

PULSE

ISSUE 41 | JULY 2023
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To Balloon Or
Not To Balloon?

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

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Opening Hours:

8.30am to 5.30pm (Mondays to Fridays). Closed on Weekends & Public Holidays.

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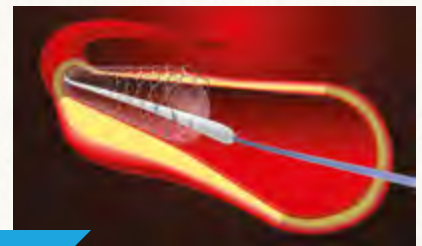
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National University Heart Centre Singapore

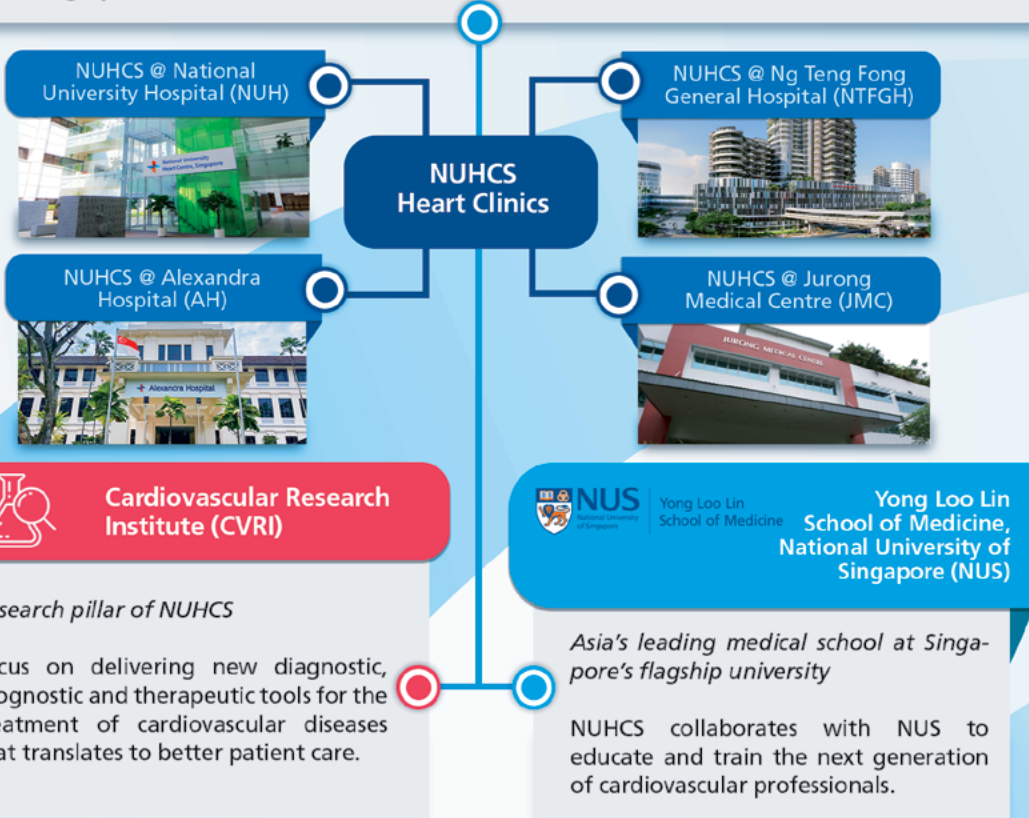
NUHCS brings a wide range of cardiovascular specialists, including physicians, surgeons, nurses and technicians, together to provide a comprehensive and holistic approach to cardiovascular medicine and the treatment of heart conditions in Singapore. It includes the departments of Cardiology and Cardiac, 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



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,

In this issue of Pulse, we want to honour our heroes at NUHCS who went beyond their call of duty in battling the COVID-19 pandemic. Their spirit of selflessness, courage, and civic-mindedness was our beacon of hope during that period of crisis and uncertainty.

For that, Dr Christopher Koo, Dr Lim Yinghao, and Mr Tan Teck Chong received the National Awards (COVID-19). Walk with them through their challenging journeys as they share their personal stories on how they contributed to the nation's battle against the virus.

More than just providing tertiary cardiology, cardiothoracic and vascular surgery care, as an academic heart centre, our mission at NUHCS aims to address today's challenges in cardiovascular diseases and medicine with innovative world class research and groundbreaking developments to give patients the highest standard of care.

This is evident through new clinical programmes in our Vascular service, Aortic Centre, and Lung Surgery Centre that have shown better outcomes for patients.

In particular, our Aortic Centre, which boasts a 0% mortality rate in 2022 for surgically-treated Aortic Dissection patients, is currently running the first large-scale aortic screening programme in Singapore to better detect individuals who are at high risk of this life-threatening condition.

Banking on the expertise of our senior thoracic surgeons, we have successfully developed and established

minimally-invasive procedures which accord faster recovery times, fewer risks, and less pain for lung surgery patients. An example is the Uniportal Video-Assisted Thoracic Surgery (UVATS) treatment option, which we pioneered in 2009, which allows lung surgery to be performed in just a single cut.

With high clinical loads returning after the abatement of the pandemic, the steadfast dedication our doctors showed in the areas of research and education has been impressive. Their efforts have not gone unnoticed and have won commendation from the medical fraternity.

Adj A/Prof William Kong's work on moderate Aortic Stenosis continues to yield high impact publications. Asst Prof Lim Shir Lynn's research was recognised with a national research grant award while our young resident, Dr Jamie Ho, won the Young Investigator Award at the European Society of Cardiology (ESC) Asia Conference 2022. Other young researchers have also dominated the Singapore Cardiac Society 2023 Annual Scientific Meeting Young Investigator Award (YIA) competition by taking five out of the six finalists' spots.

Behind our research publications is an unsung hero – Dr Chan Siew Pang, a biostatistician working under our research arm, Cardiovascular Research Institute (CVRI), whose role is critical in guiding and advising many research investigators on the intricacies and complexities of biostatistics.

On exciting new developments – A/Prof Graeme MacLaren,

who heads our CTVS Intensive Care Unit, published a book guiding clinicians on the use of Extracorporeal Membrane Oxygenation (ECMO) while Prof Theodoros Kofidis was instrumental in the set-up of NUHCS' CTVS Simulation Centre – the first of its kind in Southeast Asia.

These will undoubtedly contribute to the advancement of cardiovascular medicine and patient care, not only in Singapore, but in our region and beyond.

Do take the time to read further and I hope you will enjoy this issue as much as our team has in putting it together for you.

Tan Huay Cheem

Prof Tan Huay Cheem
Senior Advisor to NUHCS



BEYOND THE CALL OF DUTY: NATIONAL AWARDS FOR COVID-19

ARTICLE BY

NUHCS Pulse Editorial

For staff who have gone beyond the call of duty during the pandemic

In recognition of their public spirit and outstanding contributions to Singapore’s fight against the COVID-19 pandemic, about 9,500 individuals from the public healthcare, public, private, and people sectors have been recognised and will receive the National Awards (COVID-19), announced at the 2022 National Day Rally. The number and spread of individuals receiving the awards reflect how the fight has been a nationwide effort.

These National Awards honour all those who have gone beyond their duty and contributed to the efforts in fighting against COVID-19.

At NUHCS, three received The Public Administration Medal (Bronze) (COVID-19) and another 14 received The Commendation Medal (COVID-19).

Read on as three recipients of The Public Administration Medal (Bronze) (COVID-19) shares more about how they went beyond their call of duty during the COVID-19 pandemic.

THE PUBLIC ADMINISTRATION MEDAL (BRONZE) (COVID-19)

The Public Administration Medal (Bronze) (COVID-19) is awarded to individuals who led and implemented efforts that contributed to the management of the impact of COVID-19 on Singapore. The award recognises the hard work and personal dedication of these individuals who had to respond quickly to the unpredictable pandemic situation, with no compromise in standards of professionalism and excellence.

THE COMMENDATION MEDAL (COVID-19)

The Commendation Medal (COVID-19) is for individuals who performed outstandingly in their role during the COVID-19 pandemic. These individuals displayed great courage and dedication beyond the call of duty while maintaining a high level of professionalism.

The Commendation Medal (COVID-19) Recipients:

Athiveeraperumal Veeralakshmi
Senior Staff Nurse, NUHCS

Chew Mei Leng Doreen
Asst Director of Nursing, NUHCS

Cui Beiyun @ Cui Pei Yun
Asst Director, NUHCS

Geng Lihong
Staff Nurse, NUHCS

Labya Munra @ L Munra
Senior Staff Nurse, NUHCS

Lee Kar Yee
Asst Nurse Clinician, NUHCS

Lee Sok Gin
Senior Staff Nurse, NUHCS

Li Geying
Senior Staff Nurse, NUHCS

Liew Man Ling
Senior Staff Nurse, NUHCS

Ma Phyu Phyu Thein Aung
Senior Staff Nurse, NUHCS

Moe Sandi Thein
Staff Nurse, NUHCS

Oh Seok Lee Pauline
Senior Nurse Manager, NUHCS

Sarmini Binte Ahmat Sahwe
Asst Nurse Clinician, NUHCS

Tan Ming Cheng
Senior Staff Nurse, NUHCS

The Public Administration
Medal (Bronze) (COVID-19)

Mr Tan Teck Chong
Asst Chief Operating Officer,
Department of Operations &
Administration, NUHCS



In April 2021, there was a surge in COVID-19 cases which had a huge impact on the National University Health System (NUHS), including National University Hospital (NUH). However, as a hospital, it was critical that operations continued to care for the sick.

To mitigate the situation, Mr Tan Teck Chong, Asst Chief Operating Officer, NUHCS, was appointed as the leader of NUHS's task force to organise swabbing operations for the entire staff population situated at the Kent Ridge campus. This includes about 10,000 staff, including students, cleaners, vendors and tenants who were working every day to keep the hospital running.

Mr Tan put together a team from scratch and set up a swabbing operation facility for Rostered Routine Testing (RRT) via Oropharyngeal and Mid-Turbinate Swab (OPMT) – a type of swab where the sample is taken from the back of one's throat and nostrils – for every staff situated in the Kent Ridge campus.

The entire exercise continued for about five months until the situation stabilised.

About 100,000 tests were conducted and processed in the laboratories. Further precautionary measures as well as protocols were communicated to every staff to minimise any risk of infection.

What was your motivation behind the role?

