activity.

Both had never used their skills before but immediately jumped into action, and applied what they learnt in an attempt to resuscitate their unconscious brother.

"One of us was on the phone with the 995 emergency response while the other kept performing CPR as

we anxiously waited for the paramedics to arrive," said John. "We thought we were losing him and were desperately recalling all our CPR knowledge and skills to hopefully save him."

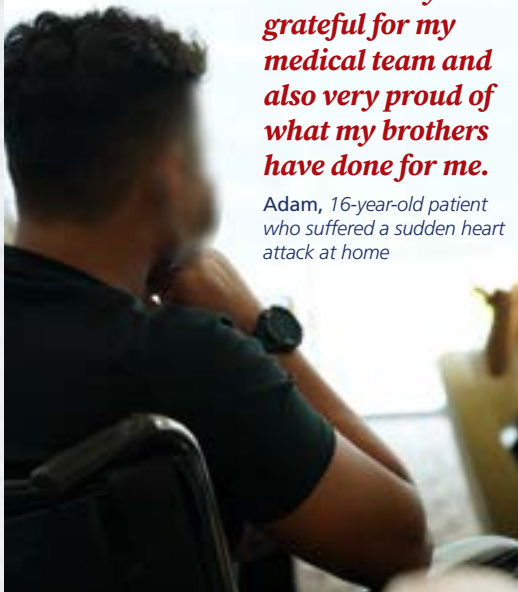
When Adam arrived at the hospital, he was in a very critical state and was quickly put on the Extracorporeal Membrane Oxygenation (ECMO)¹ machine. Doctors also cooled Adam's body to reduce injury to his brain.

Many healthcare personnel were activated to ensure immediate help was rendered to Adam, depending on how his situation turned out. Surgeons, cardiologists, and specialist



“I’m very lucky to be alive today. I’m grateful for my medical team and also very proud of what my brothers have done for me.”

Adam, 16-year-old patient who suffered a sudden heart attack at home



Doctors involved in Adam’s care (from left): Dr Robin Cheriau, Asst Prof Lin Weiqin, A/Prof James Yip, Dr Lim Shir Lynn, A/Prof Graeme Maclaren and Asst Prof Ramanathan K.R. (not pictured)

Cardiopulmonary Resuscitation (CPR):

Technique used to restore breathing and blood circulation

Automated External Defibrillator (AED): A portable machine that automatically analyses a victim’s heart rhythm and directs the user to deliver an electric shock to the victim if required.



nurses all formed part of his medical team, constantly monitoring his vital signs while he was in intensive care.

“Our first good sign came after 48 hours when Adam’s heart began to beat steadily, indicating that his body may have recovered and this allowed us to report back to his parents with some good news,” said Asst. Prof Ramanathan K.R., Senior Consultant, Department of Cardiac, Thoracic and Vascular Surgery (CTVS), National University Heart Centre, Singapore (NUHCS).

Five days later, Adam’s recovery progressed further and he could be moved off the ECMO machine. As

his doctors investigated the cause behind his cardiac arrest, his body continued its slow progressive recovery and whilst being cared for by the intensive care unit during his inpatient rehabilitation.

“In retrospect, his brothers’ immediate CPR played a key role in keeping him alive,” said A/Prof Yip Wei Luen James, Centre Director and Senior Consultant, NUHCS.

Finally, on the 10th day, he regained consciousness and was able to be discharged from the hospital.

“It was a scary nightmare for our family,” said John. “Having him with us

today is a miracle.”

Michael concurred, “It was just pure coincidence that both of us had learnt CPR before, and were both at home when he collapsed. We actually never anticipated that we would use CPR on anyone but clearly, this is a life-saving skill. Everyone should at least learn the basics of it because you will never know when you may need it.”

**Names have been changed to protect the identity and privacy of the family.*

ECMO – A life support machine that takes over the heart and lung functions. ECMO is a life-sustaining treatment where patients need to be monitored and cared for by a specialist team in intensive care round the clock.



About **3,000 people** suffer a heart attack outside of the hospital each year.

Without CPR, a victim's chance of survival **drops 7-10%** every minute.

Bystander CPR increases a victim's survival rate by **2.2 times**.



Immediate application of CPR & AED has led to survival rates of **as high as 60%**.



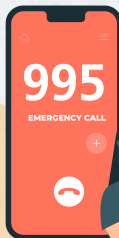
LEARNING CPR *Saves Lives*



To locate the nearest AED, download the **myResponder app now**.

AED comes with **voice-guided step-by-step instructions** for any user. It will determine if a shock is required and delivers only when one is necessary.

995 Emergency Medical Services (EMS) specialists will also provide CPR guidance over the telephone while waiting for the crew to arrive on-site.



When CPR is performed properly, **ribs are cracked** in about one-third of the cases. Cracked ribs would not cause any serious complications. Do not be alarmed and do not stop CPR.



LEARN CPR

Some training centres provide a free basic course with pointers on hands-only CPR and how to use an AED during an emergency. There are many advanced courses where you can get guidance from an instructor with hands-on practice on a mannequin, and qualify for a certification with a validity of 2 years.

Singapore Heart Foundation (SHF)

SHF Virtual Restart A Heart (RAH) Programme is a simplified course conducted online for free. The course provides basic pointers on how to identify a heart attack, how to perform hands-only CPR, and the use of an AED. Advanced and practical courses are available with certification given to participants upon successful completion. For more information, visit www.myheart.org.sg.

Costs: Free for RAH Programme; advanced courses start from \$64.20 for new participants or \$48.15 for repeat participants.
To Register: Call 6354 9379/55 or email cpaed@heart.org.sg

Singapore Red Cross Academy

Singapore Red Cross Academy organises several first aid and life support courses, including learning to perform CPR with the use of an AED machine. Their 2-hour CPR+AED Awareness workshop is conducted in-person in a classroom setting and is free for Singaporeans and PRs. For more information, visit www.redcross.sg/learn.

Costs: Free for CPR+AED Awareness workshop; Advanced courses start from \$60
To Register: Register online, call 6664 0500, or email academy@redcross.sg

Singapore Emergency Responder Academy (SERA)

SERA's CPR+AED course comprises a 1-hour online theory session and a 2-hour in-person practical assessment. Upon successful completion, participants will receive an e-certificate valid for 2 years. Other courses with first aid skills and certification are also available at SERA.

Costs: Starts from \$74.90 for CPR+AED Course
To Register: Register online, call 6866 0663, or email courses@sera.sg

To search for more training classes, visit Singapore Resuscitation and First Aid Council's (SRFAC) website (at srfac.sg/directory/training-centre), and search for accredited training centres with the "BCLS+AED" certification.

