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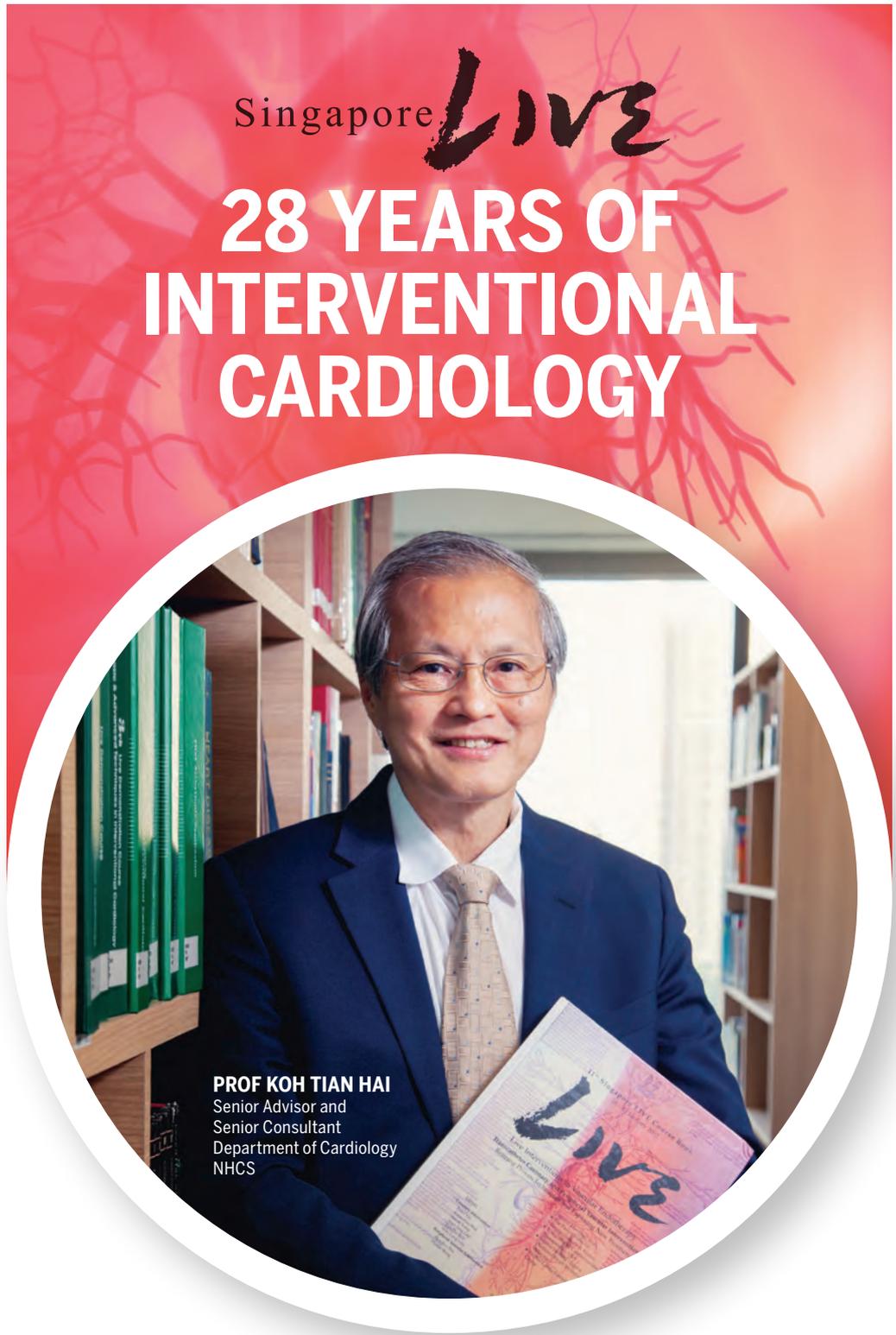
SOLELY A HEARTY AND
FUN WALK & RACE



CARDIAC REHABILITATION:
THE BEST MEDICATION
FOR RECOVERY



THE ROAD FROM
RESEARCH TO CURE



Singapore **LIVE**

28 YEARS OF INTERVENTIONAL CARDIOLOGY

PROF KOH TIAN HAI
Senior Advisor and
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SINGLIVE: 28 YEARS OF INTERVENTIONAL CARDIOLOGY

Interventional cardiology has greatly evolved over the years. “In the beginning, physicians were mainly providing diagnoses, and surgeons were the ones to administer medical treatments. Now, interventional cardiologists can diagnose as well as perform minimally invasive interventional procedures to treat cardiovascular disease,” said Prof Koh Tian Hai, a pioneer of this field in Singapore and the region, as he shared with us more.