There was a real sense of urgency to get ahead and maintain control over the situation. As the regional health-care system for the west, safeguarding the health of everyone working here was critical for us to continue serving the greater public. The last

thing we wanted was an outbreak in the hospital, which was very possible, and having to close the hospital to prevent further infections.

Could you share some of the challenges you faced?

We had to carve out some resources to allocate to this exercise. To avoid taxing our medical staff who were already busy with sick patients, we conducted crash courses for non-medical staff so that they could help out with voluntary duties such as swabbing.

The uncertainty of how long the pandemic would last was worrying as I had to manage the sustainability of our resources including our manpower – there was a limit to how long we could keep up with all the extra shifts.

How has the experience impacted you?

What amazed me was that many colleagues willingly put up their hands to take turns in shifts to ease one another's workload. Everyone showed tolerance, understanding, and support. Personally, I think we survived the pandemic because of the solidarity and support we have at NUHS.



There's a solution to every problem; nothing is insolvable as long as the team comes together. We will come out of the crisis stronger because of good teamwork.

Mr Tan Teck Chong

Asst Chief Operating Officer, Department of Operations & Administration, NUHCS





It was inspiring that even those with non-medical backgrounds from the public pitched in to help. The entire experience was truly a very hierarchical-less affair where everyone came together with one goal in mind – to help the workers through this challenging and uncertain period.

The Public Administration Medal (Bronze) (COVID-19)

Dr Koo Chieh Yang Christopher
 Consultant, Department of Cardiology, NUHCS

Dr Koo Chieh Yang Christopher
 Consultant, Department of Cardiology, NUHCS



Following an outbreak of COVID-19 in migrant worker dormitories, Singapore placed all dormitories under isolation from mid-April as part of the nation's strategy to stem transmissions and protect the health of workers.

At the peak of the outbreak, more than 1,000 new cases a day were being detected among the workers. Cases surged from 31 in April 2020 to over 15,000 in May, and 33,000 in June.

Dr Koo Chieh Yang Christopher, Consultant, Department of Cardiology, NUHCS, was approached to join the medical core group in charge of the COVID-19 medical operations at the largest dormitory in Singapore, which housed about 25,000 workers. His first task was to provide immediate daily medical care to the workers who had COVID-19 and were quarantined within the dormitory.

To contain and clear the dormitories of COVID-19, medical support was set up within the dormitories to care for and monitor the health of the workers, as well as to conduct regular testing. As the situation wore on, the medical team built rapport with the foreign workers to gain their trust during a time of fear and uncertainty.

It took over four months before all the dormitories were cleared of the

virus. Nine in 10 workers in the construction, maritime, and process sectors could return to their jobs.

What motivated you to take up this role?

It was not the first time I have worked with migrant workers. I always thought we could do more to appreciate their efforts. Hence, when the opportunity presented itself, I said yes. This meant I had to leave my work at NUHCS to be in the dormitories, but thankfully, my colleagues were willing to cover my clinical duties in the hospital.

Could you share some of the challenges you faced?

Having to adapt to a sudden change in the working environment took some adjustments. We donned the full Personal Protection Equipment (PPE) whilst working under the sun and were drenched in buckets of sweat every day. There was also a

language barrier, so we had to come up with creative ways to get critical information across both ways.

The most challenging though was managing the frustration and fear of the workers when we did not have all the answers back then. There were times when workers got hostile or were suicidal. We could only practice patience and be calm in such situations, so we could find ways to help.

How has the experience impacted you?

It was a very intense period, but I gained a lot of learning points from this experience. I got to see a different side of my colleagues, befriend those in other departments I would never have otherwise met. I made friends amongst the workers, who would message me about their fears, lives back at home, and offer to meet up after the pandemic. It is the relationships that I have built that I will remember the most.



Photo Credit @ Elliot Tan





The Public Administration Medal (Bronze) (COVID-19)

Dr Lim Yinghao
 Consultant, Department of Cardiology, NUHCS

As part of the nation's response to the pandemic, the National University Health Systems (NUHS) looked into setting up a 1,622-bed community care facility for COVID-19 patients to reserve hospital beds for those who were very sick.

Dr Lim Yinghao, Consultant, Department of Cardiology, NUHCS, volunteered to lead the project, taking on the responsibilities of planning and getting the facility ready to meet the fast increasing number of COVID-19 patients.

Without pre-determined guidelines, he not only had to direct his team in setting up a new medical facility but had to map out its operating protocols. The facility had to be adapted to recuperate sick patients with segregated zones to prevent the spread of disease infections, and be flexible enough to be quickly scale up or down depending on how the situation progressed in Singapore.

After the facility was set up, he remained as the medical co-lead to care for patients who were admitted to the facility.

Together with his team, the Tuas Community Care Facility was set up in just three weeks, and run fully on-site by the medical and nursing team before it closed.

What motivated you to volunteer for this role?

The decision to volunteer was not an easy one. At that time, there was widespread fear that the virus could be fatal and it was already seen to be extremely infectious. But, I was lucky

to have the full blessings and support of my wife as well as from my family and colleagues. Thus, I decided to take on the role. It was a time of need for our nation - that was impetus enough.

Could you share some of the challenges you faced?

The greatest challenge was navigating the sea of uncertainty in a rapidly developing global situation. No one knew what the virus was and what trajectory the disease would take. That made planning tricky. We had no way of knowing how long the situation would last, except to make the best preparations possible.

How has the experience impacted you?

I am and remain inspired by the passion and dedication of the entire team involved. These are people who selflessly stepped forward to serve when they were needed, and served without a complaint. Not surprisingly, they have since moved on to achieve excellence in each of their fields.

The facility was put together with gumption, courage, and fortitude; it completed its mission successfully through camaraderie and friendship. I am humbled to be in the company of heroes.

Dr Lim Yinghao
 Consultant, Department of Cardiology, NUHCS





NUHCS CELEBRATES SINGAPORE'S 57TH BIRTHDAY

CONNECTING LOCAL CULTURE WITH HEART HEALTH TIPS

How much of Singapore's culture and Singaporean's love for food affect our heart health?

NUHCS marked Singapore's National Day in 2022 with a series of fun and engaging videos that not only celebrates the unique food culture of Singaporeans, but also featured local favourites with a heart-health twist.



CAN WE SPEAK THE LANGUAGE OF YOUR HEART?

FEATURING: Ms Norsuziana Binte Samsaimon (Patient Service Associate), Dr Robin Cherian (Consultant, Department of Cardiology), Prof Tan Huay Cheem (Senior Consultant, Department of Cardiology), Ms Saraswathy D/O Nadarajan (Senior Staff Nurse), and Dr Kang Giap Swee, (Senior Consultant, Department of CTVS).



NUHCS GUESSES LOCAL FAVOURITES

Coffee



Featuring: **A/Prof James Yip**
National Centre Director



NUHCS GUESSES LOCAL FAVOURITES

Durian



Featuring: **Dr Sim Hui Wen**
Consultant, Department of Cardiology



NUHCS GUESSES LOCAL FAVOURITES

Chilli



Featuring: **Dr Jai Ajithchandra Sule**
Consultant, Department of CTVS



The Way To A Woman's Heart

Women's Heart Health Campaign 2023

DID YOU KNOW?



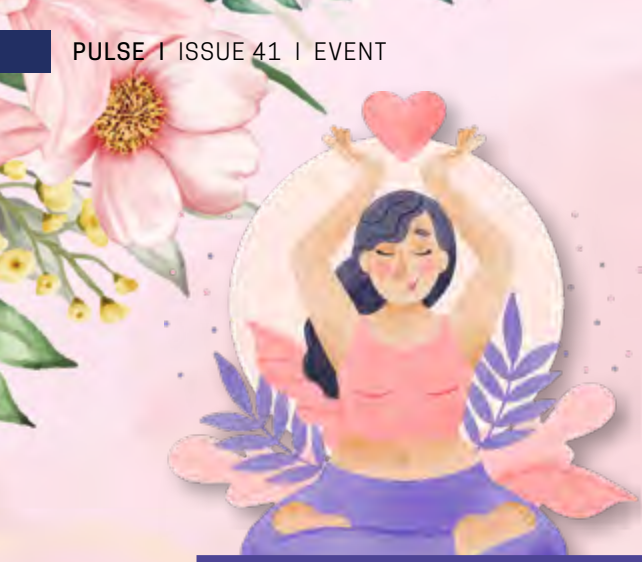
Women with a waist circumference of more than 80cm have an increased risk of heart disease

DID YOU KNOW?



Surgical removal of ovaries can increase the risk of heart disease

Commemorating International Women's Day in the month of March, NUHCS launched its Women's Heart Health Campaign with informative videos on healthy ways to keep women's hearts beating strong, featuring special guests – former Member of Parliament (MP) Lee Bee Wah (Hua Jie) and local celebrity, Evelyn Tan.



Heart Disease risk rises for everyone as they age, but for women, the years leading up to and after menopause are a critical time for caring for their heart health. In March this year, NUHCS Women's Heart Health month dived into debunking the common myths about heart disease, shared stories and facts on Women's heart health, and expounded on healthier dietary choices with exercise tips from a cardiologist.

Missed out on these content? Scan the QR codes on these pages to watch them now!



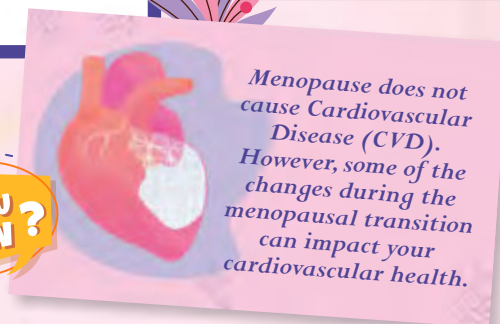
Kicking off the campaign, Dr Laureen Wang, Head of Well Programme (Be Better), Alexandra Hospital, and Consultant, Department of Cardiology, NUHCS, addressed the myth that heart disease is a "man's disease" and why women are more vulnerable to heart disease.



What is the link between menopause and women's heart health? Asst Prof Low Ting Ting, Director of Women's Heart Health Programme and Senior Consultant, Department of Cardiology, NUHCS, shares insights with special guests – former MP Lee Bee Wah (Hua Jie) and local celebrity, Evelyn Tan in this video.



Small tweaks to gain stronger heartbeats. Check out your favourite local hawker eats made heart-healthy, with former MP Lee Bee Wah (Hua Jie) and Dr Sim Hui Wen, Consultant, Department of Cardiology, NUHCS.