NUHCS CLINCHES EXCELLENCE AWARD AT THE REGIONAL HMA AWARDS

Successful project reduces costs and length of stay for TAVI procedure

A project led by Dr Ivandito Kuntjoro, Director of Structural Heart Disease and Consultant, Department of Cardiology, National University Heart Centre, Singapore (NUHCS) to reduce patients' length of stay after undergoing a Transcatheter Aortic Valve Implantation (TAVI) procedure has won the Excellence Award under the "Best in Financial Improvement" category at the regional 2021 Hospital Management Asia (HMA) Awards.

The HMA Awards is a platform that showcases innovative and progressive projects undertaken by hospitals in Asia to improve healthcare outcomes. In recognition of best practices, projects are awarded across seven categories for their achievements in providing significant improvement and sustainable results that lead to a higher standard of healthcare.

The TAVI procedure is a minimally invasive treatment for Aortic Stenosis (AS)¹ that involves fitting a valve stent, delivered via a catheter² through the femoral artery. In 2019, a groundbreaking trial highlighted the advantages of the procedure over the conventional surgical approach where an incision is made in the chest to access the heart. Without treatment, survival rates for patients with severe AS are 50% at two years and 20% at five years.

Despite the effectiveness of TAVI, it is expensive and categorised as an "elective" procedure in Singapore. As a result, Dr Kuntjoro led a project team with the goal of making TAVI more affordable to benefit more patients.

It took two years for the team to achieve the targeted outcomes which include reducing the length of stay in the hospital to less than seven days, thereby reducing the average treatment cost per patient by about 40%.

The team also reviewed current clinical workflows and re-designed processes, such as developing standardised checklists which helped to fast-track patients to step-down care facilities. Working with the support of community hospitals for the placement of patients who require further care and rehabilitation, the team was also able to secure early referrals and shorten the waiting time.

Now, Singapore's Ministry of Health has accepted the recommendation to subsidise TAVI treatments for AS patients who are inoperable or have an unacceptably high risk for surgery with significant comorbidities³. Patients will need to be assessed for their eligibility by an interventional cardiologist and a cardiac surgeon.

¹AS – occurs when the heart's aortic valve narrows reducing or blocking blood flow from the heart into the main artery and onward to the rest of the body.

²catheter – A long, thin, hollow tube inserted into the body for various treatments and procedures.

³comorbidities – Describes situation where patient has two or more diseases at the same time.

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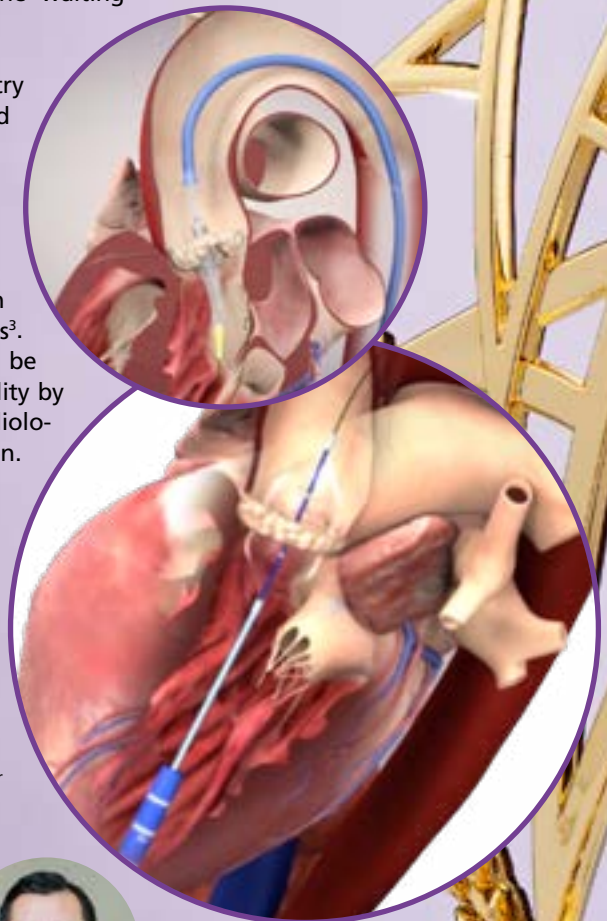
Dr Ivandito Kuntjoro
Director of Structural Heart Disease and Consultant,
Department of Cardiology,
NUHCS



Dr Kuntjoro specialises in complex valvular heart disease, congenital heart conditions and pulmonary hypertension. He has co-authored a number of research paper published in peer-reviewed journals and has written a book chapter on Structural Intervention. He is also actively involved in medical education as a core faculty of the Cardiology Senior Residency Programme. Prior to joining NUHCS in 2012, he worked eight years as an internal medicine attending physician in different hospitals in the United States of America (USA).

The bigger win for us is not the award, but that we can help more patients by making this treatment more affordable.

Dr Ivandito Kuntjoro, Director of Structural Heart Disease and Consultant, Department of Cardiology, NUHCS



NEW NGEMR SYSTEM BRINGS NUHCS FORWARD AS A **FUTURE-READY INSTITUTE**

The latest centralised digital medical record system enables more efficient patient care management

Moving to the Next Generation Electronic Medical Record (NGEMR) platform is an initiative by Singapore's Ministry of Health to put in place an advanced centralised electronic medical record system for the country's population.

With the NGEMR platform, a patient's journey from the point of admission to discharge, outpatient appointments, medical and administrative data will be captured, recorded and harmonised across the National University Health System (NUHS), which includes the National University Heart Centre, Singa-

pore (NUHCS), and the National Healthcare Group (NHG). This allows healthcare providers to provide a seamless patient experience by responding in a cohesive and efficient manner.