When a heart attack strikes, the most effective way to unblock the blocked heart artery is through an interventional procedure called coronary angioplasty. This is done by inserting a stent through a small puncture in the groin or wrist to open up the artery, successful in over 95% of the cases. This procedure, which is also known as percutaneous coronary intervention (PCI), is the gold standard of care for a heart attack.

Interventional cardiology involves treating patients with disease of the heart vessels, known as coronary artery disease. The interventional procedures are minimally invasive and carried out in the cardiac catheterisation laboratories, which is operational round-the-clock at NHCS, to ensure that patients suffering from heart attacks are able to receive prompt treatment.



With many years of experience and expertise under his belt, **Prof Koh Tian Hai**, Senior Advisor and Senior Consultant from NHCS' Department of Cardiology, together with the NHCS team, has continuously worked towards improving interventional cardiology services in Singapore and the

region. Being a mentor to numerous doctors, Prof Koh has also witnessed vast improvements in the field of interventional cardiology over the years.



The very first 'live' interventional cardiology conference was held in October 1989.

THEN VERSUS NOW

One of the key improvements in interventional cardiology is the development of stents used in interventional procedures. Stents are tiny metal mesh tubes that are placed in the artery. The first-generation stents which were introduced in 1986 were much bulkier, making it hard to deliver them into the narrowed segments of the artery.

While cardiologists may have implanted stents with great success back then, the stents did not have a medicated coating, which led to a re-narrowing of the arteries in four out of 10 patients. Some 15 years on, in 2001, stents came with special medication coatings, which greatly revolutionised the way coronary angioplasty is performed. The incidence of re-narrowing of an artery has since fallen to single digits.

“When we first carried out catheterisation procedures, it took up to two hours to complete a straightforward case without complications. Now, it only takes 30 minutes,” Prof Koh shared on how the cases have since evolved through the years. “Our current capabilities have also expanded tremendously. We used to be doing only single-vessel cases, but now we regularly work on complex multi-vessel cases.”

INTERVENTIONAL CARDIOLOGY IN SINGAPORE

Singapore is a cosmopolitan city that offers 24-hour PCI for patients with heart attacks, which is an advantage over many countries due to the size of Singapore, its efficient infrastructure and medical expertise which make commuting and access to healthcare relatively easier and faster. This is not the case, however, for many other countries who are still providing their patients with the traditional treatment of thrombolytic therapy, which is the use of drugs to break up or dissolve blood clots, even though PCI has been proven to provide better clinical outcomes.

Heart attack patients who need coronary interventions are receiving faster help than in the past. This door-to-balloon time, a measure of the duration from when a patient arrives at the emergency room to receiving primary PCI, is currently at the recommended 90 minutes or less, in accordance to the American Heart Association guidelines, a benchmark where all Singapore hospitals work hard to adhere to.

SINGLIVE – ASIA'S LEADING INTERVENTIONAL CARDIOLOGY EVENT

The Singapore LIVE (SingLIVE) interventional cardiology conference was started 28 years ago and it has since remained as one of Asia's pre-eminent annual courses in cardiac interventions. This flagship event of NHCS is an international cardiology conference showcasing the latest interventional techniques in cardiac and peripheral angioplasty procedures, as well as “live” transmission of procedures to enhance the learning experience. Year after year, SingLIVE attracts a large number of medical professionals from Singapore, Asia-Pacific and around the world.

The idea of a “live” interventional cardiology conference originated from NHCS' founding father, Assoc Prof Arthur Tan, who is also SingLIVE's first Course Director, in 1989. However, it was then known as ‘First Live Demonstration in Basic and Advanced Techniques of Percutaneous Transluminal Coronary Angioplasty’ and was held at the auditorium of the College of Medicine Building, Ministry of Health, near the Singapore General Hospital.

Having been the course director of SingLIVE since 2003, Prof Koh fondly recalled the very first SingLIVE event that he had participated in. “The year was 1998. Everything was very new to us then, yet it was special. We had only one catheterisation lab in which we performed about six cases over the three-day period of the conference.”

The turnout for the inaugural SingLIVE conference in 1989 was just 200 participants, but it has since grown to over 2,000 local and international participants in recent years. Prof Koh and his team have gone on to organise the yearly SingLIVE event for 28 years. “Many medical courses had come and gone. But we are still around and that is a significant feat for us.” The SingLIVE faculty has also expanded to include many Asian key opinion leaders and experts, elevating it to a higher plane to become a key premier live interventional course in Asia Pacific.

“It's a very exciting era for us, interventional cardiologists, to be in”, Prof Koh enthused. “There have been many innovations and improvements in the treatment of cardiovascular disease by interventional means over the last two to three decades. We have witnessed new, innovative use of stents and technological advancements not just in the area of coronary circulation but also in the development of interventional cardiology. For example, we can now administer treatment for structural heart disease, by replacing heart valves through Transcatheter Aortic Valve Implantation (TAVI).” TAVI, also known as percutaneous aortic valve replacement, is a minimally invasive procedure to correct severe aortic stenosis, which is the narrowing of the aortic valve opening.

