THE **HEARTBEAT** OF NATIONAL UNIVERSITY HEART CENTRE, SINGAPORE (NUHCS)

National University Heart Centre Singapore

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COVER STORY

UNFOLDING CARDIAC REHABILITATION

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Pulse is a biannual publication by the **National University Heart Centre, Singapore (NUHCS).**

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National University Heart Centre Singapore

NUHCS brings a wide range of cardiovascular specialists, including physicians, surgeons, nurses and technicians, together to provide a comprehensive and holistic approach to cardiovascular medicine and the treatment of heart conditions in Singapore. It includes the departments of Cardiology and Cardiac, Thoracic, and Vascular Surgery (CTVS), and has honed two Peaks of Excellence and six Core Clinical Programmes that provide leading care and treatment strategies for patients:

Core Clinical Programmes

- Acute Coronary Syndrome Programme
- Women's Heart Health Programme
- Heart Failure & Cardiomyopathy Programme
- Heart Rhythm Programme
- Vascular Medicine and Therapy Programme
- Congenital and Structural Heart Disease Programme

Institutional Peaks of Excellence:

- Minimally Invasive Cardiothoracic Surgery (MICTS)
- Aortic Centre

NUHCS Heart Clinics

NUHCS @ National University Hospital (NUH)

NUHCS @ Ng Teng Fong General Hospital (NTFGH)

NUHCS @ Alexandra Hospital (AH)

NUHCS @ Jurong Medical Centre (JMC)

Cardiovascular Research Institute (CVRI)

Research pillar of NUHCS

Focus on delivering new diagnostic, prognostic and therapeutic tools for the treatment of cardiovascular diseases that translates to better patient care.

Yong Loo Lin School of Medicine, National University of Singapore (NUS)

Asia's leading medical school at Singapore's flagship university

NUHCS collaborates with NUS to educate and train the next generation of cardiovascular professionals.

National University Health System (NUHS)

An integrated Academic Health System, serving as one of three public healthcare clusters.

As a member of NUHS, NUHCS collaborates with professionals and centres across the health system to advance the tripartite missions of achieving clinical excellence for patients, developing the next generation of healthcare professionals, and changing the natural history of chronic diseases through research.

EDITOR'S MESSAGE

Dear readers,

Happy New Year! It is always uplifting to welcome a new year with fresh ideas and impetus.

Much of what we do daily at the National University Heart Centre, Singapore (NUHCS) over the years has been centered on improving patient care in a sustainable manner.

Singapore is one of the fastest ageing societies in the world. By 2030, one in four Singaporeans will be over the age of 65. This implies our workforce is also getting older and therein, a need to close the gap in finding ways to cater to more patients with an older workforce – a conundrum we often face in public health.

To do so, we enhanced our professional proficiency through skills upgrading, streamlining clinical workflow, education and training of our junior colleagues, and investing in research to uncover new knowledge – with the goals of achieving better efficiencies and improving the quality of care to meet international standards.

An important aspect of achieving full recovery of the heart is to help patients return to their normal physical activities and improve their overall psychosocial well-being. Our cover story in this issue draws attention to this critical aspect of a heart's recovery – cardiac rehabilitation, a medically-proven strategy that helps patients recover and even strengthens their hearts and lowers the risks of future complications.

Supporting the need for positive behavioural changes as part of the full rehabilitative process, NUHCS' patient support group, aptly named the Caring Hearts Support Group (CHSG), comprises members supporting one another in their respective heart recovery journeys.

Under the stewardship of Ms Magdalene Chia, the group has been active in organising suitable physical activities and engaging informative talks. Members have not only become patient advocates at our events, but at national meetings held by the Ministry of Health, as well as other international conferences.

In this issue, we also featured our promising group of aspiring homegrown clinician-scientists who have been successful in their application for the competitive national research grant awards. With exceptional aptitude and talent in their pursuit of scientific research, their works have been presented at esteemed international meetings and published in international peer-reviewed journals.

What is also encouraging is that the Department of Cardiology has the second highest number of published collaborative research work with medical students from the National University of Singapore (NUS) Yong Loo Lin School of Medicine. This mentorship programme augurs well for the future development of cardiovascular research in Singapore.

Learn more about the complex cardiovascular professions at NUHCS with in-depth interviews with Asst Prof Chai Ping, Head of Cardiology, NUHCS @ the National University Hospital (NUH), and an exclusive feature on our specialist nurses.

Finally, we hope you will be inspired by the story of our volunteer team who went on a charity paediatric surgical mission trip to Fiji Island. With limited time and resources, our team performed splendidly and made such a difference to the lives of the Fijian children, who would otherwise had limited access to life-saving treatments.

I hope you enjoy reading this issue and pass it along to someone who may too, learn something useful.

Tan Huay Cheem

Prof Tan Huay Cheem
Senior Advisor of NUHCS

Special Feature: Unfolding Cardiac Rehabilitation

The Rundown of CARDIAC REHABILITATION

ARTICLE BY
NUHCS Pulse Editorial

What is Cardiac Rehabilitation (CR)?

Cardiac Rehabilitation (CR) is a medically supervised programme designed to strengthen and improve one's cardiovascular health. The programme is particularly focused on strengthening the hearts of those who are suffering from a cardiac condition, or who are recovering from a heart attack or surgery.

Consisting of exercise training, emotional support, and education about lifestyle changes, this programme helps recover one's strength and health.

Through personalised exercise plans, patients under CR programmes are empowered to regain their fitness in safe and progressive phases, while learning to manage lifestyle-related risk factors such as blood pressure and cholesterol.

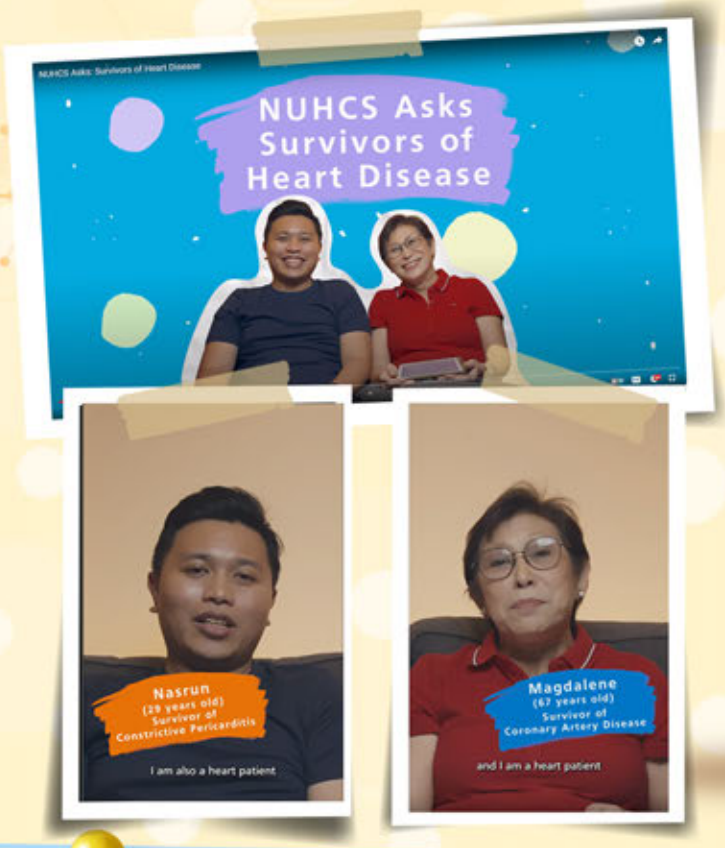
Beneficial for almost any heart condition, NUHCS Cardiac Rehabilitation is a specialised programme to help patients achieve normalcy in daily living, while reducing the risk of a relapse.

Despite international recommendations in support of a CR programme, fewer than 50% of suitable patients complete such a programme.

Your Cardiac Rehabilitation Team

- Cardiologist
- Physiotherapist
- Nurse Clinician
- Pharmacist
- Dietitian
- Occupational Therapist
- Clinical Psychologist
- Medical Social Worker

SCAN HERE TO FIND OUT MORE ABOUT NUHCS CR PROGRAMME



SCAN HERE TO HEAR FROM OUR SURVIVORS OF HEART DISEASE

Should You Join A CR Programme?

A CR programme helps people who have had:

- A heart attack
- Percutaneous coronary intervention (PCI)[1]
- Cardiac surgery, such as a coronary bypass or valve surgery
- Vascular surgery
- Heart failure
- Heart transplantation
- Had an electrophysiology (EP) device implantation
- Treatment for other heart conditions such as heart failure, high-risk coronary artery disease

Please consult a cardiologist before starting a CR programme.

3 Components of NUHCS' CR Programme

Education

Patients need to be informed about the disease, types of treatment, risk factors and be advised on what they can safely do at home.

Counselling

Many patients and their families are struck with many uncertainties (e.g. fear of having another heart event, coping with lifestyles changes, worrying about hospital expenses or future follow-up costs). The NUHCS CR team helps patients navigate these challenges by providing support and guidance to them and their families on this road to recovery.

Prescribed exercise training

Each patient is unique and will be guided on safe and suitable physical exercises that fit his or her individual tolerance, progress, endurance, needs, and goals. The intensity or frequency of the exercise will be increased in a progressive manner to give one's cardiac recovery a boost and to help one maintain their heart health even after a heart attack.

[1]PCI – A non-surgical procedure to treat the narrowing of the coronary arteries, often done through balloon angioplasty.

Special Feature: Unfolding Cardiac Rehabilitation

Caring Hearts SUPPORT GROUP

Caring Hearts Support Group (CHSG) is a volunteer initiative by patients of NUHCS. The support group was established with the vision to build an inspiring and caring heart patient support group that brings positive changes to the lives of cardiac patients and the community.

In September 2022, CHSG organised its Annual Retreat-cum-Appreciation Day with the theme "Exercise and Love Your Heart", while introducing new CHSG shirts that members can use in their group exercises.

Held at the National University Health System (NUHS) Tower Block, the event kick-started with a heartwarming sharing session, where members encouraged each other with their experiences of living and overcoming their heart conditions. The NUHCS Cardiac Rehabilitation team also engaged members with a video-led mass workout session during the event.

NUHCS doctors and staff as well as partners from the Singapore Heart Foundation also gamely took part in support of NUHCS patients and CHSG.

How Does CHSG Help?

CHSG designed the H.E.L.P. Programme Initiatives with educational and training support from NUHCS. The programme aims to instil friendship and bonding amongst heart patients to foster a heart-healthy lifestyle.

H — **HEALING TOWARDS A HEALTHY HEART**

Working together towards attaining and sustaining a healthy heart.

E — **EMPOWER, EDUCATE AND EXERCISE**

Through partnership, members are empowered through education and exercise to achieve their health objectives.

L — **BALANCED LIFESTYLE AND LOVE**

Promoting a balanced and healthy lifestyle filled with meaning, love and laughter through friendships and social activities.

P — **PERSEVERANCE, PROGRESS AND PREVENTION**

Supporting each other in the persevering process of overcoming health challenges, and in preventing future heart related issues.

"No member walks alone. We will grow stronger together."

-- Ms Magdalene Chia, Programme Coordinator, CHSG

Join CHSG

Membership is open to heart patients who have completed the Basic Cardiac Rehabilitation Programme at NUHCS. For more information about CHSG or to join CHSG, please contact Programme Coordinator, Magdalene Chia, at mchia@kucinta.com.

Special Feature: Unfolding Cardiac Rehabilitation

Facts about CARDIAC REHABILITATION (CR)

Many studies show evidence supporting the effectiveness and benefits of a comprehensive CR programme. International guidelines as well as leading CR centres around the world support a structured exercise programme as part of the rehabilitative process.

The heart needs time to recover especially after major events such as a heart attack or surgery. Starting physical activities early is important to help the heart recover faster, but overstraining the heart should be avoided.

EXERCISE-BASED CR CAN:

- REDUCE HOSPITALISATION RATES ↓18%
- REDUCE RISK OF ALL-CAUSE MORTALITY ↓27%
- REDUCE RISK OF CARDIAC MORTALITY ↓31%
- INCREASE TOLERATED METABOLIC EQUIVALENTS ↑33%
- INCREASE MAXIMAL OXYGEN CONSUMPTION ↑16%

- HELP WITH WEIGHT LOSS
- IMPROVE CHOLESTEROL LEVELS
- LOWER RISK OF DEPRESSION
- REDUCE STRESS
- IMPROVE THE QUALITY OF LIFE

PHYSICAL ACTIVITIES CAN HELP YOU BE

30-50%
LESS LIKELY TO BE HYPERTENSIVE

1.5X
LESS LIKELY TO DEVELOP HEART DISEASE

SMOKING CESSATION

is the most important and the most cost-effective of all the lifestyle modifications recommended to prevent cardiovascular disease.

CARDIAC REHABILITATION

was more cost-effective after a heart attack, compared to lipid-lowering drugs, clot-busting drugs, and a Coronary Artery Bypass Graft (CABG)[1].

[1]CABG – A procedure to treat the narrowing of coronary arteries by creating a bypass of the blocked portion using a healthy blood vessel.

CELEBRATING DECADES OF COMMITMENT TO CARDIOLOGY

Prof Tan Huay Cheem receives lifetime achievement award 2022 for more than three decades of contribution

ARTICLE BY
NUHCS Pulse Editorial

Prof Tan Huay Cheem, Senior Consultant, Department of Cardiology and Senior Advisor of the National University Heart Centre, Singapore (NUHCS) has been accorded the Singapore Cardiac Society (SCS) Lifetime Achievement Award 2022.

The Lifetime Achievement Award 2022 honours Prof Tan's contributions and dedication of more than three decades in the field of cardiology and his efforts in advancing the field of cardiology in Singapore and abroad. The award also recognises his contributions to the SCS and the cardiac fraternity, most notably in the field of interventional cardiology.

Over the past 35 years of his career, he has spent the last 18 years leading and establishing cardiovascular clinical programmes in Singapore, as well as in developing countries such as Myanmar.

In Singapore, he was appointed the Chief of the Cardiac Department at the National University Hospital (NUH) in 2003 and later, became the Founding Director of NUHCS in 2008 before passing the baton on in July 2021. During his tenure, NUHCS grew to become a renowned international academic medical centre, having established a number of peak of excellence programmes and recognised for its high quality clinical service, research and training programmes.

Prof Tan has made many significant contributions in advancing the practice and standards of cardiovascular medicine in Singapore and the region through his leadership roles such as the President of the Asia-Pacific Society of Interventional Cardiology (APSIC), Founding Course Director of AICT-AsiaPCR, Vice Chairman of the World Association of Chinese Cardiologists, President of SCS, Chairman of Singapore Heart Foundation, Chairman of the Cardiology Specialist Advisory Board as Singapore's Ministry of Defence (MINDEF) volunteer, and numerous other executive committees under the National University Health System (NUHS) as well as Singapore's Ministry of Health (MOH). He has since passed some of these roles to others. However, he continues to contribute to the organisations as a member or an advisor.

On the education front, he is an inspirational teacher, leading and mentoring the next generation of cardiologists and has been recognised for his extensive teaching locally as well as overseas, evident through the numerous awards he has been accorded over the years. He is a regularly invited faculty at hundreds of international meetings and has delivered more than 600 international lectures in English and Mandarin. Aside from being the Professor of Medicine at the National University of Singapore (NUS) Yong Loo Lin School of Medicine, he is also a Visiting Professor to 11 university-affiliated hospitals in China as well as the University of Mandalay in Myanmar.

For his merit and service to Singapore's healthcare industry, Prof Tan had also been awarded the Distinguished Senior Clinical Award in 2017, the National Medical Excellence Award in 2010 by Singapore's Ministry of Health, and the National Day Award (Bronze Medal) in 2016 by Singapore's Prime Minister's Office.

In addition to his leadership responsibilities, he continues to be a passionate clinician, dedicated teacher, and active researcher, spearheading various research projects to further the practice of cardiovascular medicine and serves on the editorial boards of several medical journals, to this day.

Prof Tan Huay Cheem (right) receiving the Lifetime Achievement Award from SCS President Dr Lim Toon Wei

The HEART Truth
Mandarin Public Symposium

NUHCS held its Mandarin biannual public heart health talk in July 2022

In advocating for cardiovascular health, the National University Heart Centre, Singapore (NUHCS) has been active in public education and outreach activities.

NUHCS organises public symposiums (heart-health talks titled "The Heart Truth") annually, either in English or Mandarin, to increase awareness about cardiovascular health and share tips on preventing or managing heart conditions.

In 2022, the public symposium was conducted in Mandarin. Hosted by local radio personality Anna Lim on a Saturday afternoon on 2 Jul, it was attended by 200 participants in the auditorium at the National University Health System (NUHS) Tower Block.

Those unable to attend in person were still able to participate through a livestream on NUHCS's YouTube channel.