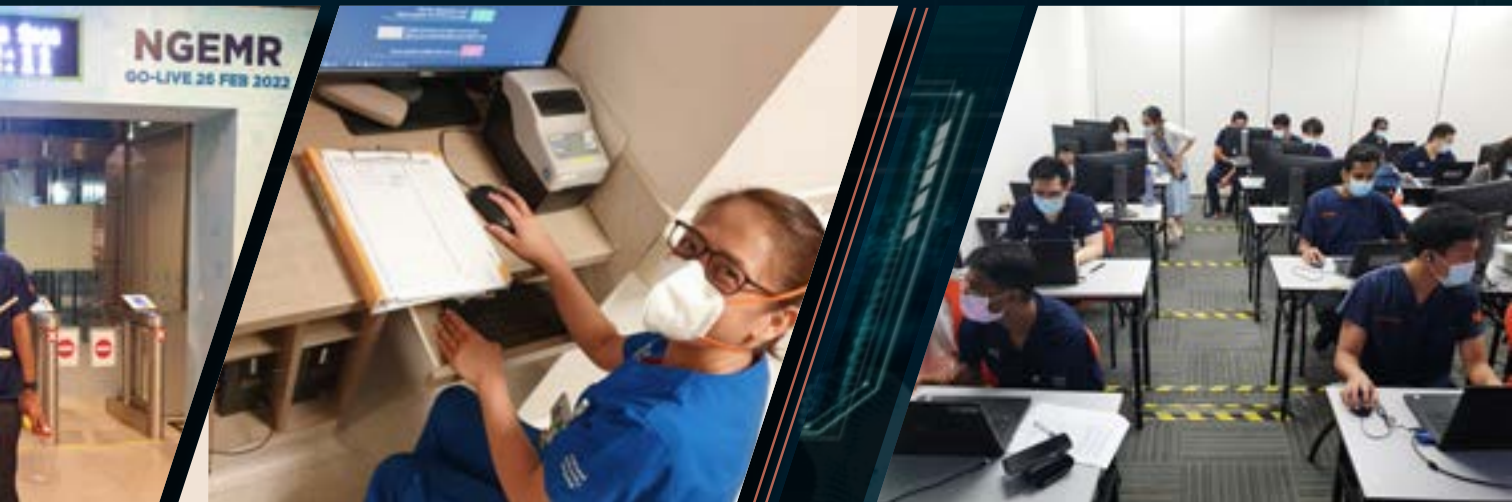
The digitalisation of patients' medical data also ensures that the necessary medical team have quick access to the latest relevant medical records and avoid unnecessary duplication. Critical information such as past medical history, results from any blood tests and x-rays or other investigations done from the point of admission can be captured and communicated accurately as

the patient moves through the healthcare system from primary to tertiary care.

Such a technological transformation is expected to yield results such as higher quality patient care, increased patient satisfaction, and enhancement of staff experience and improving operational efficiencies.

Yet, migrating from a previous legacy software to an entirely new platform and system across different departments, specialties and healthcare entities requires a herculean effort carried out meticulously to avoid errors and mistakes.





During the system migration, an inevitable downtime period was also required for tech engineers to transfer all the data and set-up the platform, which meant that all medical teams had to rely on antiquated paper forms temporarily before subsequently back loading the information onto the new system.

Staff from all levels and departments, including senior management, had to work through the late nights and early mornings to test the viability of the system before the migration was declared final and complete on 26 Feb 2022.

This is not the end; but the start of the next chapter as NUHCS moves forward into the future.

Even though the toughest part of our system migration journey is ahead of us now, I have the fullest confidence that our department will pull through after witnessing how supportive everyone is of one another.

Dr Chen Zhengfeng Jason, Consultant,
Department of Cardiology, NUHCS

ARTICLE BY

Dr Chen Zhengfeng
Jason
Consultant,
Department of
Cardiology, NUHCS



Dr Chen is a Consultant at NUHCS and a member of the 24-hour emergency percutaneous coronary intervention (PCI) team which forms part of the Western STEMI Network. He has special interests in coronary artery disease, interventional cardiology, novel interventional therapeutics of heart failure, machine learning, medical informatics and healthcare innovation. He is also a Clinical Lecturer at Yong Loo Lin School of Medicine, National University of Singapore (NUS).



ROBOTS: SURGICAL HELPING HAND

Robots help NUHCS surgical team achieve better outcomes

On 18 Jan 2022, robots joined forces with the surgical team of cardiac and thoracic surgeons and nurses at the National University Heart Centre, Singapore (NUHCS) to perform a minimally invasive heart surgery, carrying out a successful Internal Mammary Artery (IMA)¹ harvest – the first robot-assisted bypass surgery in Singapore.

The team from the Department of Cardiac, Thoracic and Vascular Surgery (CTVS) consisting of Dr Chang Guohao, Consultant, Ms Peggy Hu, Senior Case Management Officer, and Ms Corina Lau, Nurse Clinician, coordinated this case with the support of Dr Harish Mithiran Muthiah, Senior Consultant, and Dr Lowell Leow Choong Kiat, Associate Consultant.

Robot-assisted bypass surgery has been advancing around the world, with even newer technologies arising. One of the key reasons why many advanced heart centres in the world are shifting their model of care to include robots is due to positive reports of such surgeries, including reducing patients' hospitalisation stay for recovery to an average of just three days, even for major surgeries like the Coronary Artery Bypass Graft (CABG).

There are many clear advantages for robot-assisted surgery. Robot arms are as thin as rods and needles which means that these surgeries only need much smaller cuts – down to the millimetre – to access inner parts of the body. This causes less trauma to patients thus, translating to an overall quicker recovery process.

These advanced robotic systems are mostly equipped with sharp, high-resolution cameras that provide three-dimensional visualisation of the internal body. The images that show up on the screen can be further magnified many times over, allowing the surgeons controlling the robots to make very precise cuts. This feature helps to prevent the straining of surgeons' eyes and allows them to perform more complex surgeries with ease.

Another key advantage of the robot is its precision in graft harvesting – a widely used technique to reduce post-surgery wound complications

“I was impressed by how little trauma and bleeding the robot caused, which was most probably due to the sharp higher resolution views and more precise surgical motion of the robotic arms, which allowed surgeons to avoid any vascular trauma.”

*A/Prof Theodoros Kofidis,
Head and Senior Consultant,
Department of CTVS, NUHCS*





from heart operations. The robot has a wide range of motion which allows the surgeon to skeletonise² the left IMA and right IMA with more ease.

With robots, the surgical team would have better accessibility to both mammary arteries, further providing the option to perform a minimally invasive Total Arterial Revascularisation (TAR)³ procedure.

Working with the advice and guidance of renowned experts – Dr Gianluca Torregrossa, Director of Robotic and Coronary Revascularization Program at the Lankenau Heart Institute in Philadelphia, the United States of America (U.S.A.) as well as Prof Husam H Balkhy, Director of Robotic and Minimally Invasive Cardiac Surgery, the University of Chicago Medicine in Chicago, U.S.A. – the NUHCS team hopes to achieve results such as an average hospitalisation of just one to three days, similar to reports from renowned specialised cardiac centres around the world.

¹IMA – The artery that supplies blood to the anterior chest wall and breast and is the preferred artery choice for coronary artery bypass grafting.

²skeletonise – An advanced technique in cardiac surgery of graft harvesting for the arterial conduit by dissecting from all surrounding tissues, the accompanying veins, fascia, lymphatics, adipose tissue, and chest wall.

³TAR – A treatment for coronary heart disease.

ARTICLE BY

A/Prof Theodoros Kofidis
Head and Senior
Consultant, Department
of Cardiac, Thoracic and
Vascular Surgery (CTVS),
National University Heart
Centre, Singapore (NUHCS)



A/Prof Kofidis has been recognised for his innovative surgical discoveries focused on less traumatic heart surgery. His passion in this area led to his founding of the Initiative for Research & Innovation in Surgery (IRIS). He continues to present his work at numerous international conferences and lead training workshops for medical teams around the world. He actively contributes to the industry through his multiple concurrent appointments held globally. A/Prof Kofidis remains active in research with many published works, as well as patents, and sits on the editorial review board for several scientific journals. He is also the Group Chief of CTVS at NUHS.