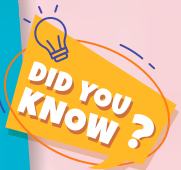




Catch former MP Lee Bee Wah (Hua Jie) and Dr Jeanne Ong, Associate Consultant, Department of Cardiology, NUHCS, as they “serve” important advice on staying active to lower your risk of Cardiovascular Disease!



Discover the unique risk factors behind an increased cardiac risk in women, with senior consultants from the Department of Cardiology, NUHCS – Asst Prof Low Ting Ting, Director of Women's Heart Health Programme, and Dr Lim Toon Wei, Head of Community Cardiology, on radio talk show, 《健康娜件事》 on 96.3 好(hao) FM with DJ Anna Lim.



Scan the QR codes here to download NUHCS' Women's Heart Health Campaign sticker packs for WhatsApp or Telegram.



Caring Hearts Support Group Turned 5 As One Big Family

Celebrating another year of health

ARTICLE BY

NUHCS Pulse Editorial

As a voluntary initiative by NUHCS patients, the Caring Hearts Support Group (CHSG) was launched in 2018 with the vision to build an inspiring and caring heart patient support group that brings positive changes to the lives of patients and the community.

When the COVID-19 pandemic struck, the mission of CHSG became more meaningful and purposeful as the group was determined to connect with fellow heart patients to support them in their recovery journey during a difficult time.

“Looking back now, there is a sense of gratefulness and contentment that we managed to emerge through challenging times,” reflected Ms Magdalene Chia, Programme Coordinator, CHSG.

Over the past five years, CHSG has been active in engaging members by forging and fostering bonds of friendship and showing support not only to heart patients, but to their families and friends as well. This engagement is especially critical for CHSG members as many need to sustain lifestyle changes to avoid a relapse.

CHSG provides the opportunity for patients to share personal experiences

and feelings, as well as coping strategies, which act as a bridge to fill a gap between medical treatment and emotional support.

In addition to the invaluable peer support CHSG provides, the group frequently organises educational talks with NUHCS heart health experts so members have regular access to insightful heart-related information and tips to assist them on their journey towards better health.

Once admitted as individual heart patients, CHSG members of varying age groups turned up in their ethnic clothes to showcase their heritage as one big CHSG family celebrating their fifth anniversary and the fulfilling journey they have been on together.

“CHSG is a family guided by the principle – let all that we do, be done in love. We want to focus on bringing about positive changes to the lives of heart patients and the community.”

Ms Magdalene Chia
Programme Coordinator, CHSG

CARING HEARTS SUPPORT GROUP (CHSG)

Membership is open to heart patients who have completed Basic Cardiac Rehabilitation at the National University Heart Centre, Singapore (NUHCS).

For more information about CHSG or to join CHSG, please contact Magdalene Chia, Programme Coordinator, at mchia@kucinta.com.



Scan the QR code to find out more about CHSG





*Christmas Carolling 2022
at Cardiac wards and the
NUHCS Heart Clinic*



5th Anniversary 2023



PRACTICE MAKES PERFECT

The NUHCS Cardiac, Thoracic and Vascular Surgery (CTVS) Simulation Centre is the first of its kind in Southeast Asia



NUHCS' Department of CTVS has over the years worked towards becoming the centre of excellence in the region despite the sparsity of resources and manpower. Several programmes were streamlined to benchmark a higher standard of care including Minimally Invasive Cardiac Surgery (MICS), Aortic Surgery, Structural Heart, and Extracorporeal Life Support. One such initiative to improve the standard of training at NUHCS is the development of the CTVS Simulation Centre.

The CTVS Simulation Centre has been in the pipeline for several years following funding courtesy of a donation from the Chu Family, with

the objective of providing training to the next generation of surgeons for better patient care. It is designed to spearhead contemporary surgery in the field of CTVS through advanced simulation training and education. Various state-of-the-art simulators have been obtained over the years to advance specialised training, including the Maastricht Minimally Invasive Mitral Valve Simulator amongst numerous others. These will be housed within the Advanced Surgical Training Centre and the Medical School Simulation Centre.

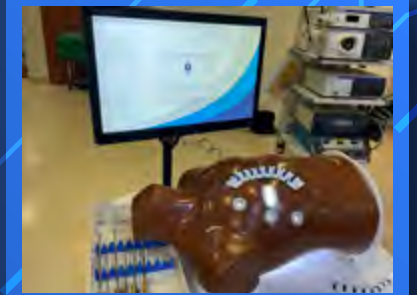
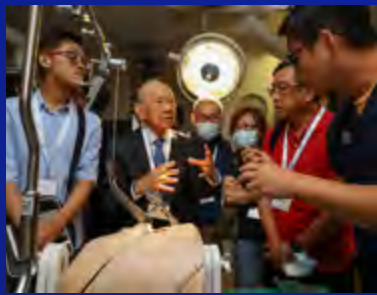
The Simulation Centre provides hands-on advanced surgical training to surgeons at various levels of exper-



This inaugural centre that hosts some of the world's best simulators for surgical training will be a jewel in Asia and the region, setting a new paradigm for specialised education.

Prof Theodoros Kofidis

Head of the Department of CTVS, and Founder, CTVS Simulation Centre, NUHCS



tise, including residents familiarising with certain specialised surgical skills to senior surgeons honing special skillsets in niche areas of cardiothoracic and vascular surgery. The Centre also serves as a hub for training workshops for local, regional, and international participants. It could also be a space for virtual reality learning and proctoring.

Education through simulation plays an important role in ensuring a high minimum standard for performing niche surgery even before providing such advanced procedural options to patients. Such training enhances safety standards during live operations and improves overall surgeon skills in areas that demand a high level of proficiency and dexterity. The Simulation Centre serves as a platform for educational ex-

change through wider local and regional participation in simulation workshops. This ultimately raises the regional benchmark for quality for quality cardiothoracic and vascular surgery.

Development of the Simulation Centre was curtailed due to the COVID pandemic, when resources were redirected elsewhere. The CTVS Simulation Centre officially opened during a comprehensive inauguration ceremony and workshop event held on 10 to 11 March 2023, graced by prominent local and international faculty. It marked the start of more collaborative workshops to support the local and regional surgical community in CTVS to advance their skills in an ever-advancing field.

NUHCS is proud to be the first in the region to cater to such a level of CTVS simulation training where advanced training equipment can be readily accessible to trainees and specialist surgeons alike. Through industry-sponsored workshops, the setup can be further utilised for specialised surgical proctoring. We look forward to a new paradigm in CTVS surgical training.

ARTICLE BY

Dr Jai Ajitchandra Sule
Consultant, Adult Cardiac Surgery,
Department of CTVS, NUHCS



Dr Sule's interests lie in modern coronary revascularisation techniques, minimally invasive cardiac surgery, arrhythmia surgery, surgery for various acute and chronic aortic and valvular heart conditions as well as the institution's extracorporeal life support programme. He is also involved in research, simulation, and mentoring of students and surgical trainees.



The Asian REPRESENTATIVE

“This invitation is a testament of NUHCS’ recognition as a Centre of Excellence in catheter-based interventional cardiology in Asia.”

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

NUHCS was a LIVE transmission centre for EuroPCR 2023, the world’s leading course in interventional cardiovascular medicine. Held in Paris, France, from 16-19 May this year, this was NUHCS’ third invitation in the past seven years.



ABOUT EUROPCR

EuroPCR is the world-leading course in Interventional Cardiovascular medicine and the official annual meeting of the European Association of Percutaneous Cardiovascular Interventions (EAPCI). The annual conference is created by and for the cardiovascular community to share knowledge, experience and practice through a series of case presentations, meetings, workshops and discussions. Encouraging the advancement of cardiovascular medicine, awards are also given out in recognition for innovative research and clinical breakthroughs.

NUHCS is back at the EuroPCR 2023 conference for the third time in seven years

LIVE case presentations allow the audience to interact with the operators and the panel in real time, which enhance the learning experience especially for complex techniques. It makes learning collaborative and immersive whilst ensuring patient safety is not compromised. Amongst five other invited European live transmission centres this year, NUHCS was the only centre in Asia and presented two cases.

The first case was led by A/Prof Mark Chan Yan Yee, Senior Consultant, Department of Cardiology, NUHCS, assisted by Prof Lee Chi Hang Ronald, Senior Consultant, Department of Cardiology, NUHCS. The team showcased a complex two-stent Distal¹ Left Main² Bifurcation³ Stenting procedure, performed with the aid of Intravascular Imaging⁴.

The second case was led by Prof Tan Huay Cheem, Senior Consultant, Department of Cardiology, and Senior Advisor, NUHCS, as he performed a complex multivessel coronary intervention, and demonstrated the use of novel non-invasive and invasive physiologic tools to guide in the approach to the procedure.

He was assisted by Dr Koo Chieh Yang Christopher, Consultant, Department of Cardiology, NUHCS.

Asst Prof Chan Koo Hui, Senior Consultant, Department of Cardiology, NUHCS, served as the commentator for both LIVE cases.

Attended by more than 12,000 delegates worldwide, the presentation from NUHCS served as an invaluable opportunity to provide an Asian perspective to the contemporary interventional approach to patients with increasingly complex disease and comorbidities.

¹Distal – A body part that is situated further away from the center of the body.

²Left Main – The left main coronary artery that supplies blood to the left side of the heart.

³Bifurcation – Divided into two parts.

⁴Intravascular Imaging – A tool to capture the image of diseased vessels for diagnosis and treatment.

ARTICLE BY

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



Prof Tan is a Professor of Medicine at the Yong Loo Lin School of Medicine, National University of Singapore and holds 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.

GAINING A WIDER PERSPECTIVE

Cardiology exchange programme between Singapore and Japan

From May 2022 to February 2023, a group of interventional cardiologists from NUHCS led by Prof Tan Huay Cheem, Senior Consultant, Department of Cardiology and Senior Advisor, NUHCS, participated in a virtual hospital exchange with Japanese Kitasato University Hospital.

Consultants from NUHCS' Department of Cardiology – Dr Sim Hui Wen, Dr Chen Zhengfeng Jason, and Dr Koo Chieh Yang Christopher – joined the nine-month programme where participants delved into the complexities of contemporary approaches in interventional cardiology, with a focus on Percutaneous Coronary Intervention¹, Intravascular Imaging², and the evaluation of Microvascular Disease³.