Addressing the issue of rising prevalence of heart failure in Singapore, Dr Lin Weiqin, Consultant, Department of Cardiology, NUHCS, took the audience through the treatment options and detailed how this chronic condition can be better managed. Though the risk of having a heart condition increases with age, having an active lifestyle can help to manage symptoms and reduce the progression of the disease for a better quality of life in one's golden years.

Delving deeper into clinical studies that NUHCS has been involved in, Prof Tan Huay Cheem, Senior Consultant, Department of Cardiology, NUHCS, shared insights on key research findings and addressed concerns about Covid-19's long-term outcomes on people's cardiovascular health.

With the advancements made in Minimally Invasive Cardiac Surgery (MICS), better results and outcomes can now be achieved. Dr Chang Guohao, Consultant, Department of Cardiac, Thoracic and Vascular Surgery (CTVS), NUHCS, shed light on how MICS technology is performed without opening the chest bone and thus causing less trauma to the body, allowing patients to recover faster.

Being able to grow old healthily with our family and loved ones is the most treasured thing in life.

- Dr Raymond Wong, Senior Consultant, Department of Cardiology, NUHCS

As the old adage goes, prevention is better than cure, Dr Raymond Wong, Senior Consultant, Department of Cardiology, NUHCS, summarised key lifestyle-related cardiovascular risk factors such as diabetes and hypertension, and laid out the active steps the audience can take to halt heart disease in its tracks.

Both live audiences and online viewers on YouTube were able to engage with our specialists during the Q&A session. Four lucky participants who attended the event in person also walked away with a lucky draw prize!

The next public symposium in 2023 will be conducted in English. Keen to be part of the audience? Follow NUHCS on our social pages for details which will be announced closer to date.

ARTICLE BY

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

A PIT STOP IS BETTER THAN A FULL STOP

SCREEN EARLY TO GO A LONG WAY WITH NUHCS WORLD HEART DAY 2022

ARTICLE BY
NUHCS Pulse Editorial

World Heart Day is celebrated every year on 29 September. Designated by the World Heart Federation, World Heart Day is the biggest platform for raising awareness on Cardiovascular Diseases (CVD).

The National University Heart Centre, Singapore (NUHCS) commemorated this day with an event filled with fun games and sure-win prizes just outside the NUHCS Heart Clinic.

Participants from as young as six years old joined in a cardiopulmonary resuscitation (CPR) relay where they test out their CPR techniques on mannequins continuously in a tag team, clocking a total of almost four hours!

Doctors from NUHCS took part in an "Ask the Experts" LIVE session on Facebook and Instagram, tackling online viewers' questions on heart health in real-time.

NUHCS's World Heart Day campaign runs through the month of September, with the objective of encouraging the public to go for early heart screening.

Reaching out to the public on social media, NUHCS shared the benefits of early heart screenings and bite-sized heart health tips, such as how to indulge in your favourite foods that can also be prepared in a healthier way.

To make it fun to share these healthy heart tips, NUHCS also created a free-to-use sticker pack for WhatsApp and Telegram, so anyone can send these virtual hugs and tips to their loved ones.

NUHCS also collaborated with Singapore Heart Foundation (SHF) for a booth set up at their heart-health carnival held at Our Tampines Hub from 17-18 Sep, dishing out heart-health tips through exciting games and prizes.

Do look out for more interactive games and activities when World Heart Day comes around again in 2023, and join in the fun!

Watch the re-run of our **Ask the Expert LIVE** session here!

About World Heart Day

World Heart Day informs people around the globe that Cardiovascular Diseases (CVD), including heart disease and stroke, are the world's leading causes of death claiming 18.6 million lives each year. It highlights actions that individuals can take to prevent and control CVD, and drives action to educate people that by controlling risk factors such as tobacco use, unhealthy diet, and physical inactivity, at least 80% of premature deaths from heart disease and stroke could be avoided.

BRAVING THROUGH HEART CHALLENGES

NUHCS Congenital Heart Surgery Parent Huddle

ARTICLE BY
NUHCS Pulse Editorial

On 25 Jun 2022, the National University Heart Centre, Singapore (NUHCS) hosted the Congenital Heart Surgery Parent Huddle, inviting parents of children with Congenital Heart Disease (CHD) to learn about the journey of paediatric heart surgery and meet other parents who face similar challenges and concerns.

CHD is the most common birth defect, affecting approximately one newborn in every 120 to 166 live births. About two-thirds of these patients need cardiac surgery in their lifetime and half of these surgeries are required within the first six months of birth.

A/Prof Laszlo Kiraly, Head of Congenital Heart Surgery, Department of Cardiac, Thoracic and Vascular Surgery (CTVS), NUHCS, delved deeper into the various types of CHD, explaining the complexities of such surgeries, and offered how parents can find the support they need through their child's treatment and recovery.

Congenital heart surgery is largely a reconstructive procedure where surgeons aim to restore the heart's normal function. However, about 30% of these patients have complex abnormalities in their anatomy that cannot be corrected in a single surgery. As such, these young patients often have to brave through a series of heart surgeries, making the journey an arduous one for them and their families.

Owing to advanced treatment possibilities, CHD survival to adulthood in developed countries has now reached 90-95%, with most patients going on to lead healthy, normal lives.

Another 15% of CHD patients will require subsequent surgeries in their adulthood, mainly to replace artificial body implants. Nonetheless, they can go about their lives and, in some cases, even participate in competitive sports.

During the parent huddle, A/Prof Theodoros Kofidis, Head and Senior Consultant, Department of CTVS, NUHCS, also shared more about the latest surgical and medical innovations that help surgical teams make more precise decisions and minimise trauma for patients.

I always think positive thoughts, even after all I got. If you stay positive and never give up, you can push through anything – be it exams, major surgery, or a job interview.

-Miguel Antonio S. Espiritu, 14, Young Heart Warrior

To all those who have struggled in life, just know that this pain is only temporary and there is more to life. So keep on going and never give up.

-Qistina Aisha, 12, Young Heart Warrior

Yet, the most heartwarming takeaway from the session was hearing from young Heart Warriors, who have braved through multiple surgeries, and shared their journeys in living with CHD.

Mr Miguel Antonio S. Espiritu, aged 14, was born with Transposition of the Great Arteries (TGA) – a rare condition where the arteries leaving the heart are the wrong way around. Despite his condition, he aspires to be many things including an architect, a doctor, and a musician. Attesting to his musical talents, he even showcased a live guitar performance after sharing his heartfelt journey with the audience.

Miss Qistina Aisha, aged 12, has Pulmonary Artery Atresia where the valve that controls the blood flow from the heart to the lungs was not formed at all. She shared a touching memory where her mother teared up whilst encouraging her to pull through her surgery. The love and support from her mother steeled her resolve to overcome her condition and pull through her recovery.

Bonds of friendship were forged as families exchanged tips and advice on coping with challenging times. The session also allowed parents to gain better understanding on their child's condition and the best way to support their child's journey to healthy, happy hearts.

An expectant mother whose unborn child was recently diagnosed with CHD through a prenatal screening shared that attending the event gave her hope and confidence. She said, "Listening to the first-hand experience from children and parents who have CHD made me realise that my child will have the opportunity to recover with surgery and grow up well."

CONGENITAL HEART DISEASE (CHD)

CHD is an abnormality of the structure of the heart that exists at birth. It occurs when the heart or major blood vessels fail to develop or mature normally during pregnancy. Here are the most common CHD conditions:

Blue Baby Syndrome

This condition happens when the baby takes on a bluish hue due to poorly oxygenated blood circulating in the baby. The primary cause of this syndrome is known as Tetralogy of Fallout (TOF) which is a combination of four heart defects – a displaced aorta, reduced outflow of blood from the heart to the lungs, a hole in the heart wall between the heart's ventricles and a reduced pumping efficiency of the heart due to abnormally thick walls in the heart.

TOF can be surgically corrected with a full repair procedure that involves closing up the congenital hole in the heart with a patch, and relieving the blockage pathway, to allow for adequate blood flow to the lungs.

Hole in the Heart

This condition describes a hole in the wall (septum) that separates the heart's chambers. If the hole is in the lower chambers, it is known as a Ventricular Septal Defect (VSD); if it is in the upper chambers, it is known as an Atrial Septal Defect (ASD). The hole causes oxygenated blood from the lungs to mix with deoxygenated blood returning to the heart, which results in a lower oxygen intake and consequential symptoms such as shortness of breath, or bluish discolouration of the lips and nails in a baby.

The hole can be closed with surgery by stitching the gap or patching it with surgical materials to prevent further complications.

TEAMWORK MAKES THE DREAM WORK

NUHCS CHARITY SURGICAL MISSION GIVES FIJIAN CHILDREN A NEW LEASE OF LIFE

Led by A/Prof Laszlo Kiraly, Head of Congenital Heart Surgery, Department of Cardiac, Thoracic and Vascular Surgery (CTVS), a multidisciplinary team of 16 paediatric cardiothoracic specialists including surgeons, anaesthetists, intensivists, cardiac specialist nurses and perfusionists from the National University Heart Centre, Singapore (NUHCS) travelled to Fiji for a paediatric cardiac surgery charity mission – the first since the suspension of travel during the Covid-19 pandemic.

Collaborating with a specialised children's heart hospital in Fiji, the mission had two goals – to provide paediatric cardiac intervention and to contribute to the development of the local paediatric cardiac surgery programme.

Specialist nurses from Malaysia and Australia, as well as a medical team from the Sai Sanjeevani Hospitals in India, were also present to support the mission.

The team completed 21 operations, including 15 open-heart surgeries between 17 Sep and 3 Oct, though preparation for this mission began five months before the team left Singapore.

The self-funded mission trip required healthcare professionals with different expertise to converge and make detailed plans. As the new hospital was still being built, some instruments had to be brought from Singapore. Collectively, the team gathered about S$30,000 worth of medical supplies, instruments, and consummables.

To maximise their time in Fiji, NUHCS worked closely with the local medical team to identify high-priority cases

CONGENITAL HEART DISEASE (CHD) IN FIJI Approximately 2,500 children in the Pacific and 200 children in Fiji are born each year with CHD. The lack of paediatric cardiovascular diagnostic tools, screening systems, local expertise, and medications for treatment meant that Fijian children had to travel overseas for treatment which was unaffordable for most families. With the lack of specialist care, CHD became one of the leading causes of childhood mortality and morbidity in the middle-income country.

SRI SATHYA SAI SANJEEVANI CHILDREN'S HEART HOSPITAL Established and funded by the Sai Prema Foundation and the United Nations Development Programme in Fiji, this charity hospital opened in April 2022 with a mission to serve the underprivileged and the needy in the region by offering treatment and surgery completely free-of-charge.

Despite being a charity project, the hospital will be equipped with modern facilities including a dedicated catheterisation lab, operating theatres, separate care units, operation wards, and a training centre capable of international video conferencing. Paediatric cardiac specialists around the world have travelled to donate their expertise and time to save the lives of children. The NUHCS mission was the third such mission to offer its services at the hospital.

"This experience has allowed our team to collaborate more effectively and coherently. There were also learnings that we took away, such as streamlining processes and maximising limited resources, all of which we will translate back at NUHCS to achieve better outcomes for our patients.

A/Prof Laszlo Kiraly, Head of Congenital Heart Surgery, Department of CTVS, NUHCS

and developed detailed preoperative briefs, including possible deviations and complications for each patient, as well as how each patient's health would be sustainably monitored post-operation.

The oldest patient the team operated on was aged 23 suffering from supravalvular aortic stenosis – a heart defect where abnormal tissue growth hinders the normal function of the aortic valve.

Another patient aged 5 had severe coarctation of the aorta - a birth defect where a part of the aorta is narrowed, forcing the heart to pump harder and restricting blood flow to the rest of the body. As a result of his condition, the boy experienced cramping in his legs, frequently having to stop to rest when walking.

If not treated early, such heart defects progress with further complications, making surgery complex and risky. Though operative results can be unclear, yet the lack of treatment can cause serious conditions such as hypertension and heart failure to develop, eventually leading to death.

Patient profiles in Fiji were very different compared to those in Singapore, which made the work challenging. Patients with similar birth defects born in Singapore would typically be diagnosed soon after birth through neonatal screening and received surgery or treatment to prevent serious complications.

Working in unison with the local medical team, surgical procedures were lined up back-to-back with everyone on the team chipping in wherever they could, making the most out of the limited resources and challenging circumstances on the island.

Involving the local medical team from the beginning meant that there was an effective knowledge transfer and reciprocal learning between the teams, which helped the Fiji team develop a high-quality and sustainable model to meet the cardiac care needs of the local population.

Two weeks after returning to Singapore, the NUHCS team continued to support the local medical team with remote patient follow-up consultations to ensure that the patients recovered well and could resume normal lifestyle activities soon after their rehabilitation.

"Treating as many patients as possible in the short amount of time we had made the experience very intense and a great learning experience for us. Needless to say, it was also very fulfilling to be involved in such a meaningful project," reflected Dr Senthil Kumar Subbian, Consultant, Congenital Heart Surgery, Department of CTVS, NUHCS.

ARTICLE BY

A/Prof Laszlo Kiraly
Head of Congenital Heart Surgery, Department of CTVS, NUHCS

A/Prof Kiraly joined NUHCS in 2021 after spending 14 years in Abu Dhabi, and 7 years in Hungary, establishing and leading internationally recognised paediatric cardiac services. He has won many awards and was honoured with the Zayed Award in 2018 which recognised 100 eminent personalities for their service to the United Arab Emirates. He is a keen adopter of innovative technology and modalities including the use of 3D printing, augmented reality, and artificial intelligence, to revolutionise congenital heart surgery and address complex heart problems. He is passionate about training and teamwork collaboration to advance the quality of care for his young patients.

THE INTRIGUE OF CARDIOLOGY

NUHCS DELEGATES AT THE EUROPEAN SOCIETY OF CARDIOLOGY (ESC) CONGRESS 2022

For cardiologists, the ESC Congress 2022 is the first in-person international cardiology conference since the start of pandemic. It took place in Barcelona, Spain, where its vibrant culture and exuberant hospitality charmed intrepid cardiologists worldwide. The vivid architecture mesmerised and the paella tantalized, but the distinct summer heat took the cake.

More than 30,271 clinicians, scientists, and allied health professionals across 174 countries attended the conference. Across the four fully-packed days from 26 to 29 Aug 2022, there was a total of 820 sessions, 3,846 faculty and participants, and dozens more exhibitions.

Highly-anticipated clinical trial outcomes were showcased in daily "Hot Line" sessions. Simultaneously, satellite sessions about the latest scientific discoveries, interactive tutorial sessions, and special lectures given by award-winning researchers and doctors, as well as controversial debates on challenging issues occurred throughout the venue.

The National University Heart Centre, Singapore (NUHCS) sent a delegation of nine cardiologists to the highly anticipated event where three were invited to moderate scientific sessions at the congress – Adj Prof Poh Kian Keong, Director of Research and Senior Consultant, Department of Cardiology, Adj A/Prof William Kong Kok Fai, Clinical Director of Echocardiography and Non-invasive Diagnostic Cardiology and Senior Consultant, Department of Cardiology, and Asst Prof Lim Toon Wei, Head of Community Cardiology and Senior Consultant, Department of Cardiology.

Representatives from the Singapore Cardiac Society as well as the National Heart Centre Singapore were interviewed on ESC TV's Daily Highlight Sessions (a video broadcast service by ESC) where they shared their insights into the applicability of landmark trials in the local Singaporean population.

The congress kick-started with an overview of the latest 2022 ESC Guidelines on "Pulmonary Hypertension", "Ventricular Arrhythmias[1] and Sudden Cardiac Death", and "Cardiovascular Assessment in Patients Undergoing Non-Cardiac Surgery".

Meet-the-trialists forums ensured that in-person and remote audiences could interact and engage meaningfully in these spotlight sessions. The first ESC guideline on cardio-oncology was also revealed on the first day of the congress which outlines definitions for cancer therapeutics-related cardiotoxicity, baseline assessment, surveillance and post-treatment monitoring recommended.

Keynote subjects ranged from digital health to the history of Percutaneous Coronary Intervention (PCI)[2] and Transcatheter Aortic Valve Implantation (TAVI)[3] over the past 20 years. The wide spectrum of cardiovascular medicine and health was covered thoroughly in the sessions ranging in topics from preventative cardiology to advanced imaging and digital health.

Groundbreaking trials were introduced. For instance, the REVIVED-BCIS2 trial showed that PCI does not reduce

ABOUT ESC CONGRESS 2022

It is the world's largest gathering of cardiovascular professionals, disseminating ground-breaking science both onsite in Barcelona and online – from 26 to 29 Aug 2022.