NEW EYES FOR SURGEONS

NUHCS's innovative Endopsis Retractor System enhances minimally invasive heart surgeries

The conventional method of reaching the heart requires a sternotomy surgical approach, where the surgeon cuts through the breastbone and then spreads it apart with steel structures to access the thoracic cavity.

Naturally, the stretching of bone, muscles, and ligaments results in pain and discomfort after surgery, and some necessary downtime is required for the patient to fully recover. To overcome such post-operative trauma, various advancements in the medical field including innovative surgical techniques and technological devices have been developed over the last decade.

In particular, devices and techniques that are minimally invasive are preferred due to the smaller incisions required to access the patient's anatomy.

Small incisions in surgery provide many advantages for patients, including reduced blood loss, lower risk of wound infection and the resulting effect of a more cosmetically acceptable wound

compared to a long scar after an operation. Minimally invasive surgeries also allow patients to recover faster and return to their normal activities sooner.

“This innovation saves the patient unnecessary incisions, and the surgeon excess labour and complexity on the operation field.”

*A/Prof Theodoros Kofidis,
Head and Senior Consultant,
Department of CTVS, NUHCS*

At the National University Heart Centre, Singapore (NUHCS), the team of surgeons at the Department of Cardiac, Thoracic and Vascular Surgery (CTVS) invented a new video camera system that further enhances such minimally invasive surgeries.

The Endopsis Retractor System comprises of a hollow shaft that holds the heart open while a flexible miniature video camera passes through



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 Consultant, Department of
 CTVS, NUHCS



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it to provide a wide range of vision inside the patient's heart for the surgeon. An advanced type of screw is then used to hold the camera in place by pressing against the surface of the chest, negating the need for additional steel fixators that can be heavy and bulky.

With this latest system, the camera is not only held in place with the advanced screws, but is also flexible and can be easily maneuvered to provide different viewing angles for the surgeon, especially during complex operations.

Current endoscopic instruments¹ use a 4 to 6 centimetre incision between the ribs on the side of the chest. However, the Endopsis Retractor System only requires a 2 to 3 centimetre

incision through the groin area to reach the patient's heart.

Having used the Endopsis Retractor System for a mitral valve repair surgery, Dr Chang Guohao, Consultant, Department of CTVS, NUHCS concurred that the new system is user-friendly, capable of providing high-resolution images and allows the operative field to be de-cluttered due to its much simpler set-up, all of which contributes to the ease and efficiency of the operation process.

This innovative Endopsis Retractor System has now been used for numerous successful surgeries and will continue to undergo clinical trials at NUHCS to further enhance the application process.

¹endoscopic instruments – Instruments doctors use to look inside the body or organs.

HOLOGRAMS: A GAME-CHANGER FOR HEART SURGERY

NUHCS successfully conducted Singapore's first holography-guided heart surgery

The Department of Cardiac, Thoracic and Vascular Surgery (CTVS), National University Heart Centre, Singapore (NUHCS) has successfully conducted Singapore's first holography-guided heart surgery using Microsoft's HoloLens 2 – a pair of mixed reality smart glasses through which surgeons can view a projected three-dimensional (3D) hologram of the patient's heart derived from the patient's Computerised Tomography (CT) scans.

Holographic devices give doctors a different perspective of the patient's anatomy with views from different angles. In cases where patients possess a unique anatomy, holograms can empower and enhance the surgeon's experience by providing better and clearer visualisation of the body before the complex surgery.

The device further allows the surgeon to manipulate images via hand gestures to move, resize and rotate the visual or even to superimpose the hologram onto the patient's chest during surgery, allowing for better understanding of the challenges before proceeding with the operation.

Doctors could also potentially use the device to educate and better describe medical conditions to their patients, by giving them a visual of their anatomy and walking them through the recommended procedure.

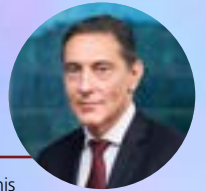
A/Prof Theodoros Kofidis, Head and Senior Consultant, Department of CTVS, NUHCS, Mr Ng Kian Wei, Data Scientist, National University Health System (NUHS), Dr Illas Skaltsiotis, Clinical Fellow, NUHCS, Dr Chang Guohao, Consultant, Department of CTVS, NUHCS and Dr Gao Yujia, Associate Consultant, National University Hospital (NUH) formed the team that conducted the first holography-guided heart surgery, which was also the world's first holography-guided minimally invasive adult heart operation, in Oct 2021.

The first patient was a 75-year-old man diagnosed with advanced aortic valve leakage, a condition where the heart's aortic valve does not close tightly, resulting in a backflow of blood. With the patient's heart failing quickly due to dilation, an immediate valve replacement was crucial.



ARTICLE BY

A/Prof Theodoros Kofidis
 Head and Senior Consultant,
 Department of CTVS, NUHCS



A/Prof Kofidis has been recognised for his innovative surgical discoveries focused on less traumatic heart surgery. His passion in this area led to his founding of the Initiative for Research & Innovation in Surgery (IRIS). He continues to present his work at numerous international conferences and lead training workshops for medical teams around the world. He actively contributes to the industry through his multiple concurrent appointments held globally. A/Prof Kofidis remains active in research with many published works, as well as patents, and sits on the editorial review board for several scientific journals. He is also the Group Chief of CTVS at NUHS.

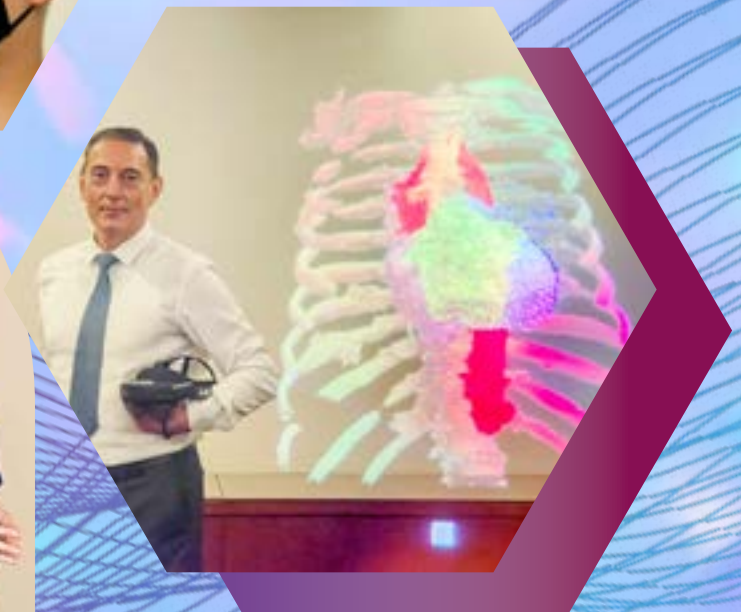


Using HoloLens 2, A/Prof Kofidis was able to project a hologram of the patient's heart onto his chest during the surgery. This assisted A/Prof Kofidis in placing the incisions exactly in the right areas through the space between the ribs, and also enabled him to accurately evaluate how deep the cuts needed to be.