Prof Junya Ako, a cardiologist at the Kitasato University and Hospital in Tokyo, Japan, whose research interests focus on spontaneous coronary artery dissection and hypertension, led the Japanese team.

Deep engagement between Prof Junya Ako's team and NUHCS cardiologists, with presentations on individual patient case studies, allowed for the sharing of skills and greater learning on how the coronary arteries adapt and adjust, even after months of post-stenting (opening of heart arteries). The collaborated

“Lifelong learning forms an integral part of a doctor's training, and it was interesting to exchange different perspectives with our fellow Japanese cardiologists.”

Dr Koo Chieh Yang Christopher
Consultant, Department of Cardiology, NUHCS



learning was supported by research studies on serial intravascular imaging.

In addition, new perspectives of protocols and management strategies for patients with non-obstructive Coronary Artery Disease and suspected Microvascular Dysfunction were shared during their case-based discussions.

This virtual learning session is one of the many programmes NUHCS has embarked on that allows for physicians across different parts of the world to gather efficiently and conveniently.

Sharing knowledge, experiences and observations based on different patient profiles not only add new insights for the cardiologists, but such knowledge-sharing allows doctors to examine new strategies and methodologies which translates to optimal cardiovascular care and outcomes for patients.

¹**Percutaneous Coronary Intervention** – A non-surgical procedure to treat obstructed blood vessels by inserting a catheter and placing a stent to keep the vessel open.

²**Intravascular Imaging** – A tool to capture the image of diseased vessels for diagnosis and treatment.

³**Microvascular Disease** – Condition where small blood vessels feeding the heart muscle do not work as they should.

ARTICLE BY

Dr Koo Chieh Yang Christopher
Consultant, Department of Cardiology, NUHCS



Dr Koo is presently a Consultant at NUHCS having completed his cardiology training in 2018 and concurrently obtained his Master of Clinical Investigation. His research interests are focused on coronary artery disease and examines the effects of sleep-disordered breathing on cardiovascular disease. Presently, he is also investigating the effects of cancer and cancer treatment on the cardiovascular system.



A Tribute To Champions Of Heart Health

*At the Singapore
Heart Foundation 53rd
Anniversary Celebration*



SHF has been an impetus in Singapore's pursuit of optimal heart health and is proud to have positively impacted the lives of many individuals through its various initiatives.



Prof Tan Huay Cheem
*Senior Consultant, Department of Cardiology, and
Senior Advisor, NUHCS*

Celebrating its 53rd anniversary, the Singapore Heart Foundation (SHF) hosted a gala dinner to recognise and honour those who have contributed to the Foundation's achievements in preventing heart disease and promoting heart health for Singaporeans over the years.

As a strategic partner, many NUHCS heart specialists were invited to grace this event in honour of their involvement in the Foundation and contributions to the community through SHF-fronted initiatives.

Held on 8 April, a total of 300 guests attended the gala dinner with the President of Singapore, Halimah Yacob, gracing the event as the guest-of honour. Emeritus Senior Minister Goh Chok Tong was also present as a patron of SHF.

Since its inception in 1970, SHF has been instrumental in Singapore's efforts to prevent heart disease and promote heart health in the population. As a social service agency, SHF also offers financial assistance to financially disadvantaged heart patients for emergency relief and medical treatment.

Some of the key highlights in the Foundation's history include the introduction of Asia's first-ever Cardiopulmonary Resuscitation (CPR) Self-Learning Kiosk in 2018, and the development of the female CPR mannequin vest in 2021 to help community first responders get accustomed to doing chest compressions around female breasts and

pastoring the Automated External Defibrillator (AED) pads with minimal chest exposure.

Over the years, the Foundation has also established three cardiac rehabilitation centres as a vital means of supporting heart attack patients through recovery and empowering them to make positive lifestyle changes. These centres have helped over 2,500 patients and at-risk individuals through supervised exercise sessions, nutrition counselling, and patient education on heart disease conditions, treatment, and lifestyle modifications.

As a social service agency, SHF continues to work with NUHCS by connecting heart patients from this National Centre to their Foundation after patients have completed their basic cardiac rehabilitation programme, to provide them with a seamless extended support for their recovery.

In acknowledgement of the leadership of SHF who has spearheaded its growth through the years, President Halimah Yacob presented tokens of appreciation to the chairpersons of the Foundation – Dr Low Lip Ping (1992-2008), Prof Terrence Chua (2008-2019), and Prof Tan Huay Cheem (2019-present), the latter whom also led NUHCS as the Centre Director from 2008 to 2021 and is now serving as the centre's Senior Advisor.

ARTICLE BY

Prof Tan Huay Cheem
*Senior Consultant, Department of Cardiology,
and Senior Advisor, NUHCS*



Prof Tan is a Professor of Medicine at the Yong Loo Lin School of Medicine, National University of Singapore and holds 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.

NUHCS Opens NEW HEART CLINIC AT JURONG MEDICAL CENTRE

Specialist cardiac services now closer to home

In order to enhance the heart care services provided to patients in the community, NUHCS Heart Clinic @ Jurong Medical Centre (JMC) is bringing cardiac specialised services nearer to them so they can be treated for chronic diseases, which require long-term follow-ups, as well as for urgent cardiac disorders.

Recently opened in January 2023, NUHCS Heart Clinic @ JMC offers less waiting time and easier access to a heart clinic for patients referred in by their primary care physicians - such as General Practitioners (GPs) and polyclinic doctors.

As the clinic expands, more complex cardiac conditions and services will be offered, such as Transthoracic Echocardiography (ultrasound scan of the heart), Treadmill Exercise testing and Holter monitoring (24-hour Electrocardiogram) of the heart, which is mainly used to detect heart rhythm disorders.

NUHCS Heart Clinic @ JMC will also spearhead a new health coaching service to provide personalised care to patients. The Health Coaching clinic will help patients develop healthy habits and sustain

their motivation to make positive changes to their lifestyles, especially for heart attack survivors who are adjusting back to their regular lifestyle.

As more services are added to the NUHCS Heart Clinic @ JMC, patients can also undergo their basic diagnostic tests here without having to travel to other NUHCS Heart Clinics at the National University Hospital (NUH) or Ng Teng Fong General Hospital (NTFGH).

The same NUHCS doctors providing clinic sessions at JMC also practice at the NUHCS Heart Clinic @ NUH. However, as the new clinic is based in the community, the services provided have been tailored to be more accessible and personalised.

At this clinic, patients will be seen by consultant cardiologists sooner. Eligible patients will also enjoy similar healthcare subsidies.

NUHCS Heart Clinic @ JMC is the fourth heart clinic service provided by NUHCS, in addition to NUHCS @ NUH, NUHCS @ NTFGH and NUHCS @ Alexandra Hospital (AH).



NUHCS Heart Clinic @ Jurong Medical Centre (JMC)

Level 2, Clinic B, Cardiology
60 Jurong West Central 3
Singapore 648346
(Located at The Frontier Community Place, 400m walk from Boon Lay MRT Exit D)

8.30am to 5.30pm
(Mondays to Fridays)
Closed on Weekends & Public Holidays

6908 2222

appointment@nuhs.edu.sg

ARTICLE BY

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



Asst Prof Lim has a special interest in heart rhythm disorders and its treatment. He is also the Head of Community Cardiology at NUHCS and his main focus is integrating the care of heart patients by specialists and primary care physicians. He has served as a council member of the Singapore Cardiac Society since 2015 and was its president from 2021 - 2023. He also holds a doctoral degree from the University of Sydney for his research work on atrial fibrillation ablation techniques.

A TICKING TIME BOMB

Singapore's first large scale aortic screening programme to detect fatal conditions

Beginning from the lower-left chamber of the heart, the aorta looks like a candy cane, arching upwards a short distance before running downwards through the chest cavity into the abdomen. It is the largest blood vessel carrying oxygen-rich blood from the heart to vital organs throughout the body.

As the body's main blood supply, a diseased or damaged aorta could lead to a medical emergency of massive internal bleeding if not attended to immediately. Common conditions which affect the aorta include an aneurysm or a dissection.

Aortic Aneurysms are mainly caused by a weak area in the aorta that results in a bulge or a swelling. The bulge can get bigger over time with the danger of bursting (rupture). Treatment options depends on the size of the bulge and how fast it is growing.

An Aortic Dissection refers to a tear along the elastic wall of the aorta, which can lead to massive and rapid blood loss if the tear completely dissects (cuts through) the aorta.

Unfortunately, both conditions do not have any obvious symptoms until it is at the risk of rupture and death. This explains why these deadly conditions are often diagnosed when patients are being screened for other conditions, and the swelling of the aorta is being discovered incidentally.

Mr Donald Teo experienced persistent and excruciating pain in his lower back that did not seem to go away even after taking painkillers, thus affecting his sleep and daily activities. When he finally sought help from a General Practitioner (GP), he was immediately admitted to the National University Hospital (NUH) Emergency Department where it was discovered that his aorta had a leak that caused the severe pain.

Following the advice of his doctor, he immediately proceeded with a minimally invasive endovascular repair, where a stent was placed in his leaking aorta to reduce the bulge and and minimise the chance of rupture.

Endovascular repair requires regular follow-up visits with an aorta specialist as problems after the procedure may not show any symptoms. Hence, follow-up checks are important to ensure that no relapse occurs.





Watch this feature on Channel NewAsia here



In Mr Teo's case, his bulge reduced to half in size over two years after having the stent first inserted in his abdominal aorta.

The goal of treatment is to avoid a rupture, as research has shown that less than half survive for patients who are suffering from a ruptured aorta.

The only way to prevent a rupture is to detect the Aneurysm or Dissection early through screening, done through an ultrasound or preferably, Computed Tomography (CT) scans where a dye is inserted intravenously to capture an image inside the body.

If detected early, the treatment for Aortic Aneurysms or Dissections could be managed with medication or monitored with a "wait-and-see" approach, depending on where the Aneurysm or Dissection occurs, its size and the likelihood of rupture. In some people, Aneurysms can remain small and not pose the risk of rupture.

It is not clear why and how fast Aneurysms or Dissections grow. However, risk factors such as being male, having hypertension, and being a smoker can increase the risk of rupture. Genetics seem to play a role as well.

To better understand why and how these conditions occur, NUHCS is currently conducting a study where an aorta screening will be offered to participants.

As early detection will help save lives, NUHCS also hopes to better identify individuals at high-risk of a rupture in their aorta through this study.