ABOUT THE EUROPEAN SOCIETY OF CARDIOLOGY (ESC)

ESC brings together healthcare professionals from more than 150 countries, working to advance cardiovascular medicine and help people to live longer healthier lives.

all-cause mortality or heart failure hospitalisation in patients with severe left ventricular dysfunction and extensive coronary artery disease.

The SECURE trial shifted polypills back into frame by showing that a pill, containing a combination of aspirin and medications, lowers lipids and blood pressure more effectively, thus preventing worse outcomes after a heart attack compared with taking the drugs separately.

Through the ESC Gold Medal, ESC honours a few individuals in recognition of their outstanding achievements each year. Dr Marie-Claude Morice from Paris was amongst the few conferred the ESC Gold Medal in 2022, for her extensive clinical and research work in PCI. As a female interventional cardiologist, she is not only a role model for women, but an inspiration for future generations as well.

"The ESC Congress was an enriching experience and a must for any professional interested in cardiovascular medicine or treatment. From Tapas to Tulips – ESC Congress will return to the Netherlands again after 10 years – and I cannot wait to continue learning the magic of cardiology.

Dr Joy Ong Yi Shan, Senior Resident, Department of Cardiology, NUHCS

[1]Ventricular Arrhythmias – Abnormal heartbeats that originate in the lower heart chambers called ventricles.

[2]PCI – A non-surgical procedure to treat the narrowing of the coronary arteries, often done through balloon angioplasty.

[3]TAVI – A minimally invasive procedure where a new valve is inserted inside the old damaged valve, without removing it.

ARTICLE BY

Dr Joy Ong Yi Shan
Senior Resident, Department of Cardiology, NUHCS

Dr Joy is a first-year Cardiology Senior Resident at NUHCS. She hopes to contribute in areas of research, education and innovation in Cardiology.

AICT-ASIAPCR 2022

ASIA PACIFIC'S LARGEST MEDICAL CONFERENCE FOR INTERVENTIONAL CARD

The official four-day course of Asian Pacific Society of Interventional Cardiology (APSIC), AICT-AsiaPCR 2022, returned to Suntec Singapore from 5 to 8 Oct 2022. The event was attended by more than 930 attendees across Asia Pacific and beyond. Some who were not able to travel to Singapore joined the educational meeting online.

There was a certain palpable buzz as the enthusiastic attendees moved from session to session in deep engagement with faculty across various workshops, case-based discussions, clinical cases submissions, and LIVE demonstrations.

The National University Heart Centre, Singapore (NUHCS) hosted two LIVE demonstrations which were broadcast directly from NUHCS's Catheterisation Laboratory.

The first LIVE demonstration was of Left Main - Double Kissing (DK) Crush Stenting. The left main is the largest bifurcation[1] of the coronary artery[2] which is commonly found narrowed in 80% of coronary artery disease patients. Although DK crush is the most studied two-stent coronary bifurcation stenting strategy with published data supporting its use, DK crush can be challenging to perform.

A/Prof Adrian Low, Clinical Director of Angiography Centre and Senior Consultant, Department of Cardiology, NUHCS, discussed the use of imaging techniques in guiding complex Percutaneous Coronary Intervention (PCI)[3], and demonstrated the approach of DK crush stenting.

Selected content and replays from AICT-AsiaPCR 2022 are now available on demand. Scan the QR code here or visit PCR Online at **https://www.pcronline.com/Courses/AICT-AsiaPCR.**

The second LIVE demonstration was showcased by founding Course Director, Prof Tan Huay Cheem, Senior Consultant, Department of Cardiology, NUHCS, on rotational atherectomy for the treatment of calcified coronary lesion[4]. Rotational atherectomy involves the use of a revolving device to break up calcified plaque that is clogging a coronary artery.

During this session, interventional cardiologists discussed the approach of managing calcified stenosis – one of the more prevalent heart valve disorders in developed countries – and demonstrated the rotational atherectomy procedure. The team further deliberated on the indications and limitations of the procedure as well as the advantages of using this new device.

LIVE demonstrations from other cardiac centres contributing to this educational meeting include Humanitas Research Hospital in Milan, Italy, and Queen Elizabeth Hospital in Hong Kong.

This year, there was an overhaul of the entire format of the meeting, such that various educational tools and technologies were employed for the very first time to facilitate systematic discussion of subject topics.

'Smart screen' technology was introduced to illustrate pointers during the sessions which eased the discussion flow from online to offline, facilitating participation for faculty who could not make it in person.

Feedback received from the audience was uniformly positive with many describing the meeting as 'refreshing', 'creative', 'innovative', and 'useful for their daily practice'.

NUHCS is proud to have supported this event in collaboration with other institutions around the world, to share the latest innovations in interventional cardiology that further improves patient care.

> ***The sense of camaraderie and physical interaction among the fraternity was most heart-warming. I'm certainly glad to see this turnout; perhaps telling of how much everyone had anticipated this meeting.***
>
> *Prof Tan Huay Cheem, Senior Consultant, Department of Cardiology, NUHCS*

[1]**bifurcation** – The division of something into two parts.

[2]**coronary artery** – Arteries that supply blood to the heart muscle for it to function.

[3]**PCI** – A family of minimally invasive procedures used to open clogged coronary arteries.

[4]**calcified coronary lesion** – Refers to the build-up of plaque and calcium causing damage to the heart's arteries.

AICT-AsiaPCR

Formed in 2019, AICT-AsiaPCR is an educational platform built by local practitioners, with the support of centres of excellence in the Asia Pacific and Europe, to focus on the diverse needs of patients in the interventional cardiology landscape. The platform allows for the knowledge exchange between peers and the opportunity for healthcare professionals to showcase their research and innovation, aimed at contributing to the development of treatment and care possibilities to better serve the region's patients.

Key Figures for AICT-AsiaPCR 2022:

- 4 session rooms covering all the hot topics
- 50% of session time dedicated to live interaction
- 300+ faculty and presenters
- 6 LIVE case sessions
- 100 accepted submissions & 2 Interventional Clinical Cases

ARTICLE BY

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

Prof Tan is a Professor of Medicine at the 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 an invited speaker at many international cardiology meetings.

KEEPING TABS ON THE HEART

NUHCS Aortic Masterclass for healthcare professionals

On 22 Oct 2022, the National University Heart Centre, Singapore (NUHCS) held its Masterclass: Aortic Stenosis (AS) for healthcare professionals to share new insights on the treatment and diagnosis of AS, for the betterment of patient care.

AS is one of the most common and severe valve disease problems which happens when the aortic valve opening is narrowed, restricting blood flow from the left ventricle to the aorta. In most patients, this condition is usually caused by a build-up of calcium or scarring damages in the aortic valve.

The prevalence of AS in Singapore increases from 3% in adults older than 75 years to about 8% in those above 85 years. Unfortunately, a high proportion of patients with severe symptomatic AS do not do well with many dying after about 14 months.

Partly due to a rising incidence of Cardiovascular Diseases (CVDs), including AS, many improvements in diagnostic and surgical techniques have since resulted in advances in the treatment of AS over the last decade.

In this Masterclass, doctors from NUHCS discussed new perspectives on the recent advances made in diagnosing AS, highlighted the challenges faced in conventional diagnosis and latest research findings on the topic.

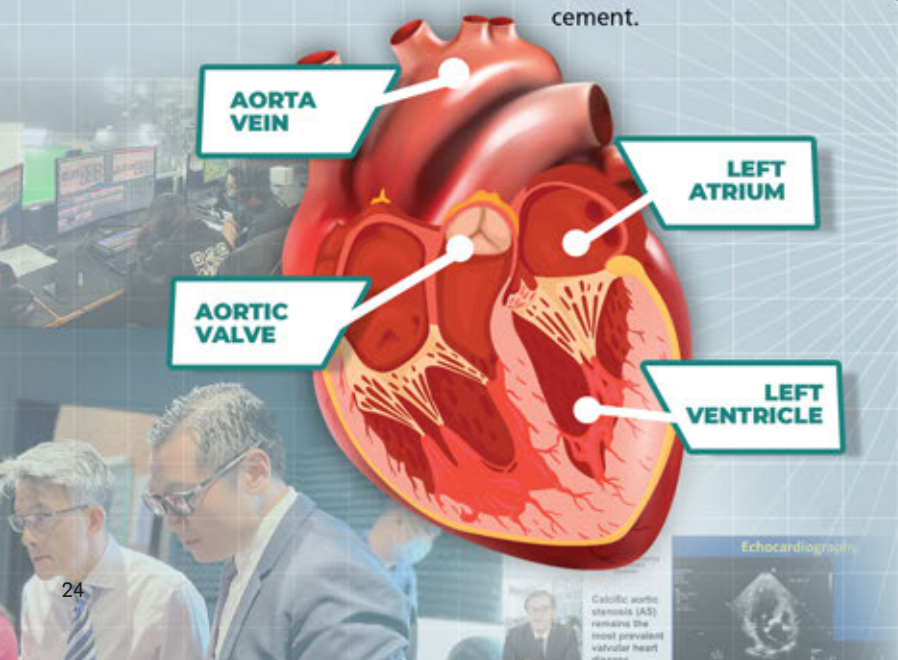
Doctors also elaborated on the newest treatment options, including percutaneous[1] solutions and minimally invasive surgical treatment methods.

The subset of Low-Flow, Low-Gradient (LFLG) and paradoxical LFLG diagnosis was also covered in the talk, along with ways to manage and overcome the condition. The difficulty of diagnosing this condition is being able to differentiate a true-severe from a pseudo-severe stenosis, which determines the treatment strategy and the need for an aortic valve replacement.

Designed for the medical community, all medical professionals including nurses, medical technologists and medical students are welcome to attend the next NUHCS Masterclass series to stay up to date on the latest in cardiovascular health.

[1]percutaneous – Made or done through the skin.

> *"In just under four hours, this Masterclass provides healthcare professionals with practical and relevant quick bites for their clinical practice.*
>
> *Dr Ivandito Kuntjoro, Director of Structural Heart Disease and Consultant, Department of Cardiology, NUHCS*



ARTICLE BY

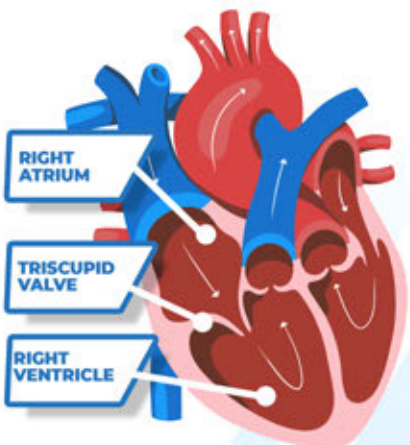
Dr Ivandito Kuntjoro
Director of Structural Heart Disease and Consultant, Department of Cardiology, NUHCS

Dr Kuntjoro specialises in complex valvular heart disease, congenital heart conditions, and pulmonary hypertension. He has co-authored many research papers 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. Before joining NUHCS in 2012, he worked for eight years as an internal medicine attending physician in different hospitals in the United States of America (USA).

THE FORGOTTEN HEART VALVE

NOVEL SOLUTIONS TO TREAT LEAKY TRICUSPID VALVE

> *"As compared to more mature aortic and mitral valve disease intervention, it is about time we have percutaneous[2] solutions to treat the 'no more forgotten' tricuspid valve.*
>
> *Dr Ivandito Kuntjoro, Director of Structural Heart Disease and Consultant, Department of Cardiology, NUHCS*



On 2 Sep 2022, the National University Heart Centre, Singapore (NUHCS) performed its first Transcatheter[1] Edge-to-Edge Repair (TEER) for the tricuspid valve, one of the heart's four major valves.

TEER is a minimally invasive procedure that treats 'leakage' (also known as regurgitation) of the tricuspid valve without requiring open-heart surgery.

The procedure is performed by placing the clips on the tricuspid valve to reduce the severity of regurgitation. The clips are delivered through a small incision on the right groin to access the femoral vein. By using the guidance from advanced live 3D imaging, the clip of roughly 2cm in open-position length was placed precisely on the desired part of the leaky valve, and the procedure is performed on the beating heart. After the procedure is completed, patients can return to their regular daily activities within a week or two.

One of the most common valvular abnormalities, Tricuspid Regurgitation (TR) occurs when the tricuspid valve does not close properly, resulting in the back flow of blood from the lower right chamber (ventricle) to the upper right chamber (atrium) of the heart. The pressure in the heart then increases as there is a substantial strain from the back flow of blood, which can cause leg swelling, shortness of breath, excessive fatigue, and eventually lead to heart failure.

TR is commonly diagnosed in older people and especially in patients more than 75 years of age. With our aging population and increased complexity of cardiac conditions, there will be a growing need for less invasive valvular heart disease treatment like TEER.

Before the introduction of this percutaneous treatment for severe TR, elderly patients who are considered high-risk for surgery had very limited treatment options without significant improvement of their medical symptoms.

However, novel Transcatheter Tricuspid Valve Interventions (TTVIs) such as tricuspid valve replacement and leaflet coaptation repair have shown to have safer and better long-term results compared to only treating with medications.

Further, newly published research data debunked traditional thinking that patients with pacemakers may not be eligible for or respond to tricuspid TEER therapy. Even patients with pacemakers will now have access to less invasive percutaneous treatment for severe TR.

What was once a "forgotten" valve with limited treatment options is now receiving exciting updates for percutaneous valve intervention -- providing a less invasive treatment option and a faster recovery process for patients.

[1]transcatheter – Done through a small, flexible, hollow tube (catheter).

[2]percutaneous – Made or done through the skin.

ARTICLE BY

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 many research papers 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. Before joining NUHCS in 2012, he worked for eight years as an internal medicine attending physician in different hospitals in the United States of America (USA).

EVOLUTION OF HEART FAILURE MANAGEMENT

The making of a holistic Heart Failure & Cardiomyopathy Programme

WHAT IS HEART FAILURE (HF)?

HF is a condition characterised by shortness of breath, effort intolerance, and fluid retention, secondary to dysfunction of the heart muscles. This dysfunction can be a result of poor contraction strength of the heart muscles, or failure of adequate muscle relaxation.

Coupled with frequent hospitalisations and longer average hospital stays compared to patients suffering from diabetes or hypertension, people with HF report a poor quality of life with a huge physical and psychological stress. Symptoms can be severe such that it affects everyday tasks, including showering or crossing an overhead bridge.

The treatment for HF is often complex and can last over extended periods of time. How patients cope with HF is highly dependent on the time they receive their diagnosis and treatment, as well as their body's receptivity to key medication adjustments. This calls for holistic, personalised care with close monitoring and reviewing of the patient's ongoing condition and medications.

HEART FAILURE AT NUHCS

Aligned with international practice guidelines and recommendations, the National University Heart Centre, Singapore (NUHCS) takes a multidisciplinary approach towards the management of HF and cardiomyopathy[1], providing end-to-end care for patients. In addition to their treatment, patients receive a holistic and personalised care approach with advice and guidance on lifestyle changes, medication use, health monitoring as well as appropriate physical activities at every stage of HF – from "high risk of developing HF" to "advanced HF".

This requires a team of healthcare professionals with different expertise. Our team comprises of dieticians, pharmacists, physiotherapists, HF specialist nurses amongst others, working together to map out an integrated care plan to achieve a seamless experience for the patient.

Today, the HF and Cardiomyopathy[1] Programme at the NUHCS boasts of 10 specialised cardiologists working with a team of 15 allied health[2] professionals to provide specialised heart failure and cardiomyopathy care for patients.

**A study in the United Kingdom (UK) showed that deferring heart failure treatment for one year carries far greater risk than the level at which most doctors seek written consent, and 18,000 times more risk than the level at which patient information leaflets begin to mention death.*

"The NUHCS HF and Cardiomyopathy Programme has achieved many milestones in the past two decades. Riding on the work and foresight of our pioneering members, we hope to continue our journey towards being a world-class academic HF and Cardiomyopathy unit.

Asst Prof Lin Weiqin,
Clinical Director, HF and Cardiomyopathy Programme, NUHCS

2001

The birth of HF Programme in National University Hospital (NUH):
- Dr Chai Ping appointed as the first Programme Director

2007

HF Device Clinic established as part of the programme:
- Led by Dr Seow Swee Chong

Cardiac Implantable Electronic Device (CIED) therapy became part of mainstream HF care.

2011

With the opening of NUHCS as a National Centre:
- HF Programme became one of the six core programmes
- Dr Raymond Wong stepped up as the next Programme Director

Treatment services expanded to include acute HF / intensive care, HF inpatient consults and management of cardiomyopathies.

New treatment procedures were introduced, such as endomyocardial biopsy[3] and ultrafiltration[4].

2015

- First durable left ventricular assist device (LVAD) implanted – A battery-operated mechanical pump surgically implanted to help end-stage HF patients pump blood to the rest of the body. Modern devices allow patients to return home after surgery and resume normal activities with some lifestyle adjustments.