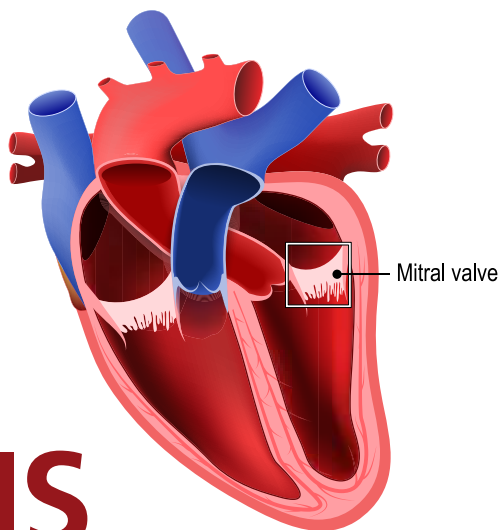
Since then, the team has conducted numerous other successful operations which have been described and published in peer-reviewed journals, and also recently presented at the International Society for Minimally Invasive Cardiothoracic Surgery conference in Jun 2022.

The technology allows us to know the exact location and which angle to make the incision and cut the chest during operation, as well as to provide a guide during the initial part of the surgery on whether the procedure is going to be a simple or challenging one,

A/Prof Theodoros Kofidis,
 Head and Senior Consultant,
 Department of CTVS, NUHCS



The Real Cause Behind MITRAL STENOSIS



Normal mitral valve



Damaged mitral valve

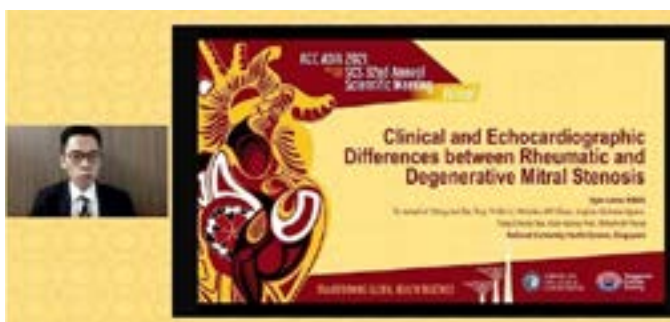
Research wins top award at two regional conferences

A research team from the National University Heart Centre, Singapore (NUHCS) recently won the top Young Investigator Award at two medical conferences – the American College of Cardiology Asia 2021-32nd Singapore Cardiac Society Annual Scientific Meeting 2021 (ACC Asia-SCS ASM) and the 25th ASEAN Federation of Cardiology Congress (AFCC) – for the team's research on Mitral Stenosis, a condition whereby the heart's mitral valve narrows and blocks blood flow into the main pumping chamber of the heart. It was once thought to be caused by rheumatic heart disease – a condition where the heart valves are permanently damaged due to rheumatic fever which is an inflammatory disease often developed when a bacterial infection has not been properly treated.

The research was presented and led by Dr Ryan Leow, Senior Resident, Internal Medicine Residency, National University Hospital Singapore (NUHS), under the guidance of Asst Prof William Kong Kok Fai, Clinical Director of Echocardiography and Non-invasive Diagnostic Cardiology and Senior Consultant, Department of Cardiology, NUHCS, and Dr Sia Ching Hui, Associate Consultant, Department of Cardiology, NUHCS.

Using 25 years of echocardiographic¹ data from Singapore, the team observed a change in the causation of Mitral Stenosis. The team successfully contextualised the importance of these findings for Asian populations that went through demographic changes similar to that of

diseases, especially in high-income countries. As the condition is less well-understood compared to rheumatic Mitral Stenosis, researchers are keen on studying the causation of the disease and examining the trends in disease burden to better manage patient health.



Singapore, such as an ageing population and rapid socioeconomic growth.

However, Mitral Stenosis is now increasingly found to occur due to metabolic conditions such as diabetes and degenerative calcification associated with ageing. Calcification occurs when excessive calcium builds up and deposits in our body tissues. In severe consequences, it accumulates in the heart valves affecting blood flow.

In recent years, degenerative Mitral Stenosis appears to be increasingly more prevalent behind heart valve

“Degenerative Mitral Stenosis is an increasing problem in our ageing society for which we need to identify effective treatment strategies for our patients,” explained the research team's senior author, Asst Prof Kong. “An Asian perspective adds valuable data to the ongoing research on this condition and our team is excited to build on this remarkable achievement.”

¹echocardiographic – Ultrasound data of the heart.

ARTICLE BY

Dr Ryan Leow
Senior Resident, Internal
Medicine Residency, NUHS



Dr Leow is a senior resident with the Internal Medicine programme at NUHS with an interest in cardiology and is an aspiring researcher in this field. He is also passionate about medical education, having been the programme's former Associate Chief Resident for medical education and was awarded the Special Recognition Award for undergraduate medical teaching by NUHS.

ARTICLE BY
 NUHCS Pulse
 Editorial

MEET THE NEW PRESIDENT OF SCS

Dr Lim Toon Wei shares his plans for growing Singapore Cardiac Society (SCS)

Asst Prof Lim Toon Wei, Senior Consultant, Department of Cardiology, National University Heart Centre, Singapore (NUHCS) has been appointed the new President of the Singapore Cardiac Society (SCS).



At NUHCS, Asst Prof Lim has also recently taken up the role of Head of Community Cardiology, bridging together cardiology expertise from the heart centre to community healthcare locations including polyclinics, while also serving as the Clinical Lead of Telehealth, a telemedicine service that allows patients to receive medical consultations via secure, online video chat applications from the comfort of their homes. Active in medical education, he is an assistant professor at the Department of Medicine, Yong Loo Lin School of Medicine, National University of Singapore, and has been a core faculty member of the Cardiology Senior Residency Programme.

Before taking on the presidency at SCS, Asst Prof Lim has served seven years in other capacities in its Executive Council and is familiar with the challenges the society faces. Nonetheless, he is keen on raising the

profile of SCS by building a high-quality membership and is excited about two upcoming developments.