Data collected from this study will further evaluate the necessity of a collaboration with the Ministry of Health, for possible implementation of a National Health Screening Programme for Aortic Diseases, for eligible individuals in the population.



NUHCS AORTIC SCREENING PROGRAMME

NUHCS Aortic Centre is offering screening to the first 1,000 participants who meet the following criteria:

- Male aged 65 and above
- Smoker
- Has existing coronary artery disease

Eligible participants will undergo an ultrasound scan of their aorta, at no cost.

For more information, interested readers can contact NUHCS Aortic Centre.

 aortic_centre@nuhs.edu.sg

PUSHING BOUNDARIES IN LUNG SURGERY

All-in-one keyhole

While thousands of patients have benefitted from UVATS, we want to continue innovating to push boundaries in finding better and safer techniques that make a difference for our patients.

A/Prof John Tam Kit Chung,
Head and Senior Consultant,
Division of Thoracic Surgery,
Department of CTVS, NUHCS

ARTICLE BY

A/Prof John Tam Kit Chung
Head and Senior Consultant,
Division of Thoracic Surgery,
Department of CTVS, NUHCS



A/Prof Tam is the founding Head of Thoracic Surgery at NUHCS. He specialises in performing minimally invasive single-port keyhole surgery using advanced techniques in Uniportal Video-Assisted Thoracoscopic Surgery (UVATS). His research has been published in many high-impact medical and scientific journals. He also serves as a member of the Singapore Residency Advisory Committee for Cardio-Thoracic Surgery and has won many awards in recognition of his service to patients and his contribution to the field of academic surgery.

Dr Lowell Leow
Associate Consultant, Division of Thoracic Surgery,
Department of CTVS, NUHCS



Dr Leow is a cardiothoracic surgeon with a special interest in minimally invasive thoracic surgery, lung nodule surgery, mediastinal mass surgery, hyperhidrosis, and Extracorporeal Membrane Oxygenation. Having graduated in 2021 from his cardiothoracic surgery residency as valedictorian, he continues to be active in research and mentorship.

“What is easy for the surgeon can be hard on the patients,” said A/Prof John Tam Kit Chung, Head and Senior Consultant, Division of Thoracic Surgery, Department of CTVS, NUHCS, as he looked back on his journey as a thoracic surgeon for the past 25 years.

Patients at NUHCS with lung conditions are usually in their 60s, 70s, and even their 80s. This makes open-chest or multiple-incision surgeries riskier for older patients, as they not only take a longer time to heal but tend to have other conditions that may complicate the surgery.

In his pursuit to reduce post-operative pain for lung surgery patients, A/Prof Tam looked to find a better technique that would be safe, reduce surgical risks and have better outcomes for patients. This led to the development of a new surgical technique – Uniportal Video-Assisted Thoracic Surgery (UVATS).

Compared to the conventional multi-portal Video-Assisted Thoracic Surgery (VATS) which uses a few small incisions on the patient's torso to access the lungs, UVATS uses only one small cut and is currently the least invasive technique for lung surgery.

The surgical technique is performed through a single cut of about 3cm, at the side of the chest. Through this cut, a small telescope is inserted into the body to magnify the insides of the thoracic region on a video monitor. Surgeons then proceed with the operation using specially made minimally invasive instruments which are small, thin and chopstick-like, in order to perform the surgery.

In 2009, A/Prof Tam led his team to perform the first UVATS in Singapore. He has since gone on to mentor a generation of thoracic surgeons in this single-incision surgery technique, developing the NUHCS Lung Surgery Centre to its current pinnacle of excellence.

Apart from lung surgery, thoracic surgeons also perform surgeries in the chest area involving organs such as the chest wall (ribcage and breast bone), the pericardium (fluid-filled sack that surrounds the heart), the sympathetic chain (structure of nerve fibres spanning





from the base of the skull to the base of the spinal column), and the diaphragm. The team is also trained to manage airway emergencies involving the trachea and bronchus (windpipe).

Committed to providing the highest standard of care for patients and advancing the field of thoracic surgery, A/Prof Tam and his team continue to pursue innovative solutions through cutting-edge research and education.

Watch this video on
NUHCS' YouTube!



NUHCS LUNG SURGERY CENTRE

Established in 2007, NUHCS Lung Surgery Centre today carries out more than 400 lung surgeries each year. It is the first centre in Singapore to perform UVATS in 2009 and is the only centre in Singapore with a full team of experienced UVATS thoracic surgeons supported by a team of specialty care nurses and case managers. In addition to the wide range of lung conditions, the Centre also manages rarer conditions such as Hyperhidrosis (excessive sweating), Pectus Chests (pigeon or funnel chests), and Rib Fractures.

CONDITIONS THAT MAY REQUIRE LUNG SURGERY

- ***Collapsed Lung (Pneumothorax)*** – When air leaks into the area between the lungs and the ribcage, this leads to the lung collapsing. Drainage tubes are used to suction the air out and re-expand the lung while the lung is repaired to prevent it from collapsing again.
- ***Fluid around the Lungs (Effusion or Empyema)*** – Fluid may build up in the chest area around the lung as a result of an infection or illness such as Pneumonia. Surgery is performed to remove all the fluid and infected material from the area to help the lungs heal.
- ***Lung Nodule or Lesion*** – An abnormal growth that forms in a lung usually after an infection or inflammation. Most lung nodules are benign and do not require treatment. However if the growth presses against the airway, it may cause chest pain. Surgery can be performed to remove the nodule.
- ***Lung Mass*** – An abnormal growth in the lung area that is more than 3cm in diameter. Lung masses could be benign or malignant and are determined by surgery to remove a lobe of the lung and the neighbouring lymph nodes for further tests.

**DID YOU
KNOW?**

**LUNG CANCER IS THE #1 CANCER
KILLER IN MEN AND #2 IN WOMEN
IN SINGAPORE.**

Unfortunately, most patients die of lung cancer due to late detection. If detected and treated early, lung cancer can be treated with more than 90% survival rate of patients in five years. Aggressive treatment of early lung cancers has also shown excellent survival outcomes with minimal long-term side effects.

Studies have shown that UVATS offers faster recovery for patients who detect lung masses early. With advanced medical technology, later stages of lung cancers are now amenable to targeted therapy with good long-term disease control.

For more information, please visit www.nuhcs.com.sg.

SAVED FROM DEADLY INFECTION

ECMO: A key life-saving treatment technique



17-year-old patient, Dante Lin, with his mother and the team behind his recovery process.



WHAT IS EXTRACORPOREAL MEMBRANE OXYGENATION (ECMO)?

ECMO is a highly specialised and complex form of life support. It takes over the functions of the heart and lungs, and is used for the most critically ill patients when no other treatment works. This life support treatment technique is very resource intensive, requiring an experienced team of interprofessional medical experts, including specially trained nurses, perfusionists, cardiac surgeons and Intensive Care Unit (ICU) physicians.

ECMO does not treat the disease or injury that led to a patient's heart or lungs to fail. An ECMO machine simply provides support for the patient by taking over the bodily functions of heart or lungs. In this way, ECMO helps to save lives by giving the medical team more time to treat the underlying disease or until organs for transplant become available.

For more than 60 days, 17-year-old Dante Lin fought for his life relying on the Extracorporeal Membrane Oxygenation (ECMO) life support.

In June 2022, Mr Lin experienced severe pain in his knee and was admitted to the National University Hospital (NUH). Unexpectedly, his condition rapidly deteriorated over the next 12 hours. He fell unconscious and his oxygen levels dropped so low that he was on the verge of a cardiovascular collapse.

He was not responding to any treatment and was on the brink of death.

With no other viable options, the medical team from NUHCS' Cardiothoracic Intensive Care Unit (CTICU) quickly put him on ECMO to sustain his life. From then, a multidisciplinary team comprising healthcare professionals from both NUHCS and NUH kept a close watch on Mr Lin's condition, adjusting his treatment accordingly.

"It was highly likely that Mr Lin would have died that same night had he not been stabilised with ECMO," said A/Prof Graeme MacLaren, Director, Cardiothoracic Intensive Care Unit (CTICU) and Senior Consultant, Department of CTVS, NUHCS. He was also the lead on Mr Lin's medical team.



Few clinicians will need to apply the results of this study in clinical practice but, for those who do, it will probably save lives.

A/Prof Graeme MacLaren,
Director, CTICU and Senior Consultant,
Department of CTVS, NUHCS

Typically, patients only need ECMO for one to two weeks. Mr Lin was the first such patient at NUH who depended on ECMO life support for much longer. In total, he spent 62 days on ECMO and 98 days in the CTICU.

While in CTICU, he had good days and bad, experiencing multiple life-threatening situations. At one point, the medical team had to put him on three different types of ECMO as no air could go in or out of his lungs.

For two whole months, Mr Lin remained unconscious while the ECMO machine took over the bodily functions of his heart and lungs. Connected to the equipment by a number of tubes, wires and cables, his medical team monitored his condition closely, frequently adjusting the amount of support he required.

Eventually, he woke up and slowly regained his strength, weaning off the ECMO life support in stages. His heart and lungs managed to stabilise, and he could finally return home on 26 Sep 2022.



Doctors discovered that Mr Lin's knee pain had been triggered by a bacteria, "golden staph", infection. The bacteria entered his bloodstream and spread quickly to his lungs, which later induced a severe septic shock.

Septic shock is a life-threatening condition when blood pressure falls to dangerously low levels during an infection. The use of ECMO in septic shock cases is extremely rare, even in the world's busiest ECMO centres.

Nonetheless, Mr Dante Lin had survived his ordeal against all odds.

A/Prof MacLaren said, "ECMO is essentially a heroic form of life support, used only for the sickest patients in whom no other treatment has worked and without which they would otherwise die. ECMO use is increasing worldwide, in part because of the COVID-19 pandemic, but also because clinicians are becoming more skilled at using it."



Extracorporeal Life Support: THE ELSO RED BOOK 6TH EDITION

Written by over 200 experts from around the world with A/Prof Graeme MacLaren as the Editor-in-Chief, this new edition is the definitive reference text on Extracorporeal Life Support, providing both

the latest evidence and practical advice on

how to clinically manage patients of all ages. The book has been completely rewritten with chapters on new topics such as Emerging Infectious Diseases, Bedside Ultrasound, Cannulation, ECLS Nomenclature, Extracorporeal Therapy to Facilitate Organ Donation, Physiotherapy and Mobilization, Anesthesia, and ECMO Crisis Management.