- Advance Care Planning incorporated – The process where a patient's future medical care plans are discussed with their family members, surrogate decision-makers, and healthcare providers. This allows patients to decide on their preferred treatment at the end of life while their condition is still stable.

2020

- Multidisciplinary cardiogenic shock team formed, utilizing the latest mechanical circulatory support devices for our critically ill patients.

2021

Launch of Advanced HF Fellowship Programme to train doctors from other countries in the aspect of HF management.

MEET THE HF TEAM

[1]**Cardiomyopathy** – Disease of heart muscles.

[2]**allied health** – The broad group of healthcare professionals providing a wide range of health services outside of medicine and nursing. These include professions such as clinical psychologists, dietitians, occupational therapists, radiographers, and others.

[3]**endomyocardial biopsy** – A biopsy of the heart where a small sample of the inner layer of your heart (endocardium and myocardium) is retrieved for analysis in the laboratory.

[4]**ultrafiltration** – A procedure where blood with excess fluid is extracted and passed through a filter and returned to the body after excess salt and water are removed. This procedure helps to treat fluid overload in HF patients.

ARTICLE BY

Asst Prof Lin Weiqin
Clinical Director, HF and Cardiomyopathy Programme, NUHCS

Asst Prof Lin is trained in the management of acute HF with temporary mechanical circulatory support, as well as caring for advanced HF patients with implanted durable LVADs or heart transplantation. Aside from HF, his other subspecialty interests include cardiomyopathies and echocardiography.

Right There When You Need It

Bringing NUHCS closer to the community

"We have been transforming the patient care model, slowly evolving to a stage where patients receive most of their non-critical care in a setting close to their homes, making it convenient for them and, only having to go to a major hospital or specialist centre when complex procedures are required," shared Dr Lim Toon Wei, Senior Consultant, Department of Cardiology, National University Heart Centre, Singapore (NUHCS), who is also the newly appointed Head of Community Cardiology.

An instance of a newly implemented patient care model is in the management of Atrial Fibrillation (AF) – a critical condition as it is highly associated with an elevated risk of heart failure and stroke, often resulting in death.

Even when other cardiovascular conditions are absent, AF patients may suffer from neuropsychiatric complications[1] such as dementia, cognitive decline and depression. As a chronic condition, AF warrants lifelong treatment with a crucial need for effective patient education and to ensure adherence to the prescribed treatment that effectively prevents the likelihood of a stroke.

Modelling recommendations published by the European Society of Cardiology for chronic AF patients, NUHCS collaborated with Bukit Batok Polyclinic to establish a Nurse-led Integrated Chronic care E-enhanced Atrial Fibrillation (NICE-AF) clinic in the community, located closer to the neighbourhood.

The intention was to provide specialised care for AF patients with low to moderate risks in the community care setting. This prevents overcrowding of patients in the hospitals whilst allowing more personalised care and patient-provider rapport through an Advanced Practice Nurse (APN) that has undergone training by a cardiologist with the expertise to manage AF.

Further, having the NICE-AF clinic integrated within a polyclinic (which delivers primary healthcare services) allows patients to have their chronic conditions reviewed alongside AF, making it an added convenience for them and hence reducing multiple clinic visits.

This makes it seamless for AF patients to manage their condition since many often suffer from common chronic conditions such as diabetes, high blood pressure, and high cholesterol as well.

Such a patient-centric integrated care model amalgamates crucial elements of patient care, engages patients in treatment plans and lifestyle modification, and encourages interdisciplinary collaboration.

MEET THE MAN BEHIND THIS INITIATIVE

Dr Lim Toon Wei,
Head of Community Cardiology and Senior Consultant, Department of Cardiology, NUHCS

What are the key goals you hope to achieve as the Head of Community Cardiology?

I hope that we can enhance the care for cardiac patients in the community by providing more support to the primary care doctors, such as general practitioners (GPs) and polyclinic doctors, so that they can manage more complex, non-urgent cases.

I am also enthusiastic about creating a more cohesive care model to improve communications between primary care doctors and specialists such that patients' care are better co-ordinated by their healthcare team across the different doctors. This way, we can avoid redundancy in medical resources and unnecessary repeated procedures such as duplicated blood testing at different clinics. These changes will add up and translate to a more pleasant experience for patients.

Could you share how community care can help patients manage their health?

Health coaching is a new initiative that we're trying. Health coaches help patients improve their own health by educating, empowering and encouraging patients to take control of their own health conditions. More importantly, they do something that doctors and nurses can't do – they act as a bridge between the medical team and the patient, assist patients in making lifestyle changes to improve their wellbeing, and become an extender of our entire health service.

What is NUHCS's role in community care?

Although we've only started with AF, we hope to broaden the clinic's support to all cardiovascular services by bringing specialist care into the community. With the increasing prevalence of complex conditions, we want to shorten the access to cardiovascular specialists, either directly where patients can consult a specialist near them or indirectly where consults could take place virtually.

Patients attending the NICE-AF clinic received regular patient education from the APN, aided by a webpage on AF which covered topics on AF management, anticoagulation, lifestyle activities, and diet modification. Patients were also supported with teleconsultations with a hospital-based cardiologist when required.

A six-month preliminary evaluation of having such as clinic serving as a one-stop facility for patients to receive care for AF and common chronic conditions demonstrated that this new model of integrated care is safe and effective.

The presence of an APN with her advanced clinical knowledge provided high-quality patient education and counselling assures AF patients about their condition, resulting in higher patient satisfaction and lower depression scores according to the preliminary evaluation.

NUHCS has since broadened the scope of the clinic to include the management of chronic ischaemic heart disease and intends to increase the capacity of the NICE-AF clinic to better serve and cater to patients residing in the western region of Singapore.

[1]neuropsychiatric complications – Diseases of the mind and nervous system.

"With better co-operation amongst doctors, patient care will become more streamlined and efficient, making it a sustainable model to care for an ageing population where we expect an increasing trend in cardiovascular diseases.

Dr Lim Toon Wei,
Head of Community Cardiology and Senior Consultant,
Department of Cardiology, NUHCS

ARTICLE BY

Dr Lim Toon Wei
Head of Community Cardiology and Senior Consultant, Department of Cardiology, NUHCS

Dr Lim has a special interest in cardiac arrhythmias and cardiac implantable devices. He is also the Clinical Lead, Telehealth and Community Cardiology at NUHCS. Active in medical education, he is a core faculty member of the Cardiology Senior Residency Programme as well as an assistant professor at the Department of Medicine, Yong Loo Lin School of Medicine, National University of Singapore. He has served as a council member of the Singapore Cardiac Society since 2015 and was recently appointed as its president in 2022. He also holds a doctoral degree from the University of Sydney for his research work on atrial fibrillation ablation techniques.

SPECIALISED CLINICAL TRAINING AT NUHCS

ARTICLE BY
NUHCS Pulse Editorial

NUHCS medical Fellowship Programme trains international doctors in sub-specialties

Committed to nurturing the next generation of healthcare professionals and in pursuit of knowledge sharing, the National University Heart Centre, Singapore (NUHCS) offers a challenging and robust fellowship programme to medical professionals around the world, also known as fellows, which further develops their potential in the clinical, educational, and research aspects of the profession.

Through a structured programme designed around the fellow's professional development goals, international doctors accepted into the Fellowship Programme have the opportunity to learn about Singapore's healthcare system and benefit from mentors across various sub-specialties. They also gain exposure to every stage of cardiovascular disease through clinical work, collaborate across disciplines through clinical research, as well as have the opportunity to network and present their work at the numerous national and global scientific meetings NUHCS participates in.

Three international doctors who recently completed their fellowship with NUHCS recount their experiences here.

HEART FAILURE PROGRAMME, DEPARTMENT OF CARDIOLOGY

Dr Lauren Kay M. Evangelista
The Philippines

My one-year fellowship in the heart failure programme was a great balance across all aspects of the job required for a competent heart failure specialist. I worked closely with physicians as well as allied health professionals and saw cases of adult heart failure and cardiomyopathy[1] care in the inpatient and outpatient settings.

I witnessed the entire spectrum of heart failure from de novo heart failure to palliative care, developed my skills in procedures such as endomyocardial biopsy[2] and right heart catheterisations[3], as well as managed patients on mechanical circulatory support.

Outside of clinical work, I delved into research and had the opportunity to present my work at the American College of Cardiology Conference and the Singapore Cardiac Society's Annual Meeting.

The experience, knowledge, camaraderie, and connections I gained from this fellowship have been immeasurable. I am looking forward to apply what I have learnt to further develop the heart failure programme back home in the Philippines in our continuous battle against failing hearts.

"It has been an honor and privilege to be trained under the renowned cardiologists of NUHCS who made me feel right at home when I first joined the team. The professional and personal lessons are forever imprinted in my heart.

[1]cardiomyopathy – Disease of the heart muscle which makes it harder for the heart to pump blood to the rest of the body.

[2]endomyocardial biopsy – Procedure done to evaluate cardiac diseases when non-invasive testing methods are not sufficient to formulate a clinical diagnosis.

[3]catheterisations – Procedure where a thin flexible tube is guided through a blood vessel to the heart to diagnose or treat certain heart conditions.

HEART RHYTHM PROGRAMME, DEPARTMENT OF CARDIOLOGY

Dr Ho Kian Hui
Malaysia

I first met NUHCS's EP team at a conference in Bangkok. Their extended hand of friendship at our first meeting made me feel very welcomed and got me eagerly anticipating the start of my fellowship.

The programme allowed me to work with EP specialists from different backgrounds, exposing me to several techniques when approaching patient cases. Further, there were case discussion sessions where other specialists weighed in and offered their perspectives, giving me a holistic view of the patient's care pathway.

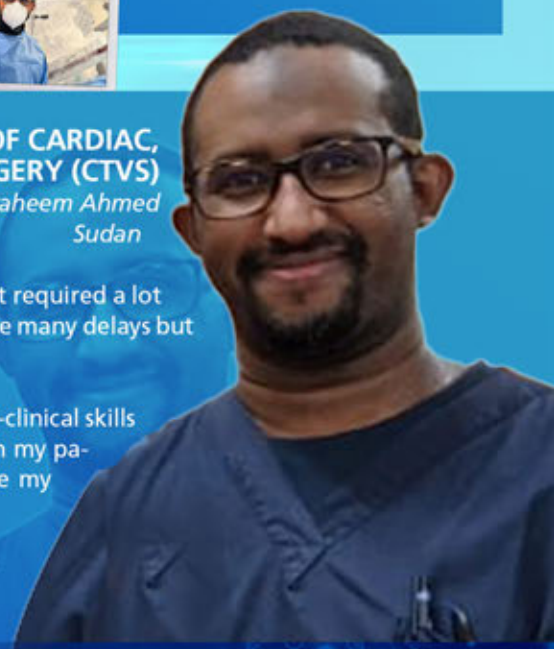
What struck me the most was the unequivocal passion for providing excellent patient care in all the professionals I met. My seniors were all equally willing to share their knowledge and always ready to answer my queries as well as freely offering tips for acquiring various skills.

"Working alongside a dedicated and passionate team has been very inspiring for me. I felt honoured to be the first Sarawakian fellow and look forward to recommending this programme to others back home.

NUHCS's programme was definitely challenging but at the same time, it was an enriching learning experience. The greatest benefit from the programme is perhaps the friendships forged and good memories gained - something which I will bring back with me and onwards in my future.

VASCULAR TRAINING FELLOWSHIP PROGRAMME, DEPARTMENT OF CARDIAC, THORACIC & VASCULAR SURGERY (CTVS)

Dr Mohamed Abdulmonem Ibraheem Ahmed
Sudan



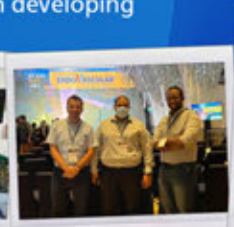
For a father of two, like me, the decision to go to Singapore was a big decision that required a lot of planning, preparations, and sacrifice, especially during the pandemic. There were many delays but I eventually started my fellowship in October 2020.

Coming from Sudan, there were not only clinical skills I had to pick up but also non-clinical skills such as learning the many facets of Singapore's culture to better understand both my patients and colleagues. Lucky for me, I made many friends – NUHCS soon became my home, and CTVS, my family.

The programme included active participation in journal clubs, morbidity and mortality meetings, scientific meetings and conferences, as well as hands-on training in the vascular laboratory. Working closely with both my seniors and juniors inevitably strengthened our bond as a team, forming friendships that will last.

My two years have been very fulfilling – I acquired the skills and expertise to specialise in Vascular and Endovascular Surgery. Leaving NUHCS, I shall translate my learning into saving people's lives back in Sudan. Amongst many others, I am especially grateful for my mentor, Dr Dharmaraj Rajesh Babu, who who has helped me and guided me in developing my skills to where I am today.

"I was not expecting to be a fellow in a heart centre with an excellent reputation. Thankfully, dreams do come true.



The Heart School

Nurturing the next generation of doctors at NUHCS

An academic medical centre under Singapore's National University Health System (NUHS), the National University Heart Centre, Singapore (NUHCS) not only provides affordable specialist care for patients, but is involved in the training of future healthcare professionals, undertakes translational bench-to-bedside research to improve care, and is also developing the latest medical innovations to solve medical problems. Physicians, nurses, researchers and teachers are all working in unison with the ultimate goal of improving the health of the community.

At NUHCS, clinicians and scientists work hand-in-glove to spearhead major advances in patient care as well as achieve research breakthroughs in heart diseases, cancer and more. Research findings are then translated to new treatments benefitting patients.

With an emphasis on nurturing world-class healthcare leaders of the future, NUHCS is committed to develop an exceptional cardiovascular medical training not only for undergraduates and postgraduates, but for fellows and specialists in Singapore and in the region as well.

During the COVID-19 pandemic when in-person trainings were cancelled to minimise person-to-person contact, clinical teaching programmes were revamped to ensure learning and training continued without compromise.

This meant the creation of multimedia content such as videos, case studies, online discussions, articles, self-test quizzes, and more, as students move to the metaverse to pursue their education. Many educators from NUHCS contributed their knowledge and expertise to develop this rich educational resource, dedicating time and effort away from their clinical and research duties to play a part in shaping the future of the tomorrow's doctors.

> ***Medical education is so much more than providing students with a job – it is about teaching the future of medicine to ensure that the health of our community and population is well looked after for years to come.***
>
> *Asst Prof Low Ting Ting,*
> *Senior Consultant and Director of Women's Heart Health Programme,*
> *Department of Cardiology, NUHCS*

Medical education goes beyond plain theoretical lectures. Doctors need to cope with medical conditions and effectively carry out medical procedures to succeed. Medical students, residents and fellows have commended on their mentors' passion to share best practices and efforts to build a collegial community where active learning and participation is encouraged to help the every learner realise their full potential.

Today, the fellowship and residency programmes at NUHCS have become highly sought after in the region, with NUHCS credited for creating an environment which supports an active exchange of information, knowledge and skills which also translates to a continuous learning culture where every professional strives to achieve the best outcome for patients.

As a testament to this conducive learning space, educators at NUHCS have received various awards in recognition for their teaching and mentorship each year. These awards also serve as an indication to the importance of education and teaching in NUHCS.

NUHS Eminent Teacher Award 2022

Dr Raj Menon
Dr Christopher Koo

Singapore Medical Association Charity Fund Outstanding Mentor Award 2022

Dr Sia Ching Hui

NUS Medicine Fortitude Award 2020

Adj Prof Poh Kian Keong
Asst Prof Low Ting Ting

NUHS Healthcare Education Research Award 2022

A/Prof Andrew Choong

NUH Undergraduate (UG) Education Good Teacher Award 2021

Prof Tan Huay Cheem
A/Prof Yeo Tiong Cheng
A/Prof Low Fatt Hoe Adrian
Dr Lim Yinghao
Dr Lim Yoke Ching
Asst Prof Tan Li Ling
Asst Prof Lin Weiqin

NUHS Teaching Excellence Award

Dr Ng Jun Jie (2022)
Asst Prof Gavin Ng (2021)

NUS Dental UG Education Leads

Asst Prof Robin Cherian
Asst Prof Loh Poay Huan
Dr Anand Adinath Ambhore

NUS Medicine Appreciation Special Recognition Award 2020

Prof Tan Huay Cheem (Best Teacher)
Dr Sia Ching Hui (Best Teacher)
Asst Prof Gavin Ng (Role Model)

ARTICLE BY

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

Asst Prof Low is currently the clinical director of the Women's Heart Health Programme, the first national gender-tailored cardiac care in Singapore with special interests in adult congenital and structural heart disease interventions, pulmonary hypertension, pregnancy, heart disease, female phenotype coronary syndromes and invasive haemodynamics. She is active in leading clinical trials and multi-centre registry work as well as research in advancing therapies for rarer conditions. Asst. Prof Low is also passionate about mentoring and leads the undergraduate cardiology programme at the National University of Singapore (NUS). She is also a core faculty member of the Cardiology Senior Residency Programme.