The first would be the Asian Pacific Society of Cardiology Annual Con-

gress taking place in mid-2023 which SCS will host, whereby “the event would be a good platform to showcase the high quality of work coming from our young doctors to the wider community,” as highlighted by Asst Prof Lim.

The second would be in establishing a Women in Cardiology group to provide a forum for female cardiologists to strongly advocate and raise awareness on women’s cardiovascular health issues, a topic that is often under-emphasised.

He shared more about his plans for SCS.

Pulse: What are some of the key challenges facing SCS?

Asst Prof Lim: Our society is relatively small, compared to other regional societies. This means we must be very fiscally prudent. While we have some funds from previous successful meet-

ings, we will need to strike a balance in making sure our assets are not eaten away by inflation and wisely invested on areas to promote our work and to advance the society’s goals.

What would be the key priorities for you as President of SCS?

That would be to set up new financial guidelines to safeguard the fiscal position of the society, improve our digital presence as a society, and to leverage the use of social media to improve the profile of our society. I am also looking at constitutional amendments to ensure that all centres and private cardiologists have representation in our council.

Where would you like to see SCS in the next five to ten years?

It would be incredible for SCS to be seen as the leading cardiac society in the region not by size, but by the quality of our membership. To do this, our Annual Scientific Meetings must focus on improving the quality of its scientific content in becoming the premier regional meeting in cardiology.



ABOUT SINGAPORE CARDIAC SOCIETY (SCS)

Formed in 1958, SCS was formed to advance the knowledge and practice of cardiovascular medicine in Singapore by creating a platform to encourage cooperation and collaboration amongst professionals. Through active collaboration and meaningful dialogues, SCS has established strong ties with similar professional societies and associations in the region and beyond, such as its affiliation with the American College of Cardiology (ACC) and the European Society of Cardiology (ESC).

MORE THAN A NURSE

Meet the new Assistant Director of Nursing

Ms Doreen Chew was recently promoted to her current position, Assistant Director of Nursing, National University Heart Centre, Singapore (NUHCS) after about 20 months in an acting role. In this role, she would be overseeing some 300 nurses in the cardiac cluster, across the whole National University Health System (NUHS) group, spearheading the growth of the nursing practice in this cluster whilst working closely with other department heads to achieve excellence in patient care, research and education.

Since graduating with a diploma in nursing in 2000, Ms Chew joined NUHCS as a staff nurse in the cardiothoracic intensive care unit, caring for critical patients who have undergone major surgeries. She has continued her pursuit to advance her skills and knowledge in nursing, earning an advanced diploma, bachelor's degree as well as a master's in nursing, specialising in critical care.

Here, Ms Chew shared her experience as an advanced practice nurse (APN) and her thoughts on moving into a role with more organisational management responsibilities.

Pulse: *Could you share some of your past career highlights?*

Ms Chew: Pursuing my masters was an eye-opener for me as I had to go a lot deeper with my clinical knowledge to be able to make sound clinical assessments, diagnoses and prescribe medicine. The study was intensive but very rewarding. I now have better insights to patients' conditions and can make more informed recommendations.

How did you end up being an APN?

I was fortunate to work in an intensive care unit in my first posting. It also happened to be during a time when the unit was small, and short on staff with the only two surgeons away on long leave. This created an opportunity for me to step up and take on more tasks. Coached closely by my nurse manager and preceptor, I followed their detailed instructions quickly to carry out the required tasks. Thus, my learning curve was steep at the start, but I learnt quickly and progressed from there.

What are the traits one need to have to succeed as an APN?

Resilience, unwavering dedication, commitment, courage, self-motivation, critical and analytical thinking skills, as well as the ability to work independently at certain times.

What are some of the key challenges you face in your new role and how would you overcome them?

Leadership is challenging for me. You need to be able to connect with your staff to be able to lead effectively. Therefore outside of my daily nursing duties, I would spend some time to connect with and learn more about my team. I will do my best to treat every staff genuinely and equally. This part of the job can be seem very draining as building rapport and team synergy is a never-ending task. Yet, it is also the most fundamental for a team to be effective which also translates to a joyful workplace culture.

What advice would you give to those interested in nursing?

Nursing is a vocation, it is a calling. Once a nurse, always a nurse.



ARTICLE BY

NUHCS Pulse Editorial



I have been lucky to have good mentors who appeared at the right time, affirmed my capabilities, nurtured me, and gave me the opportunities to grow in my career. Now I hope to be the same for others...

Sister Doreen Chew, Assistant Director of Nursing, Acute Care Advanced Practice Nurse, NUHCS

HOW **CRCs** PLAY A ROLE IN HEALTHCARE

ARTICLE BY

NUHCS Pulse Editorial

Clinical Research Coordinators (CRCs) are an integral link between patients and clinical research investigators



Clinical research, involving patients, is fundamental to medical breakthroughs and the advancement of better healthcare, treatment and prevention of diseases. As research trials involve potential risks to patients, ethical strategies are in place to ensure the integrity of research results and the safety of patients who participate in these trials.

At the National University Heart Centre, Singapore (NUHCS), the Clinical Trials Unit (CTU) manages a myriad of observational and interventional cardiovascular studies. The management and execution of these studies could sometimes take years to complete.

From this unit, Ms Vion Tan, Senior Clinical Research Coordinator (CRC), Department of Cardiology, NUHCS was recognised at the recent SCRI Distinguished Contributor Award 2021 for her outstanding contribution in supporting cardiovascular clinical trials and received the Merit Award and \$1,000 for professional development.

Ms Tan shared that she sees her role as “the bridge” between patients and researchers where she would need to consider the health of the patients who enroll in the studies.

“Our priority is always, first and foremost, the safety and well-being of our patients. We would incorporate the patients’ medical care plan and try to minimise inconveniences and burden to the patients. For example, we try to schedule the various tests they are required to take within the same day when they have to be at the hospital.”

To ensure that the integrity of the data collected from these studies are not compromised, it is important to ensure patients enrolled in these studies understand the full details of the study and are able to fulfil their commitment. CRCs take on this role to help patients understand their role in the studies and to monitor the patients’ health progress during the research.

“One fulfilling aspect of the job is when I observe patients progressing in their health. I am really happy and grateful to be able to help support them on their journey,” Ms Tan adds.

With scientific excellence, reliable support and collaboration as our core values, we adopt a team-based approach in the execution of our studies, and strive to optimise care for our patients.

Dr Lim Shir Lynn, Director of CTU and Senior Consultant, Department of Cardiology, NUHCS



From left to right: Jolene Rachel Leong Pei Kuan, Vion Tan Sik Yin, Kok Su Ing, Wong Cher Yi

SINGAPORE CLINICAL RESEARCH INSTITUTE (SCRI)

SCRI, under the Consortium for Clinical Research and Innovation, Singapore (CRIS) works with the National Medical Research Council to implement clinical trials policy and strategic initiatives to support and develop clinical research competencies in Singapore.