EXTRACORPOREAL LIFE SUPPORT ORGANIZATION (ELSO)

ELSO is an international non-profit consortium of healthcare institutions, researchers, providers, and industry partners. They provide support to those delivering extracorporeal life support through continuing education, guidelines, original research, publications, and a comprehensive registry of ECMO patient data. Formed in 1989, ELSO is the world's largest ECMO society with over 700 member centres worldwide.



In 2011, the National University Hospital (NUH) became the first hospital in Singapore to join ELSO. NUH is an officially accredited, international training site for ELSO, running the only ELSO-accredited training programme in Singapore. A/Prof MacLaren is the current president of ELSO starting 1 Jan 2023 - the first president outside of North America in ELSO's 33-year history.

ARTICLE BY

NUHCS Pulse Editorial

"NUHCS Ask The Experts"

Questions about your heart answered

"NUHCS - Ask the Experts" is a series of informative 60-second videos where NUHCS experts answer your burning questions about cardiovascular health. From common misconceptions about diet to questions about living after a heart bypass, learn more about keeping healthy through this series.

Have a burning question you want answered? Share your thoughts in the comment section and it might be featured next!

Fresh videos drop every second and last Friday of the month.



Hear what **Asst Prof Jimmy Hon Kim Fatt**, Senior Consultant, Division of Adult Cardiac Surgery, Department of CTVS, NUHCS, has to say.



After bypass, no need to keep to a healthy diet?

Prof Lee Chi Hang Ronald, Group Director, Clinical Research and Senior Consultant, Department of Cardiology, NUHCS, shares the effects of long-term sleep deprivation on the heart!





Asst Prof Vitaly A. Sorokin, *Director, Aortic Centre Programme and Senior Consultant, Division of Adult Cardiac Surgery, Department of CTVS, NUHCS*, explains what it means when your "heart bursts".



Can our hearts burst?



Asst Prof Lim Toon Wei, *Head of Community Cardiology and Senior Consultant, Department of Cardiology, NUHCS*, busts myths about implantable heart devices.



Asst Prof Kristine Teh Leok Kheng, *Senior Consultant, Division of Adult Cardiac Surgery, Department of CTVS, NUHCS*, shares how a little drink can go a long way towards good health.



FOLLOW US

on our social media channels as we share more interesting heart-health tips.



Heart Disease Raises Dementia Risk

Are women at higher risk than men?



Are you ruled by your head or your heart?

There is scientific basis for the heart-brain axis that is no longer a mere sensational metaphor. Evolving research has shown that women with heart disease are strongly linked to cognitive decline (Dementia), more so than men.

Dementia is a general term describing conditions which lead to a decline in the mental ability, severe enough to disrupt daily life. Dementia is not a normal part of aging and is instead, caused by damage to brain tissues which affects thinking, behaviour and feelings. There are different types of Dementia including Alzheimer's Disease, Vascular Dementia and Lewy Body Dementia.

In the recent Well-being of the Singapore Elderly (WiSE) nationwide study, the prevalence of Dementia was found to be one in every 10 people aged 60 years and above. This disease is well-known to affect more women than men, where two out of three people with Alzheimer's Disease are women.

"The heart holds answers the brain refuses to see."

Rob Kall, American inventor and journalist.

It is also strongly associated with various cardiovascular disorders. Heart and brain disorders more frequently co-exist than by chance alone, due to having common risk factors and a degree of interaction.

Women with history of heart disease are more likely to experience cognitive loss with age

There has been increasing evidence on a broad scale documenting women's predisposition to Dementia with heart-related issues. This is especially so for older and postmenopausal women.

In a long term study published in the Journal of the American Heart Association, of more than 6,000 women aged 65-79, female heart attack survivors are twice as likely to experience decline in memory and cognition.

In another population-based cohort study of more than 500,000 individuals, data showed that women with Coronary Heart Disease and Heart Failure were 1.6 and 1.3 times more likely to develop Alzheimer's Disease than men with the same condition.

Even without Heart Disease, women with Hypertension and Diabetes are at a higher risk of cognitive decline than men. The usual risk factors for Heart Disease and Stroke, applies to Dementia too.

Heart Disease is more than just blocked or damaged arteries, it is also an inflammatory process that can affect the turnover of brain cells, leading to small bits of tissue death in the brain over time.

Heart Disease can have a long-term impact on the brain – what is good for your heart is good for your head. Women especially, must wise up.

Asst Prof Low Ting Ting

Director of Women's Heart Health Programme and Senior Consultant, Department of Cardiology, NUHCS

Heart disease is reversible, dementia is not

80% of Cardiovascular Disease is preventable by having a healthy lifestyle.

Everyone, men or women, can do their part by maintaining a healthy diet by incorporating a daily intake of such as fresh fruits and vegetables, staying physically and mentally active, and paying attention to their blood pressure, blood sugar and cholesterol levels.

All these efforts can not only prevent Heart Disease, but also prevent cognitive impairment and Dementia.

ARTICLE BY

Asst Prof Low Ting Ting

Director of Women's Heart Health Programme and Senior Consultant, 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 and 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. She also an active educator at NUHCS and the National University of Singapore (NUS).

WOMEN ARE MORE LIKELY TO HAVE RISK FACTORS LINKED TO INCREASED RISK OF DEMENTIA, SUCH AS:

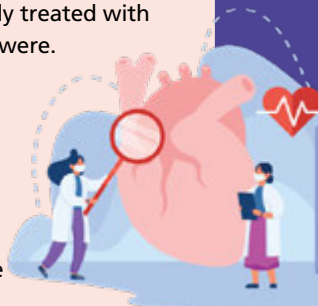


Increased prevalence/severity of Hypertension & Diabetes (especially >64 years old)

Increased Stroke Risk with Atrial Fibrillation (AF), Bypass Surgery, Aortic Valve Procedures

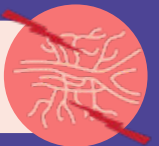
When it comes to stroke prevention for those with AF, women were found to have been less aggressively treated with blood thinners than men were.

Women are also found to have higher rates of stroke when undergoing Heart Bypass Surgery and Transcatheter Aortic Valve Procedures, but reasons for this difference is still unclear.



Systemic Inflammation

Microvascular (small coronary vessel) Disease / Dysfunction



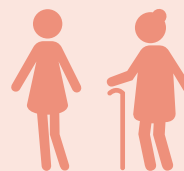
Oestrogen / Androgen (sex hormone) balance

Physical inactivity and obesity



Increased longevity

As women generally have a longer life expectancy than men, women are more at risk of developing Dementia with age. Unfortunately, this also means that



women living with heart disease and Dementia carry a larger burden of disease in their lifespan compared to men.

THE MATH IN HEART MEDICINE

ARTICLE BY
NUHCS Pulse
Editorial

CVRI Biostatistician Dr Chan Siew Pang shares more about his role

Biostatistics play an important role in medical research as it is an indispensable tool to understand the cause, natural history, and treatment of diseases. It encompasses the design of biological experiments to collect and analyse data from these experiments and interprets scientific data that is generated to improve health sciences.

Besides designing biological experiments to improve medical technologies and methods, a biostatistician also plays a critical role in evidence-based medicine, which is the basis for doctors to recommend treatment for patients.

Dr Chan Siew Pang, Biostatistician at the Cardiovascular Research Institute (CVRI), NUHCS, sees the math in heart medicine. As a biostatistician, he frames medical problems into applied statistics, using models and data to study the problems to find a coherent logic that explains and predicts how diseases occur.

What have been some of the highlights of your career?

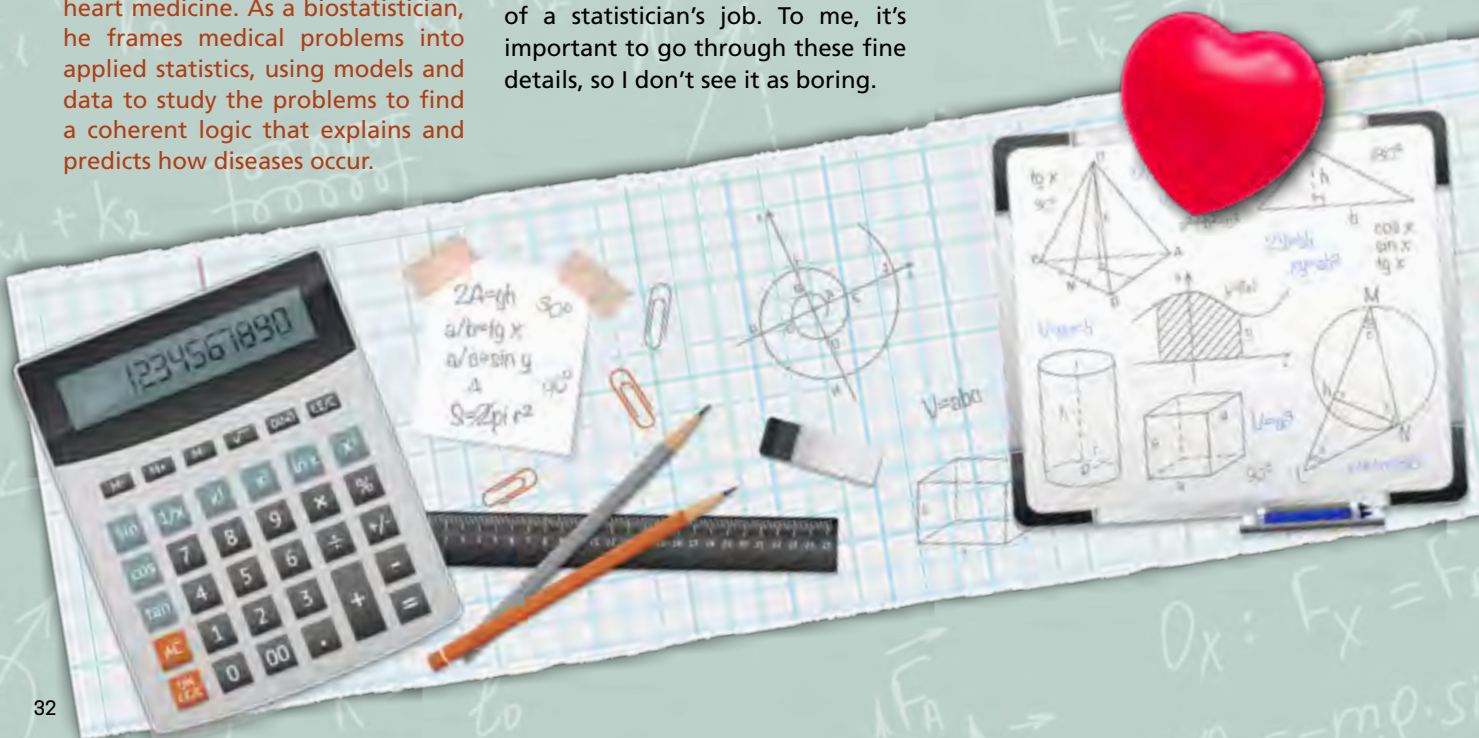
As a mathematician, numbers excite me. Getting the research papers published is always a celebration for me; the more the merrier! Research papers are peer-reviewed with the data being scrutinised before it gets published. Therefore, having our papers published is a validation of the work we put in. Some research is completed in a short time within months, but many take years.