DRIVING PROGRESS WITH SMALL CHANGES

ARTICLE BY
NUHCS Pulse Editorial

An interview with the Head of Cardiology, NUHCS @ NUH

Two and half years into his role, Asst Prof Chai Ping, Head of Cardiology and Senior Consultant, National University Heart Centre, Singapore (NUHCS), contemplated on his mental checklist of tasks he set for himself to achieve.

"An aging population includes an aging workforce. Our staff is aging too…"

Having worked more than two decades in NUHCS, Asst Prof Chai is particularly concerned about the sustainability of healthcare in Singapore. With a population that is living longer and growing older, trends show an increasing prevalence of heart conditions in Singapore which meant more healthcare resources would be required.

Yet, cardiology is a field that is rapidly advancing across many areas from leveraging artificial intelligence, and robotics, to the development of nanomaterials and miniature devices to treat diseases and creating innovative diagnostic tools to diagnose and prevent heart diseases.

On the challenges he faces, Asst Prof Chai said, "Resource allocation is always a challenge with competing needs. I find myself having to juggle all my pursuits – as a clinician, researcher, educator, management, and family. It's tricky but I have collaborative colleagues and the support of my family to lean on."

Asst Prof Chai currently holds other appointments such as Senior Advisor to the National University Hospital (NUH) Medical Board, Advisor to NUH Advanced Practice Nurse Council, and Member of the Ministry of Health's Patient Experience Survey Workgroup.

He is a champion of "making a big impact with little changes". For instance, he initiated a campaign against workplace violence in NUHCS. He observed that there were signs put up in other countries which advocated the rights of healthcare workers and reminded patients that abuse including verbal and physical abuse is not tolerated.

"Putting up signs is a simple step of showing our support for our colleagues," said Asst Prof Chai.

Asst Prof Chai shared more about his experience and what he hopes to achieve in the next few years.

In your opinion, what sets NUHCS apart?

One thing that stands out about NUHCS is that we have a comprehensive "cradle-to-grave" cardiology service. We have specialised cardiologists taking care of patients from infants in paediatrics to older adults in geriatrics. In addition to the full surgical team, we have interventional cardiology expertise and we provide specialist support in the community as well, so it's like we're taking care of people's hearts from the day they are born, all the way to their last days. This is especially helpful for those with congenital or chronic heart conditions.

We're taking care of people's hearts from the day they were born, all the way to their last days.

The other thing about NUHCS is the pervasive culture of collaboration and teamwork. This was deliberately cultivated by the management when NUHCS was first starting as a cardiac department in the 1990s. The vision

is still a work in progress. However, it is clear that we need to collaborate with our colleagues from other departments to achieve better health for our patients. Hence, we need to better communicate and work with one another.

Are there any immediate gaps that you see and hope to address?

What we are missing is perhaps some measurement of how well our patients are doing after leaving our care, when they return home six months or one year later. The challenge in compiling such data is the follow-up and cooperation required from patients.

Yet, the information will help determine what kind of care is most beneficial to our patients. The data could also help direct our budget in ensuring we take care of the wider population, especially since NUHCS is a public hospital.

Could you share a highlight in your career?

That would be when I was working in the United Kingdom (UK). What impressed me was the exposure I gained from my experience. I had the opportunity to interact with doctors from other countries such as the Middle East, Spain, and even Lebanon. Not only did I learn about the UK's health system, I learnt about the health systems in other countries. It helped to widen my perspectives about approaching the same heart condition, and helped with my creative problem-solving process.

What are your top priorities in your role as Head of Cardiology, NUHCS?

The number one priority would be to ensure we train future-ready cardiologists. We need to have cardiologists who are agile in their thinking and approach. They need to be able to quickly adapt and apply new technologies introduced every few years.

The second would be to strengthen our community care network, riding on our vision to better collaborate with our colleagues working across the spectrum of healthcare service, so we can provide better care to our patients.

The third would be to bolster our research capabilities. We need more research and data about best clinical practices based on the local or Asian population.

Could you share with us the latest news in cardiology?

That would be the discovery that Sodium Glucose Cotransporter-2 (SGLT2) inhibitors can help to treat heart failure patients and reduce the risk of kidney disease progression.

SGLT2 inhibitors are a class of medications initially developed to treat Type II Diabetes by preventing the kidneys from reabsorbing sugar, thus lowering blood sugar levels in your body. However, researchers observed that patients who took an SGLT2 inhibitor significantly lowered their risk of cardiovascular death and hospitalisation. Large-scale data published in the last two to three years further confirmed this.

This is a most fortunate discovery with a great impact on many patients.

> *"It would be incredible to shift the pulse of the next wave in cardiovascular medicine here to NUHCS. I believe we are getting there.*
>
> *- Asst Prof Chai Ping, Head of Cardiology and Senior Consultant, NUHCS*

THE MANY FACETS OF NURSING

SPECIALISED NURSES ENSURE CONTINUITY OF CARE FOR NUHCS PATIENTS

ARTICLE BY
NUHCS Pulse Editorial

Advances in technology, medical care, critical care unit organisation, and changes in patient population have contributed to the evolution of modern patient care in Cardiovascular Diseases (CVD). In tandem, the nursing profession has evolved much over the past 20 years to provide support to the growing complexity of medical and nursing care for heart patients.

At the National University Heart Centre, Singapore (NUHCS), specialised nurses work closely to assist doctors in performing minor surgical procedures and are qualified to administer some medications as well. NUHCS nurses are well positioned to build a strong rapport with patients, helping to coordinate and manage their care.

The numerous compliments and notes of gratitude from patients are a testament to the high standard of care they provide to patients. Many nurses have worked and stayed at NUHCS for many years and in fact, become the go-to for doctors and other members of the healthcare team.

Find out more about how specialised nurses contribute to the continuity of patient care at NUHCS.

Ms Senbagam D/O Sivaramakrishnan
Nurse Clinician, Thoracic Surgery Specialty Nurse

With more than four decades working at NUHCS, and the last seven years as a Thoracic Surgery Specialty Nurse, Ms Senbagam is, without doubt, well versed in post-thoracic surgery care. Post-operative care of thoracic surgical patients can be very challenging, with pulmonary complications being the key reason behind the significant number of deaths and morbidity of patients undergoing thoracotomy.

As a Thoracic Surgery Specialty Nurse, Ms Senbagam is responsible for getting patients on the road to recovery after their surgeries. She manages patients' rehabilitation to reduce their operative risks and complications, so as to improve their lung function after the surgery. This means she needs to communicate frequently, not only to patients but their family members, to ensure patients are able to follow-up with the proper care required and recover fully from surgery.

In addition to caring for the patients, she also teaches and mentors new nurses to ensure they become competent and skilful in their job.

What are the key skills required to excel in your role?

Patience, dedication, commitment, and passion. We interact with patients who have to undergo major surgeries, and the healing process may not be an easy one for all. By providing them with adequate care and understanding, with clear guidance on managing their condition, we can help ease or even accelerate their recovery process.

What inspires you to pursue this profession?

Serving mankind makes my job fulfilling and meaningful.

[1]PVD – A slow and progressive circulation disorder that affects the blood flow in the body.
[2]wound debridement – The removal of dead or infected skin tissue to help a wound heal.

Mr Clifford Xu
Assistant Nurse Clinician, Open-heart Surgery Specialty Nurse

As a mid-career switcher, Mr Xu left a role in a multinational company to become a nurse, hoping to contribute meaningfully to society and make a difference in people's lives. As the only male and one of the first few specialty nurses managing the care of open-heart surgery patients, he hopes to inspire more men to join the profession.

In his role, he collaborates with other disciplinary teams to provide a holistic care plan for patients. This means that he plans and implements pre-and post-surgical care for cardiac surgery patients. He participates in patient counselling to prepare patients for their surgery and guide them with surgery-related nursing concerns. After their surgery, he focuses on implementing a discharge plan and coordinates with his colleagues to ensure patients are stable and are fit enough to return home, resuming their daily activities.

Since joining NUHCS in 2013, he has won a few awards such as the Nightingale Nursing Award and the Healthcare Humanity Award.

What are the key skills required to excel in your role?

Having an in-depth knowledge of the various aspects of open-heart surgery enables me to work better with the surgeons, especially to support them in the post-operative care for patients. Working with a multidisciplinary team requires good teamwork and excellent communication skills.

What inspires you to pursue this profession?

I see nursing as an opportunity to constantly touch lives in real and rewarding ways. Specialty nursing in open-heart surgery is a unique and niche area that is constantly evolving with new practices and new surgical techniques that can enhance and improve the outcomes for patients. These are exciting times for people who love challenges and have an adventurous spirit.

Ms Teh Cheng Cheng
Senior Staff Nurse, Arrhythmia Specialty Nurse

Having joined NUHCS just over six years ago, Ms Teh recently advanced into the role of an Arrhythmia Specialty Nurse where she provides guidance on post-operative care to heart patients who have undergone a cardiac device implantation.

With the fast-evolving technology and multiple types of medical devices available, Ms Teh needs to familiarise herself with the various models and become competent in analysing the reports. This ensures that she can detect any subtle changes in the patient's heart condition and escalate the issue timely. She was also part of a team that started an Arrhythmia Device Service Hotline in September 2022 for patients with cardiac implantable electronic device-related queries or related wound matters.

What are the key skills required to excel in your role?

Being meticulous is fundamental to ensuring we provide the right care to our patients. Having the ability to explain complex medical terms in simple layman phrases will not only help patients and their family members understand the condition, but also assure them of the treatment they are receiving.

What inspires you to pursue this profession?

I am very fortunate to have excellent mentors who supported me in my role and guided me throughout my work. This gives me the added confidence to do more and go further in my profession.

Ms Adeline Teo
Nurse Clinician,
Vascular Surgery Specialty Nurse

Ms Teo has been at NUHCS for the past 23 years, spending the last 11 years as a Vascular Surgery Specialty Nurse.

In her role, she is responsible for the post-surgery care of Arteriovenous Fistula (AVF) in renal and Peripheral Vascular Disease (PVD)[1] patients. These patients require Negative Pressure Wound Therapy (NPWT) application, which is a sealed wound dressing attached to a vacuum pump that assists to remove fluids from the wound, helping it to heal faster and reducing the risk of infection.

She is also the point of contact for external dialysis centres to help provide patients with dialysis access. In addition, she works closely with the vascular team and podiatrists to save limbs.

What are the key skills required to excel in your role?
Experience plays a big part because you need to be able to anticipate issues to prevent the worst from happening. Every patient's condition is unique, so one needs to be observant of the slightest details. This is where experience comes in and teaches you what to look out for.

What inspires you to pursue this profession?
I was fortunate to be allowed to specialise in vascular surgery. The responsibility and trust that I undertake inspires me to do my best for my patients and colleagues.

Ms Li Geying
Senior Staff Nurse,
Structural Heart Specialty Nurse

Ms Li has worked in NUHCS for the last 14 years as a Structural Heart Specialty Nurse. In her role, she educates, counsels, and follows-up with patients with adult congenital heart diseases and Pulmonary Arterial Hypertension. She is also responsible for maintaining the registry of patients and works on relevant research projects.

While she is sometimes mistaken as an appointment booking personnel, she actually receives impromptu medical-related calls beyond her working hours from patients who need help. Nonetheless, she finds nursing a calling and enjoys nursing her patients back to health.

What are the key skills required to excel in your role?
Being an effective project manager is important as the role requires a lot of coordination. Experience helps a great deal to anticipate problems before they arise.

What inspires you to pursue this profession?
My specialised role was an opportunity provided to me as part of my career progression. The culture at NUHCS is also supportive and encouraging, which allows me to enjoy the work I do.

Ms Aileen Poh
Nurse Clinician,
Vascular Surgery Specialty Nurse

Ms Poh has worked just over two decades at the National University Hospital (NUH), recently taking on the role of a Vascular Surgery Specialty Nurse at NUHCS, in 2020. Without prior knowledge of wound management or any previous experience in the area, she initially found the learning curve challenging.

Nonetheless, she has embraced the challenges when the opportunity was presented to her. These days, wound debridement[2] and managing complex PVD and vascular wounds have become her daily tasks as she works alongside her team to care for patients.

She supports and contributes to ongoing research projects to improve hospital processes while nursing. In 2021, she spearheaded the vascular nurse-led wound clinic at NUHCS.

What are the key skills required to excel in your role?
The "Bring-It-On" mindset motivates you to take on new challenges that come up at work and to be a problem solver. Having good coordination and time management are also important as we need to liaise across different departments and colleagues to ensure the seamless recovery journey of our patients.

What inspires you to pursue this profession?
I love the challenges at work. There is a lot of room for growth as the profession is evolving rapidly, providing a lot of learning opportunities. This inspires me to continuously seek ways to do better.

WORLD'S LARGEST INFECTIVE ENDOCARDITIS REGISTRY

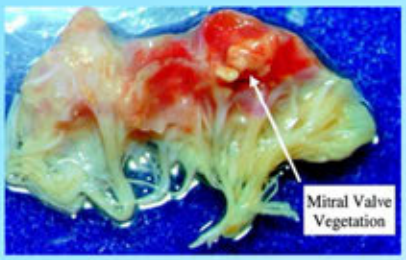
Improving disease treatment outcomes with new research insights

Blood culture-negative endocarditis (BCNE) is endocarditis[1] in which blood cultures using usual laboratory methods remain sterile, and account for 2.5% to 70% of all cases of endocarditis, depending on countries.

This geographical variation in incidence is explained by several factors including differences in the diagnostic criteria used; specific epidemiological factors, as is the case for fastidious zoonotic[2] agents; variations in the early use of antibiotics before blood sampling; differences in sampling and testing strategies; and involvement of unknown pathogens or non-infective etiologies[3].

Identification of the causative microorganism is crucial to select an appropriate targeted antibiotic therapy that, together with surgical debridement[4] whenever indicated, represents the mainstay of the therapeutic approach to infective endocarditis.

Senior consultants from the Department of Cardiology, National University Heart Centre, Singapore (NUHCS) – Adj A/Prof William Kong Kok Fai, Clinical Director of Echocardiography and Non-invasive Diagnostic Cardiology, Adj Prof Poh Kian Keong, Director of Research, and A/Prof Yeo Tiong Cheng, Group Chief of Cardiology, National University Health System (NUHS) – conducted a multi-centre study within the European Society of Cardiology (ESC), known as the EUR-Observational Research Programme (EORP) European Endocarditis



(EURO-ENDO) international registry which records data from the world's largest cohort of patients admitted to hospitals in Europe and Non-Europe countries (3,113 patients from 156 centres across 40 countries).

The ancillary analysis showed that 16.8% of patients in ESC EORP EURO-ENDO were culture negative. Most noticeably, patient characteristics showed that patients with culture-negative endocarditis were younger on average and adult congenital heart disease was more prevalent.

The 30-day mortality rate was found to be higher in the negative group than in the positive group of patients. Among the patients who are qualified for surgery, patients with negative culture were operated less frequently as compared to those with a positive culture.

No difference in one-year survival was observed between the culture-negative group and culture-positive group in the subgroup of surgically treated patients. A lower survival for the culture-negative group was observed in the patients receiving medical treatment alone.

With the publication of this study, the research team hopes physicians treating endocarditis would be encouraged to secure proper cultures at an early stage of the disease and aim to reduce the prevalence of culture-negative endocarditis. Identifying a proper causative organism early can potentially modify patients' risk and hopefully improve their outcomes.

Reference: Outcomes of culture-negative vs. culture-positive infective endocarditis: the ESC-EORP EURO-ENDO registry. Eur Heart J. 2022 Aug 1;43(29):2770-2780. Kong WKF, Salsano A, Giacobbe DR, Popescu BA, Laroche C, Duval X, Schäefer R, Moreo A, Colonna P, Piper C, Calvo-Iglesias F, Badano LP, Srdanovic I, Boutoille D, Huttin O, Stöhr

[1]endocarditis – A rare and potentially life-threatening infection in the endocardium (inner lining of the heart).

[2]zoonotic – Infectious disease that can be spread from animals to humans and vice-versa.

[3]etiologies – The causes of a disease or condition.

[4]debridement – The removal of damaged tissue or foreign objects from a wound.

ARTICLE BY

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

Adj A/Prof Kong specialises in the management of patients with valvular heart diseases and structural heart diseases. He 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 world-wide multi-centre bicuspid AVD registry. Currently, he reviews research submissions for several international cardiology journals including Circulation and Journal of American Society of Echocardiography.

CARDIOLOGISTS CLINCH **AWARDS** TO PURSUE RESEARCH

ARTICLE BY
NUHCS Pulse Editorial

Award bestows grant to recipients to further develop their research skills

The National Medical Research Council (NMRC) awards provides competitive research funds for individual projects and to nurture promising clinician-scientists, all for the development and advancement of medical research in Singapore.