KEEPING THE PASSION ALIVE

When asked what kept him motivated in this field, Prof Koh visibly lit up as he went on to talk about all the latest advancements in interventional cardiology. “It is a very exciting field. For any aspiring interventional cardiologist, it does take quite a bit of hard work, especially when working on the night shifts. The hard work will eventually pay off and the outcome will be gratifying. It is only through this that we can continue to make remarkable progress in what we do. For instance, we are now even looking at using interventional devices to treat hypertension.”



Prof Koh hopes to highlight some of these new advancements at the upcoming SingLIVE, which will be held from 16 to 18 January 2019. At SingLIVE 2019, the best of cardiovascular interventions from an Asian perspective will be showcased. An exciting key highlight is a new 3D virtual reality showcase of procedures in 360 degree view, where participants will get to experience being part of the team performing the procedures in a cardiac catheterisation lab. Another new feature of SingLIVE 2019 is the pre-conference on 16 Jan that will feature case observation opportunities in the NHCS cardiac catheterisation lab for a small number of delegates. Other highlights of the event include hands-on small group demonstrations on practical tips and dedicated sessions focusing on the learning needs of nurses and allied health professionals. More information can be found on www.singlivecourse.com.

Singapore **LIVE**

DID YOU KNOW: The SingLIVE logo was designed by Prof Lim Yean Leng, former Director of NHCS, an artistically inclined and accomplished cardiologist, with the use of Chinese calligraphy brush strokes?

Asst Prof Chin Chee Yang (bottom left) and Asst Prof Calvin Chin (bottom right), Co-chairpersons of NHCS' 20th Anniversary Organising Committee, posing with the race participants right before the flag-off.



RACE START!



Thanks to Nanyang Polytechnic's electrifying Percussion Performance – everyone was soaking up the upbeat atmosphere!



Guest-of-Honour Dr Amy Khor doing some warm-up exercise with the Fun Walk participants and also having some great fun doing the 'welfie'.



Some of the station masters smiling for the camera while standing by for the race to start.

SOLELY A HEARTY AND FUN WALK & RACE

The inaugural “NHCS Heart & Sole Challenge 2018”, a part of NHCS' 20th anniversary celebration, saw heart patients, members of public, and NHCS staff and their families coming together to walk and race, all in the name of heart-healthy lifestyle.

AIR HORN BLASTTTTTTTTTTT

And off went the enthusiastic race participants to their choice of 'pit stop' on a nice and sunny morning of 29 July 2018 at Punggol Waterway Park, where the first-ever “NHCS Heart & Sole Challenge” was held. Like a scene from the Amazing Race, participating teams strategised their routes across six challenge stations dotted around the park, pitting their knowledge and skills against one another to vie for the top prize of \$1,000. The teams were given 90 minutes to complete the race but they only took about half the amount of time to reach the finishing point, each hoping to beat one another in the shortest time possible.

Shortly after the commencement of the race, Guest-of-Honour, Dr Amy Khor, Senior Minister of State, Ministry of the Environment and Water Resources & Ministry of Health, arrived for the next activity highlight – to flag off the event's 'Fun Walk' segment. She was joined by more than 300 participants for a more relaxed version of the race, going through similar challenge stations in a leisurely fashion, while at the same time learning about the importance of cardiac health and prevention against heart diseases at the various stations.

To add to the festive mood and energy level of the event, there were stage performances that included “live” juicing and Zumba demonstrations, a symphony orchestra rendition performed by Nanyang Polytechnic, and an aerobics workout led by the Health Promotion Board.

Asst Prof Calvin Chin, Consultant at the Department of Cardiology, NHCS, and Chairperson for this event shared, “The idea of this walk-and-race event was borne out of the desire to engage the public and to raise the overall awareness of cardiac health and heart disease prevention. We hope that through this outreach initiative of NHCS, we can create greater awareness of maintaining a healthy heart in an enjoyable way.”

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Asst Prof Calvin Chin



“Why so tough?!” Race participants giving their best at various challenges...



The DARE challenge – participants learning the correct steps to perform CPR.



CARDIAC REHABILITATION: THE BEST MEDICATION FOR RECOVERY

If you think that cardiac rehabilitation is only for those who have had a recent heart surgery, think again.

A 45-year-old man suffered a heart attack a year ago and underwent percutaneous coronary intervention (PCI). He recovered well and was discharged from the hospital. Now, he is keen to continue his regular Sunday football sessions. Having been feeling well in the past year, he feels confident about returning to his favourite sport. The question is, should he?