What are some of the challenges in your job?

The day-to-day job could be very mundane and repetitive, having to scrutinise the data, making the job seem boring. But, this is the basis of a statistician's job. To me, it's important to go through these fine details, so I don't see it as boring.

Perhaps one of the challenges for me is working in the medical industry. Essentially, I am a statistician by training. However, since the research is about cardiovascular medicine, I need to learn about the subject to be able to translate the data into conceivable hypotheses. This makes my role interesting, particularly so when compared to teaching statistics, which I did in my previous role.

Here, the work is intellectually stimulating. I have to have some understanding of the problems the doctors are trying to solve to ensure that the data is robust enough to withstand the necessary scrutiny of other medical experts during the research evaluation.



The use of evidence-based research and practices in statistics enables us to see the bigger picture and not be misled by our own bias or pre-conceived notions.

Dr Chan Siew Pang
Biostatistician, CVRI, NUHCS

How does your work translate into patient care?

The tricky issue is that all research begins with a question or a curiosity – we start with going down the path of “why something happens”. This first step certainly does not give you the final answer as to how we cure a disease. However, it leads us to a greater understanding of human bodies, and cardiovascular medicine – what is happening with a disease and what works.

With this increased knowledge, our findings then inform our clinicians on how we can improve patient care. Eventually, in the end, our research will always be looking to improve the health of people such as how we can be more precise and effective with our treatment strategies, how to prevent diseases, and how to help people live healthier.

Do you have a favourite piece of research?

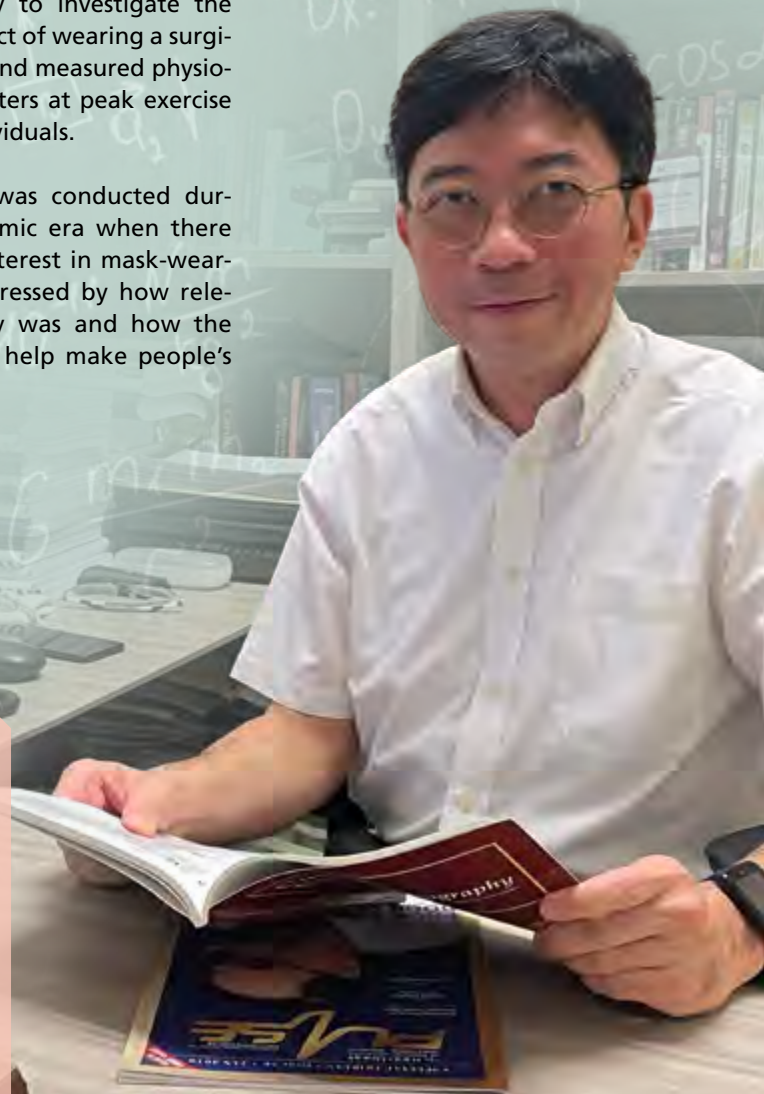
One of my favourite pieces has to be “Effect of Surgical Mask Use on Peak Performance During Exercise Treadmill Testing – A Real World, Crossover Study” published in 2022. It was a study to investigate the real-world effect of wearing a surgical face mask and measured physiological parameters at peak exercise in healthy individuals.

The research was conducted during the pandemic era when there was a great interest in mask-wearing. I was impressed by how relevant the study was and how the findings could help make people’s lives easier.



CARDIOVASCULAR RESEARCH INSTITUTE (CVRI)

CVRI is the research pillar of NUHCS focused on delivering new diagnostic, prognostic, and therapeutic tools for the treatment of cardiovascular diseases that translates to better patient care. Started in late 2009, CVRI has since expanded its facilities with the engagement of over 100 basic scientists, clinician-scientists, and support staff. It now boasts a broad range of basic science and clinical trial capabilities in the areas of molecular biology, cardio-immunology, vascular biology, small and large animal surgery, early phase cardiovascular trials, drug and device development, biostatistics, bioinformatics, and health-services research to achieve these goals.



Advancing CARDIOVASCULAR RESEARCH

ARTICLE BY

NUHCS Pulse Editorial

NUHCS wins two new research awards

Two NUHCS researchers have recently won awards in recognition for the high potential their research findings would bring in advancing cardiovascular medicine and care in patients. These awards are bestowed by an independently selected scientific committee of reputable experts.

EUROPEAN SOCIETY OF CARDIOLOGY ASIA CONFERENCE 2022 YOUNG INVESTIGATOR AWARD

Research: Interplay between Post-Myocardial Infarction Ejection Fraction and Atrial Fibrillation: Implications for Ischemic Stroke.

With little data on the interplay between post-acute Myocardial Infarction (MI)¹, Left Ventricular Systolic Dysfunction² (LVSD) and Atrial Fibrillation (AF) and the impact on subsequent Acute Ischemic Stroke (AIS)³, particularly among patients with moderately reduced Ejection Fraction (EF)⁴, the research team conducted a study to further investigate the association between low EF, AF and the risk and severity of AIS.

Using data from the Singapore Myocardial Infarction Registry (SMIR) and Singapore Stroke Registry (SSR), NUHCS researchers were able to characterise the relationship between low Left Ventricular Ejection Fraction (LVEF), Atrial Fibrillation (AF) and stroke post-Acute Myocardial Infarction (AMI) in Singaporeans, laying the foundations for further research on treatments to address this, which may eventually impact the lives of more than 11,000 patients with MI in Singapore per year.

It is an incredible opportunity to be able to present and share our research with top cardiology researchers in Asia at one of the key cardiology conferences. Winning this award is the icing on the cake and is a recognition of the quality of our research at NUHCS.

Dr Jamie Ho Sin Ying, Medical Officer, NUHS



DR JAMIE HO SIN YING

Medical Officer, NUHS

Dr Ho completed her medical education at the University of Cambridge and foundation clinical training in the United Kingdom. She is currently a medical officer in Alexandra Hospital with an interest in cardiology. As an avid researcher, she has more than 60 peer-reviewed publications on the topics of cardiovascular and cerebrovascular diseases.

NATIONAL MEDICAL RESEARCH COUNCIL (NMRC) TRANSITION AWARD (TA)

Research: **NEURO**protection via optimizing cerebral blood flow
afTercArdiaC arrest (NEURO-INTACT) study

Brain damage accounts for most of the deaths and disabilities in patients admitted after cardiac arrest. Therefore, ensuring sufficient blood supply to the brain through adequate blood pressure is essential in reducing brain injury. However, the current standard practice of assigning a fixed blood pressure target to these patients fails to account for the varying dysfunction in cerebral autoregulation (in-built protective mechanism preserving blood flow to the brain) and phasic changes in blood flow to the brain after cardiac arrest.

This pilot project studies resuscitated cardiac arrest patients, where NUHCS researchers aim to compare the effect of an individualised blood pressure strategy targeting blood flow to the brain with standard practice, on organ injury and clinical outcomes.

An individualised approach to blood pressure control targeting cerebral blood flow, if proven to be successful, could be incorporated into a protocolised, bundle of post-cardiac arrest care to improve brain recovery after cardiac arrest. Such a precision medicine strategy could potentially be extended to multiple diseases beyond cardiac arrest.



ASST PROF LIM SHIR LYNN

Director of Clinical Trials Unit and Senior Consultant, Department of Cardiology, NUHCS

Asst Prof Lim's research interest lies in acute cardiovascular conditions, aligned with her sub-specialty of cardiac critical care. Her research studies focus mainly on out-of-hospital cardiac arrest and cardiorenal syndrome. She obtained her Master in Clinical Investigation (MCI) from NUS in 2016 and currently heads the Clinical Trials Unit in NUHCS. She is a member of the Pan-Asian Resuscitation Outcomes Study (PAROS) as well as National Targeted Temperature Management (TTM) Workgroup, working to improve the care and outcomes of cardiac arrest patients in Singapore and the region.

Working on this project gives me the opportunity to collaborate with a multi-disciplinary team of clinicians – neurologists, intensivists, cardiologists, emergency physicians, neuropsychologists, biostatisticians and industry partners, who form a nurturing vibrant research community within adult critical care in Singapore.

Asst Prof Lim Shir Lynn

Director of Clinical Trials Unit and Senior Consultant, Department of Cardiology, NUHCS

¹**MI** – A heart attack.

²**Systolic Dysfunction** – A specific type of heart failure that occurs when the heart's left ventricle can contract normally.