Two cardiologists from the National University Heart Centre, Singapore (NUHCS) have each received separate notable awards under NMRC.

Dr Sia Ching Hui is the recipient of the "NMRC Clinician Scientist-Individual Research Grant (CS-IRG) - New Investigator Grant" that awards new clinical investigators for initial funding of a research idea. It serves as a step for the new investigator towards winning a first independent national level grant.

Dr Nicholas Chew is the recipient of the "NMRC Research Training Fellowship (RTF) Award" for research training to advance his qualifications and skills in becoming a Clinician Scientist. The goal of a Clinician Scientist includes plugging knowledge gaps and, over time, develop breakthrough research that will result in positive outcomes for patients.

Recipient of the NMRC CS-IRG – New Investigator Grant Award

Dr Sia Ching Hui, *Associate Consultant, Department of Cardiology, NUHCS*

STUDYING HOW HEART ATTACKS COULD LEAD TO MEMORY LOSS

Research Aim: ***Investigate and determine the links between heart attacks and memory loss through a comprehensive analysis of the patient's characteristics and advanced scans. With more clarity on this subject, it is hoped that the research could yield insights into how memory loss can be prevented and managed in heart attack patients.***

Dr Sia has a keen clinical and research interest involving multi-modality cardiac imaging to investigate mechanisms of disease, diagnose, prognosticate, and guide management of patients, as well as a special interest in cardio-neurology and cardiomyopathies[1].

As an avid researcher, he has published more than 180 papers in peer-reviewed journals to date and serves as the Associate Editor for the European Heart Journal Case Reports. He is also an active educator. He holds a concurrent appointment as a Junior Academic Fellow at the Department of Medicine, Yong Loo Lin School of Medicine, National University of Singapore (NUS).

Recipient of the NMRC RTF Award

Dr Nicholas Chew, *Senior Resident, Department of Cardiology, NUHCS*

EXPLORING WHY HEART ATTACK PATIENTS WITHOUT STANDARD RISK FACTORS HAVE WORSE SHORT-TERM MORTALITY

Research Aim: ***Explore non-standard cardiometabolic risk factors in seemingly 'healthy' patients with acute myocardial infarction (AMI)[2] through a case-control patient profiling study leveraging targeted circulating proteomic[3] and lipidomic[4] biomarkers. Research data may also serve to validate non-traditional biomarkers in larger AMI cohorts and interventional studies to determine the impact of standard and novel treatments in modifying non-standard risk factors.***

Dr Chew joined the senior residency programme at NUHCS in 2020. As an aspiring clinician scientist, he has dedicated his time to white space research regarding the liver-heart interface and has been awarded several research grants for his work. He has presented his research at international cardiology conferences with his work published in numerous peer-reviewed journals as well as in book chapters. Currently, he serves as the Guest Editor on Frontiers in Medicine and Cells focusing on the heart-liver axis.

Beyond research, he is also passionate about inpatient care and residency training through his role as Singapore Chief Resident, and chairperson of the National University Health System (NUHS) Residents' Research Committee.

[1]cardiomyopathies – General term referring to the disorders affecting the heart muscle or walls of the heart chambers.

[2]AMI – Heart attack.

[3]proteomic – Large-scale study of proteins.

[4]lipidomic – Large-scale study involving the identification and quantification of thousands of lipids in biological systems.

Congratulations

National Day Awards 2022

The annual National Day Awards recognises various types of merit and service to the nation. Singaporeans and non-Singaporeans alike are honoured for outstanding contributions to the civil or military service, social and community work or excellent performance in their own field. From NUHCS, five recipients have been honoured for their outstanding contributions in healthcare.

LONG SERVICE MEDAL

A/Prof Adrian Low Fatt Hoe
Senior Consultant, Department of Cardiology, NUHCS

Dr Seow Swee Chong
Senior Consultant, Department of Cardiology, NUHCS

Ms Seow Yen Hoon
Senior Case Manager, NUHCS

Ms Susan Lam So Shan
Senior Nurse Manager, NUHCS

COMMENDATION MEDAL

Ms Doreen Chew Mei Leng
Assistant Director of Nursing, NUHCS

NUHS Tribute Awards

The NUHS Tribute Awards is the most prestigious honour awarded by NUHS to recognise staff who have made outstanding contributions to patient care, research or education in the academic health system.

DISTINGUISHED SENIOR CLINICIAN AWARD

An award to recognise leading experts and key opinion leaders in their professional field and who have made distinguished contributions to the medical or dental professions, the Singapore public healthcare sector, and the international community in the clinical service, education and research domains.

2021:
A/Prof Yeo Tiong Cheng,
Group Chief, Cardiology, NUHS and Senior Consultant, Department of Cardiology, NUHCS

2019:
A/Prof James Yip,
Director and Senior Consultant, NUHCS

EMERITUS CONSULTANT

A lifetime honorary title awarded to long-serving renowned senior clinicians for their distinguished contributions toward NUHS development.

2019:
Prof Lee Chuen Neng,
Emeritus Consultant, Department of Cardiac, Thoracic and Vascular Surgery (CTVS), NUHCS

Congratulations

Newly Promoted Doctors

WITH EFFECT FROM 1 JUL 2022

DEPARTMENT OF CARDIOLOGY

Dr Tan Li Ling
Senior Consultant

Dr Eugene Tan Siang Joo
Consultant

Academic Appointments

On the Adjunct Clinician Educator scheme, in the Department of Medicine, Yong Loo Lin School of Medicine, National University of Singapore (NUS)

WITH EFFECT FROM 1 JUL 2022

Adj Prof Poh Kian Keong
Senior Consultant
Department of Cardiology

Adj A/Prof Ramanathan K.R.
Senior Consultant
Department of Cardiac, Thoracic and Vascular Surgery (CTVS)

Adj A/Prof William Kong Kok Fai
Senior Consultant
Department of Cardiology

PUBLICATIONS

A Class Effect Network Meta-analysis of Lipid Modulation in Non-alcoholic Steatohepatitis for Dyslipidemia. Journal of Clinical and Translational Hepatology. 2022 May. 000. Xiao J, Ng CH, Chin YH, Tan D, Lim WH, Lim G, Quek J, Shao A, Tang Pin, Chan KE, Soong RY, **Chew NWS,** Tay B, Huang DQ, Tamaki N, **Foo R, Chan MY,** Noureddin M, Siddiqui M, Muthiah M.

A novel coating method to reduce membrane infolding through pre-crimping of covered stents - Computational and experimental evaluation. Comput Biol Med. 2022 Jun;145:105524. Ong CW, Kumar GP, Zuo K, Koh LB, Charles CJ, **Ho P,** Leo HL, Cui F.

A Nurse-Led Integrated Chronic Care E-Enhanced Atrial Fibrillation (NICE-AF) Clinic in the Community: A Preliminary Evaluation. Int J Environ Res Public Health. 2022 Apr 7;19(8):4467. Woo BFY, Tam WWS, Rangpa T, Liau WF, Nathania J, **Lim TW.**

A polygenic risk score improves risk stratification of coronary artery disease: a large-scale prospective Chinese cohort study. Eur Heart J. 2022 May 7;43(18):1702-1711. Lu X, Liu Z, Cui Q, Liu F, Li J, Niu X, Shen C, Hu D, Huang K, Chen J, Xing X, Zhao Y, Lu F, Liu X, Cao J, Chen S, Ma H, Yu L, Wu X, Wu X, Li Y, Zhang H, Mo X, Zhao L, Huang J, Wang L, Wen W, Shu XO, Takeuchi F, Koh WP, Tai ES, Cheng CY, Wong TY, Chang X, **Chan MY,** Gao W, Zheng H, Chen K, Chen J, He J, Tang CS, Lam KSL, Tse HF, Cheung CYY, Takahashi A, Kubo M, Kato N, Terao C, Kamatani Y, Sham PC, Heng CK, Hu Z, Chen YE, Wu T, Shen H, Willer CJ, Gu D.

Acute and medium-term outcomes of His bundle pacing with or without an electrophysiology recording system using propensity score matching. Heart Rhythm. 2022 Apr;19(8):1394-1396. Tan VH, Loo G, Tun MH, De Leon J, **Boey E, Soh RYH, Tan ESJ,** Gan HH, **Lee JY,** Teo JTL, Yeo C, **Seow SC,** Kojodjojo P.

All that quivers is not real: recognising pseudo-atrial flutter. Singapore Med J. 2022 Apr;63(4):192-195. Lai YL, **Chew NWS, Sia CH, Yeo WT.**

Asian Pacific Society of Cardiology Consensus Statements on the Diagnosis and Management of Obstructive Sleep Apnoea in Patients with Cardiovascular Disease. Eur Cardiol. 2022 Jun 20;17:e16. Tan JWC, Leow LC, Wong S, Khoo SM, Kasai T, Kojodjojo P, Sy DQ, Lee CP, Chirakalwasan N, Li HY, Koh N, Tan A, Ong TH, Aung AT, Toh ST, **Lee CH.**

Assays Specific for BNP1-32 and NT-proBNP Exhibit a Similar Performance to Two Widely Used Assays in the Diagnosis of Heart Failure. Clin Chem. 2022 Oct 6;68(10):1292-1301. Lewis LK, Raudsepp SD, Whitlow JC, Appleby S, Pemberton CJ, Yandle TG, **Richards AM.**

Association of High-Volume Centers With Survival Outcomes Among Patients With Nontraumatic Out-of-Hospital Cardiac Arrest: A Systematic Review and Meta-Analysis. JAMA Netw Open. 2022 May 2;5(5):e2214639. Goh AXC, Seow JC, Lai MYH, Liu N, Goh YM, Ong MEH, **Lim SL,** Ho JSY, Yeo JW, Ho AFW.

Cardiac remodelling - Part 1: From cells and tissues to circulating biomarkers. A review from the Study Group on Biomarkers of the Heart Failure Association of the European Society of Cardiology. Eur J Heart Fail. 2022 Jun;24(6):927-943. González A, **Richards AM,** de Boer RA, Thum T, Arfsten H, Hülsmann M, Falcao-Pires I, Díez J, **Foo R, Chan MY,** Aimo A, Anene-Nzelu CG, Abdelhamid M, Adamopoulos S, Anker SD, Belenkov Y, Gal TB, Cohen-Solal A, Böhm M, Chioncel O, Delgado V, Emdin M, Jankowska EA, Gustafsson F, Hill L, Jaarsma T, Januzzi JL, Jhund PS, Lopatin Y, Lund LH, Metra M, Milicic D, Moura B, Mueller C, Mullens W, Núñez J, Piepoli MF, Rakisheva A, Ristić AD, Rossignol P, Savarese G, Tocchetti CG, Van Linthout S, Volterrani M, Seferovic P, Rosano G, Coats AJS, Bayés-Genís A.

Cardiac remodelling - Part 2: Clinical, imaging and laboratory findings. A review from the Study Group on Biomarkers of the Heart Failure Association of the European Society of Cardiology. Eur J Heart Fail. 2022 Jun;24(6):944-958. Aimo A, Vergaro G, González A, Barison A, Lupón J, Delgado V, **Richards AM,** de Boer RA, Thum T, Arfsten H, Hülsmann M, Falcao-Pires I, Díez J, **Foo R, Chan MY,** Anene-Nzelu CG, Abdelhamid M, Adamopoulos S, Anker SD, Belenkov Y, Gal TB, Cohen-Solal A, Böhm M, Chioncel O, Jankowska EA, Gustafsson F, Hill L, Jaarsma T, Januzzi JL, Jhund P, Lopatin Y, Lund LH, Metra M, Milicic D, Moura B, Mueller C, Mullens W, Núñez J, Piepoli MF, Rakisheva A, Ristić AD, Rossignol P, Savarese G, Tocchetti CG, van Linthout S, Volterrani M, Seferovic P, Rosano G, Coats AJS, Emdin M, Bayes-Genis A.

Cardiac sarcoidosis: Difficulties in diagnosis and treatment. Ann Acad Med Singap. 2022 Jul;51(7):436-440. Wong MY, **Wong RCC, Lim YC, Sia CH,** Evangelista LKM, Singh D, **Lin W.**

Characteristics and outcomes of patients with coronary artery ectasia presenting with ST-segment elevation myocardial infarction undergoing primary percutaneous coronary intervention. Cardiovasc Revasc Med. 2022 Jul;40:82-89. **Djohan AH,** Chiu J, **Sia CH,** Tung BWL, **Ng ZY, Chan KH, Chan MY, Kong WKF, Lee CH, Ng G, Low AF, Poh KK, Tan HC, Yeo TC, Loh PH.**

Circadian Effects on Clinical Outcomes following Acute Myocardial Infarction, Cardiac Procedures, and Surgery. Conditioning Medicine 2021. 4(6):262-270. Ko J, **Sia CH,** Hausenloy DJ.

Circulating cardiac biomarkers improve risk stratification for incident cardiovascular disease in community dwelling populations. EBioMedicine. 2022 Aug;82:104170. Wu Z, Pilbrow AP, Liew OW, Chong JPC, Sluyter J, Lewis LK, Lasse M, Frampton CM, Jackson R, Poppe K, Camargo CAJ, Cameron VA, Scragg R, **Richards AM.**

Circulating levels and prognostic cut-offs of sST2, hs-cTnT, and NT-proBNP in women vs. men with chronic heart failure. ESC Heart Fail. 2022 Aug;9(4):2084-2095. Vergaro G, Gentile F, Aimo A, Januzzi JLJ, **Richards AM,** Lam CSP, de Boer RA, Meems LMG, Latini R, Staszewsky L, Anand IS, Cohn JN, Ueland T, Gullestad L, Aukrust P, Rocca HPBL, Bayes-Genis A, Lupón J, Yoshihisa A, Takeishi Y, Egstrup M, Gustafsson I, Gaggin HK, Eggers KM, Huber K, Gamble GD, **Ling LH,** Leong KTG, Yeo PSD, Ong HY, Jaufeerally F, Ng TP, Troughton R, Doughty RN, Devlin G, Lund M, Giannoni A, Passino C, Emdin M.

Clinical Characteristics and Long-Term Outcomes of Patients With Differing Haemoglobin Levels Undergoing Semi-Urgent and Elective Percutaneous Coronary Intervention in an Asian Population. Front Cardiovasc Med. 2022 Mar 18;9:687555. **Soh RYH, Sia CH, Djohan AH,** Lau RH, Ho PY, Neo JW, Ho JS, **Sim HW, Yeo TC, Tan HC, Chan MY,** Loh JP.

Coagulation in pediatric extracorporeal membrane oxygenation: A systematic review of studies shows lack of standardized reporting. Res Pract Thromb Haemost. 2022 Mar 28;6(2):e12687. Drop J, Van Den Helm S, Monagle P, Wildschut E, de Hoog M, Gunput STG, Newall F, Dalton HJ, **MacLaren G**, Ignjatovic V, van Ommen CH.

Comparison of mechanistic pathways of bariatric surgery in patients with diabetes mellitus: A Bayesian network meta-analysis. Obesity (Silver Spring). 2022 Jul;30(7):1380-1390. Lin C, Yeong TJJM, Lim WH, Ng CH, Yau CE, Chin YH, Muthiah MD, **Loh PH, Foo R,** Mok SF, Shabbir A, Dimitriadis GK, Khoo CM, **Chew NWS.**

Comparison of the Efficacy and Safety of Non-vitamin K Antagonist Oral Anticoagulants with Warfarin in Atrial Fibrillation Patients with a History of Bleeding: A Systematic Review and Meta-Analysis. Am J Cardiovasc Drugs. 2022 Sep;22(5):511-521. Suah BH, Lee ZY, Teo YH, Teo YN, Syn NLX, **Soh RYH,** Yeo LLL, Tan BYQ, Ho JS, **Li TYW, Lee CH, Chan MY, Yeo TC, Wong RCC, Chai P, Sia CH.**

Comprehensive Review and Updates on Holistic Approach Towards Non-Alcoholic Fatty Liver Disease Management with Cardiovascular Disease. Curr Atheroscler Rep. 2022 Jul;24(7):515-532. **Chew NWS,** Ng CH, Muthiah MD, Sanyal AJ.

Coronary Artery Bypass Grafting Versus Percutaneous Coronary Intervention for Multivessel Coronary Artery Disease: A One-Stage Meta-Analysis. Front Cardiovasc Med. 2022 Mar 25;9:822228. **Chew NWS,** Koh JH, Ng CH, Tan DJH, Yong JN, Lin C, Lim OZ, Chin YH, Lim DMW, **Chan KH, Loh PH, Low AF, Lee CH, Tan HC, Chan MY.**

Current and novel biomarkers of thrombotic risk in COVID-19: a Consensus Statement from the International COVID-19 Thrombosis Biomarkers Colloquium. Nat Rev Cardiol. 2022 Jul;19(7):475-495. Gorog DA, Storey RF, Gurbel PA, Tantry US, Berger JS, **Chan MY,** Duerschmied D, Smyth SS, Parker WAE, Ajjan RA, Vilahur G, Badimon L, Berg JMT, Cate HT, Peyvandi F, Wang TT, Becker RC.