SCRI runs a number of courses and workshops suited for beginners to senior Clinical Research Coordinators (CRCs) throughout the year. More details are available on their website at www.scri.edu.sg.



INTERNATIONAL COLLABORATION ON PATIENT REGISTRY YIELDS DEEPER INSIGHT INTO AVD

NUHCS researchers lead international collaborative efforts

Aortic Valvular Disease (AVD) is one of the most common type of valvular disease in Asia.

There is an exponential increase in prevalence of Aortic Stenosis (AS) with age, with 0.2% in the 50–59-year group, 1.3% in the 60–69-year group, 3.9% in the 70–79-year group, and 9.8% in those aged 80–89 years.

According to a global report, the incidence of new AS was 5 per 1,000 per year. The burden of heart valve disease in the elderly has an important impact on patient management, due to the high likelihood of comorbidity and the increased risk associated with intervention in this age group.

The AS registry, led by A/Prof Poh Kian Keong, Director of Research and Senior Consultant, Department of Cardiology, National University Heart Centre, Singapore (NUHCS), has resulted in numerous peer-reviewed publications in recent years. With increasing evidence on the adverse prognostic outcomes of low-flow low-gradient severe AS, NUHCS has contributed to several publications on the comparison between clinical and echocardiographic features of paradoxical low-flow and normal-flow severe AS^{1,2}.

In addition, NUHCS researchers further explored the prognostic outcomes of these patients with other concomitant valvular disease such as mitral regurgitation¹. Several such studies have reported the important and novel predictors of adverse cardiac events in this group of patients such as low relative valve load³ and left ventricular stiffness index².

It is vital for clinician researchers to

push the boundaries of present scientific knowledge that revolves around Western cohort-based evidence. Asian data allows researchers to challenge current guidelines stemming from data based on the western population.

NUHCS researchers evaluated the discrepancies in echocardiographic assessment of severe AS using the traditional cut-offs recommended by Western guidelines and demonstrated significant discrepancies in AS grading within our Asian population⁴. This discrepancy is particularly evident in those with a smaller left ventricular outflow tract, which occurs in the majority of Asian patients. With this insight, NUHCS researchers proposed new thresholds of the aortic valve area that would have more consistency in AS grading within the Asian population. This proposal was later cited in an important editorial in the inaugural issue of the scientific publication, *Journal of the American College of Cardiology: Asia*⁵.

Most AS patients attending NUHCS do not have a single disease entity but often have complex medical comorbidities. Several publications from the AS registry shed light on the clinical profile and prognostic outcomes of these patients with severe AS and concomitant valve disease including aortic regurgitation⁶, atrial fibrillation⁷, and obesity⁸.

With technological advancements made in Transcatheter Aortic Valve Implantation (TAVI), the indication and feasibility of the procedure have now rapidly expanded. With the intent to push this agenda, NUHCS has shifted focus on moderate AS and its prognostic outcomes.

“**NUHCS was the first to describe inter-ethnic differences in valvular dysfunction, aortopathy and progression within our Asian BAV population²⁰ – an embodiment of our mission to further innovative research in BAV within Asia.**

A/Prof Poh Kian Keong, Director of Research and Senior Consultant, Department of Cardiology, NUHCS

The latest research from NUHCS found that those with moderate AS, particularly the elderly, may have a similar level of high risk cardiac events compared to those with severe AS. These findings warrant further reviews and more importantly, an evaluation of the expansion of the indications of valve intervention in patients with moderate AS⁹.

“In addition, we were able to publish important data on the natural progression of both bicuspid and tricuspid AS in our Asian population, which can certainly help guide clinicians across the globe in ensuring safe and effective echocardiographic and symptomology surveillance of our AS patients,” explained A/Prof Poh Kian Keong, Director of Research and Senior Consultant, Department of Cardiology, NUHCS.

Patients with Bicuspid Aortic Valve (BAV) are another group of patients who suffer from AVD. BAV is the most common form of congenital heart disease, usually present in approximately 0.5–0.8% of the population. BAV often leads to the early degeneration of the aortic valve, making patients more likely to require an aortic valve surgery at a much earlier age (mean age 47).

In 2015, to evaluate the outcome of patients with BAV, a large international multicentre BAV registry was formed comprising Singapore, the Netherlands, Australia, Canada, and 10 other countries in Europe.

Led by Asst Prof William Kong Kok Fai, Clinical Director of Echocardiography and Non-invasive Diagnostic Cardiology and Senior Consultant, Department of Cardiology, NUHCS, together with Prof Jeroen Bax and Dr Victoria Delgado from the Netherlands, the registry currently has 3,500 participants registered and continues to receive more patients, to date.

This BAV registry deepens our understanding of AVD in terms of epidemiology, prognosis, management, and therapies. One of the most exciting results from this collaborative effort to date was the promising results seen in BAV patients who underwent transcatheter valve therapy.

Other important findings that have since come out of the large international registry include reported outcomes in patients due to different BAV morphology¹¹⁻¹³, gender and ethnicity differences of BAV^{14,15}, new imaging modality to predict prognosis of BAV patients^{16,17} and favourable clinical outcomes of TAVI in patients with bicuspid stenosis¹⁶⁻¹⁹.



AV research team from Department of Cardiology, NUHCS: (from left) Dr Sia Ching Hui, AI Prof Yeo Tiong Cheng, AI Prof Poh Kian Keong, Dr Kong Kok Fai William, Dr Chew Wen Sheng Nicholas

ARTICLE BY

Asst Prof William Kong Kok Fai
Clinical Director of Echocardiography and Non-invasive Diagnostic Cardiology, Senior Consultant, Department of Cardiology, NUHCS



Asst Prof Kong specialises in the management of patients with valvular heart diseases and structural heart diseases through a weekly Valve Clinic at the National University Hospital. He is also a member of the Heart Team which provides echocardiographic assessment and support for transcatheter therapies for high-risk patients. As a prolific researcher, he is the primary investigator of numerous published research including, the biggest worldwide multi-centre bicuspid AVD registry. Currently, he reviews research submissions for several international cardiology journals including *Circulation* and *Journal of American Society of Echocardiography*.

Dr Nicholas Chew
Senior Resident, Department of Cardiology, NUHCS



Dr. Chew is currently a cardiology senior resident, having joined the senior residency programme at NUHCS in 2020. While embarking on a new journey in his specialist training, he hopes to contribute to the areas of research and education in cardiology.

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ARTICLE BY

Prof Tan Huay Cheem
Senior Consultant, Department
of Cardiology, National University
Heart Centre, Singapore (NUHCS)



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. He is also one of the founding editors of *AsiaIntervention*.