³ **AIS** – The sudden loss of blood flow to an area of the brain causing damage to some tissues.

⁴**EF** – A measurement of the proportion of blood that is pumped out by the heart with each contraction.

Moderate Aortic Stenosis: Culprit Or Bystander Of Cardiovascular Mortality

Research by NUHCS' cardiologists yields new insights on monitoring & treatment to improve survival rates

Researchers from the Department of Cardiology, NUHCS, Adj A/Prof William Kong Kok Fai, Adj Prof Poh Kian Keong, Dr Sia Ching Hui, and Dr Nicholas Chew, engaged in an international multi-centre study, cataloguing and analysing data of over 2,000 patients with moderate Aortic Stenosis (AS)¹ from five centres across four countries in Asia, Europe, and North America.

The goal of the study was to review contemporary data on morbidity and mortality associated with moderate AS, and when medical intervention is warranted.

This came about following recent observational studies showing that moderate AS was associated with an increased risk of cardiovascular events and mortality. AS is the most common valvular heart disease in developed countries with an increasing prevalence in the population.

Whether the increased risk of adverse events is due to a patient's associated comorbidities, or due to the underlying moderate AS itself, is not entirely understood. Similarly, it is unclear which patients would require close follow-up or may potentially benefit from early Aortic Valve Replacement (AVR) to treat this heart condition.

Guidelines from the European Society of Cardiology defined moderate AS as an Aortic Valve Area (AVA) of 1.0 to 1.5 cm², and a mean gradient of 20 to 39 mmHg on echocardiography².

While these parameters define moderate AS very clearly, many patients actually have discordant findings which makes the actual severity of their condition uncertain, and could have very different outcomes.

From the study, researchers found that 60% of patients were diagnosed with concordant³ moderate AS and 40% of patients with discordant⁴ moderate AS.

Of those with discordant findings, a low-flow, low-gradient pattern, but not the normal-flow, low-gradient pattern, was independently associated with worse outcomes.

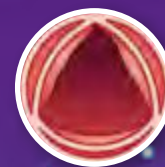
This implies that "moderate AS" patients have a wide range of indications with very different outcomes. A significant proportion may be at a higher risk of mortality and heart failure. This group of patients may also need closer follow-up than what current guidelines recommend.

Another observation that researchers found from this moderate AS initiative was that in patients with moderate AS and preserved left ventricular systolic function, left ventricular diastolic dysfunction was found to be independently associated with all-cause mortality and the composite endpoint of all-cause mortality and AVR. Assessment of left ventricular diastolic function, therefore, contributes significantly to the risk stratification of patients with moderate AS.

These findings have been published in tier one cardiovascular journals – *Journal of American College of Cardiology* and *Heart*, highlighting the complexity of the diagnosis and management of moderate AS, as well as the limitations of echocardiography, which may have variable results.

Further research and ongoing trials are expected to shed more light on the clinical management of moderate AS in patients.

Guidelines from the European Society of Cardiology



NORMAL AORTA VALVE
AVA: 3.0 to 4.0 cm²



MODERATE AORTIC STENOSIS
AVA: 1.0 to 1.5cm²



SEVERE AORTIC STENOSIS
AVA: <1.0 cm²

¹AS – Condition where the aortic valve is narrowed, constricting blood flow.

²echocardiography – An ultrasound scan to look at the structure of the heart and nearby blood vessels.

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- if the AV Vmax, mean gradient and EOA all indicate moderate AS- the parameters are concordant
- if the AV Vmax and mean gradient indicate moderate AS, yet the effective orifice area suggests severe AS- the parameters are discordant
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ARTICLE BY

Adj A/Prof William Kong
Clinical Director of Echocardiography and Non-invasive Diagnostic Cardiology, Senior Consultant, 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 worldwide multi-centre bicuspid AVD registry. Currently, he reviews research submissions for several international cardiology journals including *Circulation* and *Journal of American Society of Echocardiography*.

TO BALLOON OR NOT TO BALLOON?

Meta-analysis research sheds light on PCI treatment risks in older patients

Time is often of the essence when treating Myocardial Infarctions (MI), also known as heart attacks. Every minute after a heart attack, more heart tissue is damaged or dies, causing irreversible injury to the heart.

One of the key life-saving procedures used to treat heart attacks is Percutaneous Coronary Intervention (PCI), also commonly known as “stenting” or “ballooning”.

This procedure is minimally invasive whereby a catheter is inserted into one of the arteries through just a small incision. Once the catheter is in place, a thin wire delivers a small balloon to the artery narrowed with cholesterol deposits, and the balloon inflates to widen the passageway in order to restore blood flow to the heart muscles. Sometimes, a stent is also left in place when the balloon is removed to continue keeping the artery open.

However, such procedures come with inherent risks. With increasing age, frailty, and multiple diseases, senior patients aged 80 and above who undergo PCI are at a higher risk of mortality and other complications.

Therefore, NUHCS researchers conducted a systematic review and meta-analysis to evaluate the clinical outcomes of patients aged 80 and above who underwent PCI. The team combined data from 132 research articles across 33 regions for this study.

They found that the mortality rate of patients aged 80 and above who underwent PCI was 19.2%, of which 7.8% died due to cardiac reasons. 7.2% of these patients did not survive the hospital admission. The mortality rate increases to 14.7% when followed up for a year, and increases further to 33.3% after three years. Overall, 17.5% will experience a major adverse cardiovascular event such as heart failure, stroke, or heart attack after undergoing a PCI procedure.

These outcomes were worse for patients with ST-Elevation Myocardial Infarction (STEMI) – a type of heart attack that is caused by a complete blockage in one of the major coronary blood vessels. Patients with STEMI have an even higher mortality rate (23.1%) and an in-hospital death rate (14.2%).

The researchers attribute this to elderly patients’ underlying health issues such as chronic diseases which leave them with poorer reserves and thus more vulnerable to various stressors from their underlying illnesses.

Although older patients face significantly higher risks in undergoing PCI, the evidence still supports the need for the procedure, especially for those with unstable coronary artery diseases.

With greater clarity from this study, clinicians are now in a position to better advise patients on the considerations in proceeding with with a PCI, as a treatment method method for their heart condition.

This study also highlights the gap in care for older patients. The mortality rate for elderly patients undergoing PCI after heart attacks is still unacceptably high, hence more research still needs to be done to look into strategies to mitigate these risks. These findings build on the ongoing collaboration by NUHCS and experts in geriatric medicine to find better strategies for mitigating the high risks faced by older patients undergoing PCI.

PERCUTANEOUS CORONARY INTERVENTION IN PATIENTS AGED 80 YEARS OLD AND ABOVE:

A SYSTEMATIC REVIEW AND META-ANALYSIS

RESEARCH PROFILE



132
ARTICLES



2,566,004
PATIENTS

OUTCOMES



19.22% All-cause death
7.78% Cardiac death
17.51% Major Adverse Cardiac Events (MACE)
33.26% 3-Year mortality
followed up to 5 years

STEMI patients have worse outcomes than Non-STEMI patients

STEMI 26.16%
Non-STEMI 13.62%

Mortality rate of senior patients aged 80 years old and above, regardless of indications, was high. The 1 year and 3 year outcomes post PCI of this population group were poor.

ARTICLE BY

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



Dr Sia is an Associate Consultant cardiologist at NUHCS with 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 cardioneurology and cardiomyopathies. As an avid researcher, he has published more than 200 papers in peer-reviewed journals to date and serves as a Specialty Editor for the *Singapore Medical Journal*. He is also an active educator and holds a concurrent appointment as a Junior Academic Fellow at the Yong Loo Lin School of Medicine, National University of Singapore.

Dr Lin Huangyu Norman
Medical Officer, National
University Hospital (NUH)



As a Medical Officer at NUH, Dr Lin will soon start his residency at the National University Health System (NUHS) Internal Medicine department in July 2023. With an interest in cardiology, he intends to pursue further training and focus his medical education in this field.

Congratulations

PROF TAN HUAY CHEEM

*Senior Consultant, Department of Cardiology,
and Senior Advisor, NUHCS*

Prof Tan received the Incredible Care Service Champion Silver Award in recognition of delivering “incredible care” whilst embodying the values of NUHS’s service culture, consistently going above and beyond not only for his patients but for his colleagues as well. Service Champions are commended for their excellence in service through nominations from patients and staff who have been impressed by their genuine commitment to the highest standards of patient care and service.



**NUHS
Incredible
Care Service
Champion
Award - Silver**

Academic Promotion



PROF THEODOROS KOFIDIS
*Head of Department and Senior Consultant,
Department of CTVS, NUHCS*

In January 2023, Prof Kofidis was awarded a full professorship at the Department of Surgery, Yong Loo Lin School of Medicine, NUS.

NEW APPOINTMENTS



APPOINTED AS DIRECTOR, COMMUNITY SPECIALIST INTEGRATION, NUHS, FROM DECEMBER 2022.

ASST PROF LIM TOON WEI
Head of Community Cardiology and Senior Consultant, Department of Cardiology

In his new role, Asst Prof Lim will look into improving coordination of care by growing collaborative partnerships between specialists and family physicians, and creating new models of care for NUHS' chronic disease patients.



APPOINTED AS HEAD, WELL PROGRAMME (BE BETTER), ALEXANDRA HOSPITAL, FROM JANUARY 2023.

DR WANG YI TING LAUREEN
Consultant, Department of Cardiology

The Well Programme focuses on workplace health for staff, primary prevention, and the promotion of health and wellness within our community through community health screenings, helping people to Be Better.



APPOINTED AS ASSISTANT CHIEF, MEDICAL INFORMATICS OFFICER, NUHS, FROM DECEMBER 2022.

DR CHEN ZHENGFENG JASON
Consultant, Department of Cardiology

Dr Jason will be overseeing the GMIO-Compliance and Forensics team which manages the appropriate use and access to the hospital's clinical information systems.

DOCTORS' PROMOTIONS AT NUHCS

WITH EFFECT FROM JULY 2022:



DR WANG YI TING LAUREEN
Consultant, Department of Cardiology, NUHCS @ Alexandra Hospital



DR JIMMY ONG
Senior Consultant, Department of Cardiology, NUHCS @ Ng Teng Fong General Hospital

WITH EFFECT FROM JANUARY 2023:



DR IVANDITO KUNTJORO
Senior Consultant, Department of Cardiology



DR RAJ MENON
Senior Consultant, Department of CTVS

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