Development and validation of a decision support tool for the diagnosis of acute heart failure: systematic review, meta-analysis, and modelling study. BMJ. 2022 Jun 13;377:e068424. Lee KK, Doudesis D, Anwar M, Astengo F, Chenevier-Gobeaux C, Claessens YE, Wussler D, Kozhuharov N, Strebel I, Sabti Z, deFilippi C, Seliger S, Moe G, Fernando C, Bayes-Genis A, van Kimmenade RRJ, Pinto Y, Gaggin HK, Wiemer JC, Möckel M, Rutten JHW, van den Meiracker AH, Gargani L, Pugliese NR, Pemberton C, Ibrahim I, Gegenhuber A, Mueller T, Neumaier M, Behnes M, Akin I, Bombelli M, Grassi G, Nazerian P, Albano G, Bahrmann P, Newby DE, Japp AG, Tsanas A, Shah ASV, **Richards AM,** McMurray JJV, Mueller C, Januzzi JL, Mills NL; CoDE-HF investigators.

Development of the International Cardiac Rehabilitation Registry Including Variable Selection and Definition Process. Glob Heart. 2022 Jan 11;17(1):1. Chowdhury MI, Turk-Adawi K, Babu AS, de Melo Ghisi GL, Seron P, **Yeo TJ,** Uddin J, Heine M, Saldivia MG, Kouidi E, Sadeghi M, Aljehani R, Grace SL.

Differences in Characteristics and Outcomes Between Patients With Hypertrophic Cardiomyopathy From Asian and European Centers. J Am Heart Assoc. 2022 May 17;11(10):e023313. Tjahjadi C, Butcher SC, Zegkos T, **Sia CH,** Hirasawa K, Kamperidis V, Ngiam JN, **Wong RCC,** Efthimiadis G, Bax JJ, Delgado V, Marsan NA.

Direct oral anticoagulants in atrial fibrillation following cardiac surgery: a systematic review and meta-analysis with trial sequential analysis. Br J Anaesth. 2022 Aug;129(2):154-162**.** Koh KK, Ling RR, Tan SYS, Chen Y, Fan BE, Shekar K, **Sule JA**, **Subbian SK**, **Ramanathan K.**

Early short course of neuromuscular blocking agents in patients with COVID-19 ARDS: a propensity score analysis. Crit Care. 2022 May 17;26(1):141. Bassi GL, Gibbons K, Suen JY, Dalton HJ, White N, Corley A, Shrapnel S, Hinton S, Forsyth S, Laffey JG, Fan E, Fanning JP, Panigada M, Bartlett R, Brodie D, Burrell A, Chiumello D, Elhazmi A, Esperatti M, Grasselli G, Hodgson C, Ichiba S, Luna C, Marwali E, Merson L, Murthy S, Nichol A, Ogino M, Pelosi P, Torres A, Ng PY, Fraser JF, **COVID-19 Critical Care Consortium.**

Editorial: Rethink Thoracic Surgery as a Whole After the Pandemic. How to Optimize Resources and Deliver Excellent Patient Care. Front Surg. 2022 May 26;9:920626. Raveglia F, Orlandi R, Li H, Cerfolio R, **Tam JKC**, Scarci M.

Effect of frailty on outcomes of endovascular treatment for acute ischaemic stroke in older patients. Age Ageing. 2022 Apr 1;51(4):afac096. Tan BYQ, Ho JSY, Leow AS, Chia MLJ, **Sia CH,** Koh YY, Seetharaman SK, Yang C, Gopinathan A, Teoh HL, Sharma VK, Seet RCS, Chan BPL, Yeo LLL, Tan LF.

Effect of sodium-glucose cotransporter-2 (SGLT2) inhibitors on serum urate levels in patients with and without diabetes: a systematic review and meta-regression of 43 randomized controlled trials. Ther Adv Chronic Dis. 2022 Mar 23;13:20406223221083509. Yip ASY, Leong S, Teo YH, Teo YN, Syn NLX, See RM, Wee CF, Chong EY, **Lee CH, Chan MY, Yeo TC, Wong RCC, Chai P, Sia CH.**

Effect of Surgical Mask use on Peak Physical Performance During Exercise Treadmill Testing-A Real World, Crossover Study. Front Physiol. 2022 May 24;13:913974. **Dalakoti M,** Long C, Bains A, **Djohan AH, Ahmad I, Chan SP, Kua J, Chan PF, Yeo TJ.**

Effects of Hypertrophic and Dilated Cardiac Geometric Remodeling on Ejection Fraction. Front Physiol. 2022 May 31;13:898775. Zheng Y, Chan WX, Charles CJ, **Richards AM,** Sampath S, Ali AAB, Leo HL, Yap CH.

Effects of Sodium/Glucose Cotransporter 2 (SGLT2) Inhibitors on Cardiac Imaging Parameters: A Systematic Review and Meta-analysis of Randomized Controlled Trials. J Cardiovasc Imaging. 2022 Jul;30(3):153-168. Wee CF, Teo YH, Teo YN, Syn NL, See RM, Leong S, Yip ASY, Ong ZX, **Lee CH, Chan MY, Poh KK,** Ong CC, Teo LL, Singh D, Tan BY, Yeo LL, **Kong WKF, Yeo TC, Wong RCC, Chai P, Sia CH.**

Enhanced Thrombin Generation Is Associated with Worse Left Ventricular Scarring after ST-Segment Elevation Myocardial Infarction: A Cohort Study. Pharmaceuticals (Basel). 2022 Jun 6;15(6):718. **Sia CH,** Tan SH, **Chan SP,** Marchesseau S, **Sim HW,** Carvalho L, Chen R, Amin NHM, Fong AY, **Richards AM,** Yip C, **Chan MY.**

Epicardial adipose tissue related to left atrial and ventricular function in heart failure with preserved versus reduced and mildly reduced ejection fraction. Eur J Heart Fail. 2022 Aug;24(8):1346-1356. Jin X, Hung CL, Tay WT, Soon D, Sim D, Sung KT, Loh SY, Lee S, Jaufeerally F, **Ling LH, Richards AM,** van Melle JP, Voors AA, Lam CSP.

Evaluating the Initiation of Sodium/Glucose Cotransporter 2 Inhibitors within 2 Weeks of an Acute Hospital Admission: A Systematic Review and Meta-Analysis of Nine Clinical Trials. Med Princ Pract. 2022;31(3):215-223. Chieng JHL, Sia TK, Teo YH, Wong JZA, Ng TJY, Teo YN, Syn NLX, **Cherian R, Lim YC, Chai P, Lin W, Wong RCC, Sia CH.**

Evolving outcomes of extracorporeal membrane oxygenation during the first 2 years of the COVID-19 pandemic: a systematic review and meta-analysis. Crit Care. 2022 May 23;26(1):147. Ling RR, **Ramanathan K**, Sim JJL, Wong SN, Chen Y, Amin F, Fernando SM, Rochwerg B, Fan E, Barbaro RP, **MacLaren G,** Shekar K, Brodie D.

Expanding the utility of the ROX index among patients with acute hypoxemic respiratory failure. PLoS One. 2022 Apr 26;17(4):e0261234**.** Li A, Cove ME, Phua J, Puah SH, Ng V, Kansal A, Tan QL, Sahagun JT, Taculod J, Tan AY, Mukhopadhyay A, Tay CK, **Ramanathan K,** Chia YW, Sewa DW, Chew M, Lew SJW, Goh S, Dhanvijay S, Tan JJ, Fccp KCS; SICM-NICER Group.

Extracorporeal Membrane Oxygenation during Respiratory Pandemics: Past, Present, and Future. Am J Respir Crti Care Med. 2022 Jun 15;205(12):1382-1390. Brodie D, Abrams D, **MacLaren G**, Brown CE, Evans L, Barbaro RP, Calfee CS, Hough CL, Fowles JA, Karagiannidis C, Slutsky AS, Combes A.

Extracorporeal membrane oxygenation in patients with hematologic malignancies: a systematic review and meta-analysis. Ann Hematol. 2022 Jul;101(7):1395-1406. Sim JJL, Mitra S, Ling RR, Tan CS, Fan BE, **MacLaren G**, **Ramanathan K.**

Finding a reliable assay for soluble neprilysin. Clin Biochem. 2022 Jun;104:51-58. Liew OW, Prickett TCR, Revuelta-López E, Ling SSM, Cserkóová A, Lupón J, Ng JYX, Chong JPC, Lilyanna S, **Chan SP,** Lin Q, Lim TK, Lin Q, Barallat J, Bayés-Genís A, **Richards AM.**

Giant right coronary artery aneurysm in a patient presenting with ST-segment elevation myocardial infarction. Coron Artery Dis. 2022 Sep 1;33(6):508-509. **Djohan AH, Sia CH, Chan KH, Chai P, Tan HC.**

Global Prevalence and Clinical Characteristics of Metabolic-associated Fatty Liver Disease. A Meta-Analysis and Systematic Review of 10 739 607 Individuals. J Clin Endocrinol Metab. 2022 Aug 18;107(9):2691-2700. Chan KE, Koh TJL, Tang ASP, Quek J, Yong JN, Tay P, Tan DJH, Lim HW, Lin SY, Huang D, **Chan MY,** Khoo CM, **Chew NWS,** Kaewdech A, Chamroonkul N, Dan YY, Noureddin M, Muthiah M, Eslam M, Ng CH.

High-flow nasal cannula therapy: A multicentred survey of the practices among physicians and respiratory therapists in Singapore. Aust Crit Care. 2022 Sep;35(5):520-526. Puah SH, Li A, Cove ME, Phua J, Ng V, Kansal A, Tan QL, Sahagun JT, Taculod J, Tan AY, Mukhopadhyay A, Tay CK, **Ramanathan K,** Chia YW, Sewa DW, Chew M, Lew SJW, Goh S, Dhanvijay S, Tan JJ, See KC; SICM-NICER Group.

Hybrid type II and frozen elephant trunk in acute Stanford type A aortic dissections. Scand Cardiovasc J. 2022 Dec;56(1):91-99. **Sule JA,** Chua CR, Teo C, **Choong AMTL,** Sazzad F, **Kofidis T, Sorokin V.**

Hypercoagulability, endotheliopathy, and inflammation approximating 1 year after recovery: Assessing the long-term outcomes in COVID-19 patients. Am J Hematol. 2022 Jul;97(7):915-923**.** Fan BE, Wong SW, Sum CLL, Lim GH, Leung BP, Tan CW, **Ramanathan K,** Dalan R, Cheung C, Lim XR, Sadasiv MS, Lye DC, Young BE, Yap ES, Chia YW; COVID-19 Clotting and Bleeding Investigators.

Immunoassay-Compatible Inactivation of SARS-CoV-2 in Plasma Samples for Enhanced Handling Safety. ACS Omega. 2022 Jul 14;7(29):22510-25520. Liew OW, Fanusi F, Ng JYX, Ahidjo BA, Ling SSM, Lilyanna S, Chong JPK, Lim AES, Lim WZ, Ravindran S, Chu J, Jang HCJ, **Lim SL, Richards AM.**

Impact of restrictive red blood cell transfusion strategy on thrombosis-related events: A meta-analysis and systematic review. Vox Sang. 2022 Jul;117(7):887-899. Maimaitiming M, Zhang C, Xie J, Zheng Z, **Luo HD, Ooi OC.**

Intravenous thrombolysis and endovascular thrombectomy for acute ischaemic stroke in patients with Moyamoya disease - a systematic review and meta-summary of case reports. J Thromb Thrombolysis. 2022 Aug;54(2):339-349. Koh MY, Toh KZX, Ho JSY, Yeo LLL, Ho AFW, **Sia CH,** Tan BYQ.

Investigating 5-Level EQ-5D (EQ-5D-5L) Values Based on Preferences of Patients With Heart Disease. Value Health. 2022 Mar;25(3):451-460. Gandhi M, Tan RS, **Lim SL,** Rand K, Lam CSP, Luo N, Cheung YB.

Living in the non-alcoholic fatty liver disease silent epidemic: a qualitative systematic review of patients' perspectives. Aliment Pharmacol Ther. 2022 Aug;56(4):570-579. Ng CH, Lim WH, Chin YH, Yong JN, Zeng RW, Chan KE, Tan DJH, Fu CE, Tang ASP, Goh LH, Devi K, **Chew NWS,** Mak LL, Tamaki N, Huang DQ, Noureddin M, Siddiqui MS, Loomba R, Sanyal AJ, Muthiah M.

Long-term Prognosis in Patients With Concomitant Acute Coronary Syndrome and Aortic Stenosis. Can J Cardiol. 2022 Aug;38(8):1220-1227. **Chew NWS,** Zhang A, **Ong J,** Koh S, Kong G, Ho YJ, Lim O, Chin YH, Lin C, **Djohan AH, Kuntjoro I, Kong WKF, Hon JKF, Lee CH, Chan MY, Yeo TC, Tan HC, Poh KK, Loh PH.**

Long-Term Prognosis of Acute Myocardial Infarction Associated With Metabolic Health and Obesity Status. Endocr Pract. 2022 Aug;28(8):802-810. **Chew NWS,** Kong G, Venisha S, Chin YH, Ng CH, Muthiah M, Khoo CM, **Chai P, Kong WKF, Poh KK, Foo R, Yeo TC, Chan MY, Loh PH.**

Meta-analysis: analysis of mechanistic pathways in the treatment of non-alcoholic steatohepatitis. Evidence from a Bayesian network meta-analysis. Aliment Pharmacol Ther. 2022 May;55(9):1076-1087. Ng CH, Muthiah MD, Xiao J, Chin YH, Lim G, Lim WH, Tay P, Tan DJH, Yong JN, Pan XH, Koh JWH, **Chew NWS,** Syn N, Tan E, Huang DQ, Siddiqui MS, Loomba R, Sanyal AJ, Noureddin M.

Meta-Analysis of Percutaneous Coronary Intervention Versus Coronary Artery Bypass Grafting for Left Main Narrowing. Am J Cardiol. 2022 Jun 15;173:39-47. **Chew NWS,** Ng CH, Kong G, Lee KS, Tan DJH, Lim OZ, Chin YH, Tai BC, Gu T, Park SJ, Park DW, Morice MC, **Kofidis T, Yip JWL, Loh PH, Chan KH, Low AF, Lee CH, Yeo TC, Tan HC, Chan MY.**

Metabolic Associated Fatty Liver Disease Increases the Risk of Systemic Complications and Mortality. A Meta-Analysis and Systematic Review of 12 620 736 Individuals. Endocr Pract. 2022 Jul;28(7):667-672. Quek J, Ng CH, Tang ASP, **Chew NWS, Chan MY,** Khoo CM, Wei CP, Chin YH, Tay P, Lim G, Tan DJH, Lim WH, Chan KE, Teng M, Tan E, Tamaki N, Huang DQ, Siddiqui MS, Young DY, Noureddin M, Muthiah MD.

Moderate aortic stenosis: importance of symptoms and left ventricular ejection fraction. Eur Heart J Cardiovasc Imaging. 2022 Jun 1;23(6):790-799. Stassen J, Ewe SH, Butcher SC, Amanullah MR, Hirasawa K, Singh GK, Sin KYK, Ding ZP, Pio SM, **Sia CH, Chew NWS, Kong WKF, Poh KK,** Cohen DJ, Généreux P, Leon MB, Marsan NA, Delgado V, Bax JJ.

Myopericarditis following COVID-19 vaccination and non-COVID-19 vaccination: a systematic review and meta-analysis. Lancet Respir Med. 2022 Jul;10(7):679-688. Ling RR, **Ramanathan K,** Tan FL, Tai BC, Somani J, Fisher D, **MacLaren G.**

Non-alcoholic fatty liver disease association with structural heart, systolic and diastolic dysfunction: a meta-analysis. Hepatol Int. 2022 Apr;16(2):269-281. Yong JN, Ng CH, Lee CW, Chan YY, Tang ASP, Teng M, Tan DJH, Lim WH, Quek J, Xiao J, Chin YH, **Foo R, Chan MY, Lin W,** Noureddin M, Siddiqui MS, Muthiah MD, Sanyal A, **Chew NWS.**

Nonalcoholic Steatohepatitis Drug Development Pipeline: An Update. Semin Liver Dis. 2022 Aug;42(3):379-400. **Chew NWS,** Ng CH, Truong E, Noureddin M, Kowdley K.