Congratulatory ANNOUNCEMENTS



National University Heart Centre, Singapore (NUHCS) team gains acknowledgment for their work to improve the quality of healthcare here

Quality Improvement Project 2021 Winners (Recognition)

Prof Tan Huay Cheem
Senior Consultant, Department of Cardiology, NUHCS

Singapore Cardiac Society (SCS) – Lifetime Achievement Award 2022

The Lifetime Achievement Award pays tribute to Prof Tan's 30 years of dedication and service in the field cardiology as well as his efforts in advancing the practice in Singapore and Asia. It also honours and recognises his contributions to the SCS and the cardiac fraternity, most notably in the field of interventional cardiology.

NUHCS and Department of Diagnostic Imaging (DDI)

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- Ms Florence Foo
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A/Prof Laszlo Kiraly
Head, Division of Congenital Heart Surgery and Senior Consultant, Department of Cardiac, Thoracic and Vascular Surgery, NUHCS

Academic Appointment

Congratulations on his appointment as Associate Professor on the Clinician Educator Track (non-tenurable) at the Department of Surgery, Yong Loo Lin School of Medicine, National University of Singapore.



Prof Ronald Lee Chi Hang
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ABSTRACTS

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Effect of Sodium-Glucose Cotransporter-2 (SGLT2) Inhibitors on Serum Uric Acid Levels: A Systematic Review and Meta-Regression of 35 Randomized-Controlled Trials **Yip ASY, Leong S, See RM, Ong HT, Sia CH.**

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Young Investigator Award: Clinical, Echocardiographic and Prognostic Outcomes of Patients with Concordant and Discordant High-Gradient Aortic Stenosis in an Asian Cohort **Ho YJ, Chew NWS, Ng CH, Kong WKF, Poh KK.**

Bayesian Meta-analysis of Direct Oral Anticoagulation Versus Vitamin K Antagonists With or Without Concomitant Antiplatelet After Transcatheter Aortic Valve Implantation in Patients With Anticoagulation Indication **Lee G, Tay H, Teo V, Ng CH, Chew NWS.**

Prevalence, Risk Factors and Intervention for Depression and Anxiety in Pulmonary Hypertension: A Systematic Review and Meta-Analysis **Mai A, Lim O, Ho YJ, Ng CH, Chew NWS.**

Prognostic Outcomes in Acute Coronary Syndrome Patients Without Standard Modifiable Risk Factors: A Multi-Ethnic Study of 8680 Asian Patients **Kong G, Chew NWS, Ng CH, Chan MY, Loh PH.**

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25th ASEAN Federation of Cardiology Congress, Virtual, 13-14 November 2021 **1st Prize, Young Investigator's Award: Clinical and Echocardiographic Differences between Rheumatic and Degenerative Mitral Stenosis.** **Leow R, Sia CH, Yeo TC, Poh KK, Kong WKF.**

Wong Hock Boon Society Research Day 2022, Virtual, 29 January 2022 **Metabolic benefits of Sodium-glucose Cotransporter (SGLT) inhibitors: Meta-analysis of 116 RCTs** **Cheong AJY, Teo YH, Sia CH.**

Shunt Size is Associated with Stroke Recurrence in Medically Managed Patients with Cryptogenic Stroke and Patent Foramen Ovale **Lim ICZY, Teo YH, Fang JT, Teo YN, Lee YQ, Chen XT, Yeo LLL, Sia CH, Tan BYQ.**

International Stroke Conference (ISC) 2022, Louisiana, USA & Virtual, 9-11 February 2022 **Atrial Fibrillation Modifies The Effect Of Air Pollution On Ischemic Stroke** **Tan BYQ, Ho JSY, Ho A, Pek PL, Sia CH, Yeo LLL, Sharma V, Ong ME, Aik JCL, Zheng HL.**

FIB-4 Index And Acute Ischemic Stroke Outcomes After Intravenous Thrombolysis **Toh EM, Ravi PRJ, Ming C, Lim AY, Sia CH, Yeo LL, Huang DQ, Muthiah MD, Tan BYQ.**

Lipid Paradox In Acute Ischemic Stroke: Study Of Lipid Parameters On Outcomes After Intravenous Thrombolysis **Ming C, Toh EM, Yap QV, Chan YH, Sia CH, Yeo LL, Lim AY, Tan BYQ.**

Prevalence Of Adverse Cerebrovascular Events In Hypertrophic Cardiomyopathy Patients With And Without Atrial Fibrillation: A Systematic Review And Meta-analysis **Ye TTS, Siah OZ, Tan BY, Ho JS, Syn NL, Teo YH, Teo YN, Yeo LL, Sia CH.**

16th World Sleep Congress, Rome, Italy, 11-16 March 2022 **Obstructive sleep apnea and lung cancer: a systematic review and meta-analysis of 4,885,518 participants** **Cheong AJY, Tan BKY, Teo YH, Tan NKW, Yap DWT, Sia CH, Ong TH, Leow LC, See A, Toh ST.**

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A Network Meta-analysis of 12,116 Individuals from Randomized Controlled Trials in the Treatment of Depression After Acute Coronary Syndrome **Pin S, Tang A, Lim GEH, Chin YH, Mai AS, Ng CH, Yong JN, Tan D, Tay P, Chan Y, Lee CWM, Devi K, Ong CEC, Foo R, Tan HC, Chan MY, Ho R, Loh PH, Chew NWS.**

Long-term Outcomes in Acute Coronary Syndrome Patients Without Standard Modifiable Risk Factors: A Multi-Ethnic Study Of 5400 Asian Patients **Kong G, Chew NWS, Ng CH, Foo R, Yip JWL, Low AF, Lee CH, Chan MY, Yeo TC, Tan HC, Loh PH, Mai AS.**

Prevalence and Outcomes of Patients Without Standard Modifiable Risk Factors Following Acute Coronary Syndrome: A Systematic Review and Meta-Analysis **Chong B, Goh R, Kong G, Ng CH, Foo R, Low AF, Lee CH, Chan MY, Tan HC, Loh PH, Chew NWS.**

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Muscleblind-Like (MBNL) Protein Family Overexpression Lead to Pro-Synthetic Phenotype Modulation of Arterial Human Vascular Smooth Muscle Cells in Diabetes Mellitus **Ihsan MO, Tan DM, Muniyasamy U, Ong MS, Lin XY, Lee CN, Dorajoo R, Sorokin V.**

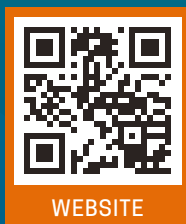
Understanding 3D Culture in Smooth Muscle Cell Biology and the Modelling of Atherosclerosis **Ong MS, Heng QJ, Ihsan MO, Lee CN, Muniyasamy U, Lin XY, Sorokin V.**

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