Outcomes of culture-negative vs. culture-positive infective endocarditis: the ESC-EORP EURO-ENDO registry. Eur Heart J. 2022 Aug 1;43(29):2770-2780. **Kong WKF,** Salsano A, Giacobbe DR, Popescu BA, Laroche C, Duval X, Schueler R, Moreo A, Colonna P, Piper C, Calvo-Iglesias F, Badano LP, Srdanovic I, Boutoille

D, Huttin O, Stöhr E, Timóteo AT, Vaskelyte JJ, Sadeghpour A, Tornos P, Abid L, **Poh KK,** Habib G, Lancellotti P.

Patient perspectives of the Self-management and Educational Technology tool for Atrial Fibrillation (SETAF): A mixed-methods study in Singapore. PLoS One. 2022 Jan 21;17(1):e0262033. Nathania J, Woo BFY, Cher BP, Toh KY, Chia WA, Lim YW, Vrijhoef HJM, **Lim TW.**

Patient reported versus physician-assessed health status in heart failure with reduced and preserved ejection fraction from ASIAN-HF registry. J Am Coll Cardiol. 2022 Mar;79(9):426. Teramoto K, Tay WT, Tromp J, Teng THK, Chandramouli C, Ouwerkerk W, Lawson CA, Huang W, Hung CL, Chopra V, Anand I, **Richards AM,** Lam CSP.

Patterns of motivators and barriers to heart health behaviors among adults with behavior-modifiable cardiovascular risk factors: A population-based survey in Singapore. PLoS One. 2022 Jan 20;17(1):e0262752. Huang Z, Ho JS, Ven Yap Q, Chan YH, Tan SY, Ya NKS, Low LP, **Tan HC,** Koh WP, Chua TSJ, Yoon S.

Pericarditis and myocarditis after COVID-19 mRNA vaccination in a nationwide setting. Ann Acad Med Singap. 2022 Feb;51(2):96-100. Yap J, Tham MY, Poh J, Toh D, Chan CL, **Lim TW, Lim SL,** Chia YW, Lim YT, Choo J, Ding ZP, Foo LL, Kuo S, Lau YH, Lee A, Yeo KK.

Plasma Ceramides in Cardiovascular Disease Risk Stratification. Arq Bras Cardiol. 2022 Apr;118(4):768-777. Junqueira DLM, Stach A, Caixeta A, Sallum J, Yasaki E, Tsutsui J, Rizatti E, Rochitte CE, Ching-Jianhong, Kovalik JP, Krieger JE, **Richards AM, Chan MY,** Carvalho LP.

Predictors of loss of capture in left bundle branch pacing: A multicenter experience. Heart Rhythm. 2022 Oct;19(10):1757-1758. **Tan ESJ, Lee JY, Boey E, Soh RYH, Seow SC,** Teo LJT, Yeo C, Tan VH, Kojodjojo P.

Prevalence and incidence of cognitive impairment and dementia in heart failure - A systematic review, meta-analysis and meta-regression. Hellenic J Cardiol. 2022 Sep-Oct;67:48-58. Yap NLX, Kor Q, Teo YN, Teo YH, Syn NL, Mance Evangelista LK, Tan BY, **Lin W,** Yeo LL, **Kong WKF,** Chong YF, **Wong RCC, Poh KK, Yeo TC,** Sharma VK, **Chai P, Chan MY,** Goh FQ, **Sia CH.**

Proteomic Analysis of Effects of Spironolactone in Heart Failure With Preserved Ejection Fraction. Circ: Heart Failure. 2022 Sep;15(9):e009693. Javaheri A, Diab A, Zhao L, Qian C, Cohen JB, Zamani P, Kumar A, Wang Z, Ebert C, Maranville J, Kvikstad,E, Basso M, van Empel V, **Richards AM,** Doughty R, Rietzschell E, Kammerhoff K, Gogain J, Schafer P, Seiffert DA, Gordon DA, Ramirez-Valle F, Mann DL, Cappola TP, Chirinos JA.

Reactive Oxygen Species Scavenging Nanomedicine for the Treatment of Ischemic Heart Disease. Adv Mater. 2022 Sep;34(35):e2202169. Zhang Z, Dalan R, Hu Z, Wang JW, **Chew NWS, Poh KK,** Tan RS, Soong TW, Dai Y, Ye L, Chen X.

Reply Letter to the Editor Regarding the ELSO Interim Guidelines for Veno-Arterial Extracorporeal Membrane Oxygenation in Adult Cardiac Patients. ASAIO J. 2022 Jun 1;68(6):e111-e112. Lorusso R, Bartlett RH, Shekar K, **MacLaren G,** Schmidt M, Pellegrino V, Meyns B, Haft J, Vercaemst L, Pappalardo F, Bermudez C, Belohlavek J, Hou X, Boeken U, Castillo R, Donker DW, Abrams D, Ranucci M, Hryniewicz K, Chavez I, Chen YS, Salazar L, Whitman G; 2021 ELSO Adult Cardiac Interim Guidelines Task Force.

Response. Chest. 2022 Jun;161(6):e401-e402. Rajamani A, Galarza L, Sanfilippo F, Wong A, Goffi A, Tuinman P, Mayo P, Arntfield R, Fisher R, Chew M, Slama M, Mackenzie D, Ho E, Smith L, Renner M, Tavares M, Natesh Prabu R, **Ramanathan K,** Knudsen S, Bhat V, Arvind H, Huang S.

Risk Factors for Mortality in Cardiac Implantable Electronic Device (CIED) Infections: A Systematic Review and Meta-Analysis. J Clin Med. 2022 May 29;11(11):3063. Ngiam JN, Liong TS, Sim MY, **Chew NWS, Sia CH, Chan SP, Lim TW, Yeo TC,** Tambyah PA, **Loh PH, Poh KK, Kong WKF.**

Severe Functional Tricuspid Valve Regurgitation: Predictors of Mortality After Initial Diagnosis. Heart Lung Circ. 2022 Sep;31(9):1234-1240. **Ng P, Cherian R, Chan SP, Soo WM, Kong WKF, Poh KK, Wong RCC, Yeo TC, Ling LH,** Tay E.

Sex-Related Differences in Medically Treated Moderate Aortic Stenosis. Structural Heart. 2022 Jul 1;6(3):100042. Stassen J, Pio SM, Ewe SH, Amanullah MR, Hirasawa K, Butcher SC, Singh GK, Sin KY, Ding ZP, **Chew NWS, Sia CH, Kong WKF, Poh KK,** Cohen DJ, Généreux P, Leon MB, Marsan NA, Delgado V, Bax JJ.

Simultaneous Polar Metabolite and N-Glycan Extraction Workflow for Joint-Omics Analysis: A Synergistic Approach for Novel Insights into Diseases. J Proteome Res. 2022 Mar 4;21(3):643-653. Lim SY, Ng BH, Vermulapalli D, Lau H, Laserna AKC, Yang X, Tan SH, **Chan MY,** Li SFY.

Sodium-glucose cotransporter 2 inhibitors and neurological disorders: a scoping review. Ther Adv Chronic Dis. 2022 Apr 11;13:20406223221086996. Tharmaraja T, Ho JSY, **Sia CH,** Lim NA, Chong YF, Lim AYL, Rathakrishnan RR, Yeo LLL, Sharma VK, Tan BYQ.

Takotsubo cardiomyopathy precipitated by election preparation-related stress. Singapore Med J. 2022 Mar 20 **[Epub ahead of print]**. **Chew NWS, Sia CH,** Loh JPY.

The Effect of Building-Level Socioeconomic Status on Bystander Cardiopulmonary Resuscitation: A Retrospective Cohort Study. Prehosp Emerg Care. 2022 Apr 28;1-8. Ho AFW, Ting PZY, Ho JSY, Fook-Chong S, Shahidah N, Pek PP, Liu N, Teoh S, **Sia CH,** Lim DYZ, **Lim SL,** Wong TH, Ong MEH; Pan-Asian Resuscitation Outcomes Study Clinical Research Network.

The effect of diabetes and prediabetes on the prevalence, complications and mortality in nonalcoholic fatty liver disease. Clin Mol Hepatol. 2022 Jul;28(3):565-574. Ng CH, Chan KE, Chin YH, Zeng RW, Tsai PC, Lim WH, Tan DJH, Khoo CM, Goh LH, Ling ZJ, Kulkarni A, Mak LL, Huang DQ, **Chan MY, Chew NWS,** Siddiqui MS, Sanyal AJ, Muthiah M.

The Galenic Heart in the Gothic Cathedral and the Adjournment in Discovery of Circulation. Rev Cardiovasc Med. 2022 Jun;23(6):217. **Kiraly L**, Gulyas B.

The role of head-up cardiopulmonary resuscitation in sudden cardiac arrest: a systematic review and meta-analysis. Ann Transl Med. 2022 May;10(9):515. Tan YK, Han MX, Tan BYQ, **Sia CH,** Goh CXY, Leow AS, Hausenloy DJ, Chan ESY, Ong MEH, Ho AFW.

Three dimensional modeling of atrioventricular valves provides predictive guides for optimal choice of prosthesis. Sci Rep. 2022 May 6;12(1):7432. Sazzad F, Goh JH, Ong ZX, Almsherqi ZAM, Lakshminarasappa SR, **Ramanathan K**, **Kofidis T.**

Tracheostomy Practices and Outcomes in Patients With COVID-19 Supported by Extracorporeal Membrane Oxygenation: An Analysis of the Extracorporeal Life Support Organization Registry. Crit Care Med. 2022 Sep 1;50(9):1360-1370. Kohne JG, **MacLaren G,** Cagino L, Boonstra PS, Brodie D, Barbaro RP.

Use of extendable helix leads for conduction system pacing: Differences in lead handling and performance lead design impacts conduction system pacing. J Cardiovasc Electrophysiol. 2022 Jul;33(7):1550-1557. **Tan ESJ, Lee JY, Boey E, Soh RYH,** Sim MG, **Yeo WT, Seow SC,** Kojodjojo P.

Using a reduced-order model to investigate the effect of the heart rate on the aortic dissection. Int J Numer Method Biomed Eng. 2022 Jun;38(6):e3596. Keramati H, Birgersson E, Kim S, **Ho P**, Leo HL.

Utility and pitfalls of the electrocardiogram in the evaluation of cardiac amyloidosis. Ann Noninvasive Electrocardiol. 2022 Jul;27(4):e12967. **Ng P, Lim YC,** Evangelista LKM, **Wong RCC, Chai P, Sia CH,** Loi HY, **Yeo TC, Lin W.**

Validation of the CaRdiac Arrest Survival Score (CRASS) for predicting good neurological outcome after out-of-hospital cardiac arrest in an Asian emergency medical service system. Resuscitation. 2022 Jul;176:42-50. Liu N, Wnent J, Lee JW, Ning Y, Ho AFW, Siddiqui FJ, **Lim SL,** Chia MY, Tiah L, Mao DR, Gräsner JT, Ong MEH; PAROS Singapore Investigators, Gan HN, Cheah SO, Ng WM, Tay WL, Leong BSH, Nadarajan G, Doctor NE, Tham LP, Arulanandam S.

Ventricular tachycardia from myocarditis following COVID-19 vaccination with tozinameran (BNT162b2, Pfizer-BioNTech). Pacing Clin Electrophysiol. 2022 Sep;45(9):1097-1100. **Lin W, Yip ACL,** Evangelista LKM, **Wong RCC, Tan HC, Lim TW,** Singh D.

ABSTRACTS

American College of Cardiology (ACC) 71st Annual Scientific Session & Expo, Washington, D.C., United States of America (USA), 2-4 April 2022

Cognitive Impairment in Heart Failure – A Review
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Singapore Cardiac Society 33rd Annual Scientific Meeting 2022, Singapore, Virtual, 6-8 May 2022

A Systematic Review And Meta-Analysis Of Non-vitamin K Antagonist Oral Anticoagulants vs Vitamin K Antagonists after Transcatheter Aortic Valve Replacement in Patients with Atrial Fibrillation
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Comparison of Mechanistic Pathways of Metabolic Bariatric Surgery in Diabetic Patients – A Bayesian Network Meta-Analysis of Bypass versus Restrictive Bariatric Procedure
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Comparison of Mortality Outcomes in Acute Myocardial Infarction Patients with or without Standard Modifiable Cardiovascular Risk Factors
Sia CH, Ko J, Zheng H, Ho AF, Foo D, Foo LL, Lim PZ, Liew BW, **Chai P, Yeo TC, Yip JWL,** Chua T, **Chan MY,** Tan JWC, Figtree G, Bulluck H, Hausenloy DJ.

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Ko J, **Sia CH**, Zheng H, Ho AFW, Foo D, Foo LL, Lim PZY, Liew BW, **Chai P, Yeo TC, Tan HC**, Chua T, **Chan MY,** Tan JWC, Fox KAA, Bulluck H, Hausenloy DJ.

Coronary Artery Bypass Grafting versus Percutaneous Coronary Intervention with Stenting for Multivessel Coronary Artery Disease without Left Main Coronary Disease: A Two-Stage Meta-Analysis of Reconstructed Individual Patient Data
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Exploring Clinical Factors Influencing Length of Hospitalisation Stay In Patients after Percutaneous Coronary Intervention in a Cardiac Monitoring Unit
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Ventricular Arrhythmias in Cardiac Amyloidosis - A Meta-Analysis
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British Cardiovascular Society (BCS) 2022 Annual Conference, Manchester, United Kingdom (UK), 6-8 May 2022

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17th Annual Scientific Meeting of the Society of Cardiovascular Computed Tomography, Las Vegas, USA, 15-17 July 2022

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Wang X, Baskaran L, **Sia CH,** Tan S, Zhong L, Yong T, Yew M, Adamson P, Wong S, **Chan MY,** Hausenloy DJ.

2022 International Society for Minimally Invasive Cardiothoracic Surgery (ISMICS) Annual Scientific Meeting, Warsaw, Poland, 16-18 June 2022

Minimally Invasive Aortic Valve Replacement Fares Better At Improving Postoperative Function: A Propensity-score Matched Asian Study
Sule JA, Tay WX, Joseph T, Lim S, Ong ZX, **Kofidis T.**

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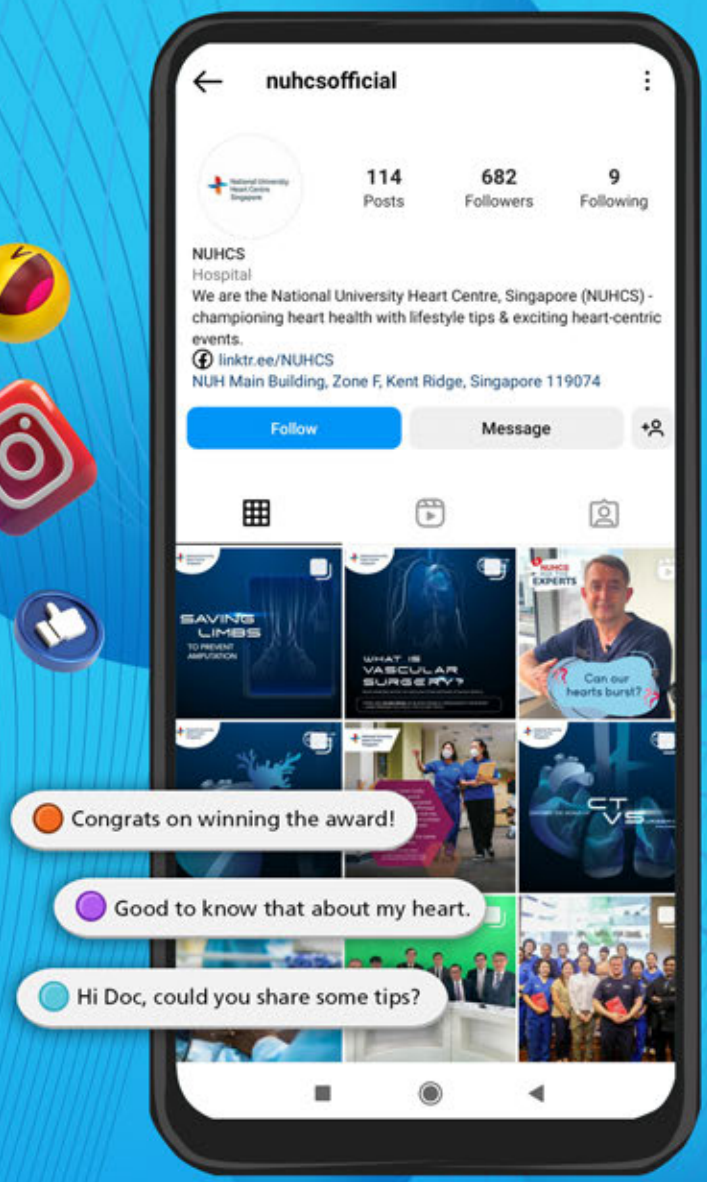

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