"Patients who have had prompt treatment after a heart attack may quickly feel better physically and want to get back to their usual lifestyle but we recommend that they seek the advice of a professional first. Even if you feel well, it doesn't mean that your heart has recovered," cautioned

Dr Ho Jien Sze, Associate Consultant from the Department of Cardiology who is also a Rehabilitation Cardiologist.



A TAILORED PROGRAMME

Since 1996, the Cardiac Rehabilitation Unit at NHCS has been offering a structured cardiovascular rehabilitation and preventive cardiology programme. Comprising 16 sessions, the programme is based on four key components – medically supervised and individualised exercises, risk factor control and monitoring, patient education and behavioural counselling.

Prior to enrolment, patients are screened and reviewed to ascertain their suitability to partake in the structured cardiac exercise programme. An assessment will then be made by the nurses and physiotherapists to stratify enrolled patients into low, moderate or high risk groups.

This personalised approach ensures that each patient receives an exercise regime with an intensity that is tailored to his or her condition for maximum benefits. The exercises are aimed at improving the patient's fitness and strength levels, and can range from running on the treadmill and cycling to weight-lifting. Experienced nurses and physiotherapists are present at every rehabilitation session to supervise the patients, making sure that they are exercising within safe limits.

Assoc Prof Tan Swee Yaw, Senior Consultant, Department of Cardiology and Director, Cardiovascular Rehabilitation and Preventive Cardiology, shared, "NHCS offers all post-operative patients, meaning those who have had a heart bypass or valvular heart surgery, for example, the cardiac rehabilitation programme. Each patient is evaluated thoroughly to ensure that they are safe to undergo the programme."



NHCS has recently embarked on a new initiative targeting patients with acute heart attack, which seeks to increase the proportion of patients that are enrolled into structured cardiac rehabilitation as part of their road to recovery. Such patients, who carry a high risk of heart attacks, would have to be treated and assessed for suitability prior to enrolment.

Nurse Manager Tan Suan Choo, who oversees the operations of the Cardiac Rehabilitation Unit, said that there has been an increase in the number of patients with ACS taking up the programme.

Assoc Prof Tan added that cardiac rehabilitation is indeed especially beneficial for patients who might be at risk of, or have already had a heart attack, "The programme will help to modify the patient's risk factors and reduce the risk of another (more serious) heart attack."

INCREASED FUNCTIONALITY AND SURVIVAL

The benefits of such a customised and well-supervised rehabilitation programme are known to aid patients with heart disease to resume the normal function of their hearts. Clinical studies have shown that, as compared to usual care, cardiac rehabilitation can help to reduce risk of death by almost 13%, cardiovascular mortality by 26% and hospital admissions by 31%.

"We had a patient in his 50s who could not even walk for a short distance due to poor heart function. After going through the programme and within a mere span of two years, he now can run two kilometres without feeling any discomfort in the heart," shared Assoc Prof Tan who emphasised that the ultimate aim of the programme is to get patients back to their optimal functional capacity.

The success of the programme hinges on well-controlled cardiac risk factors. At each cardiac rehabilitation session, depending on the patient's profile, one's blood pressure and glucose levels will be tracked. While the patient exercises, continuous electrocardiogram monitoring will also be conducted.

With the right exercise programme, right risk factors control, coupled with right medication, patients can reap benefits to live life to the fullest. It also helps that the programme offers a group exercise setting where patients can interact and motivate one another.

After graduating from the programme, the knowledge gained and preventive maintenance will enable patients to continue exercising at various community set-ups.

WHO CAN ENROL IN THE NHCS CARDIAC REHABILITATION PROGRAMME?

Cardiac conditions or cardiac procedures that may necessitate cardiac rehabilitation include, but are not limited to, the following:

- Congestive heart failure
- Stable angina pectoris / Ischaemic heart disease (IHD)
- Myocardial infarction
- Post-open heart surgery
- Post-heart transplantation
- Balloon angioplasty
- Pacemaker / Implantable cardioverter defibrillator (ICD) implantation
- Congenital heart disease
- Arrhythmia
- Rheumatic heart disease
- At risk for IHD (e.g. obesity, diabetes, hypertension)

CARDIAC REHAB IMPROVES

 Symptoms

 Cholesterol level

 Blood pressure

 Weight

 Psychological well-being and stress management

 Exercise tolerance

HOW TO MAKE A REFERRAL?

General Practitioners may make a referral by calling **6704 2000** to make an appointment with our Rehabilitation Cardiologist who will then determine the suitability of the patient for the cardiac rehabilitation programme.

CONTACT US

GP FAST-TRACK APPOINTMENT
Local Referrals Tel **(65) 6704 2222**

NHCS CALL CENTRE
Tel **(65) 6704 2000**
Fax **(65) 6222 9258**
Email **central.appt@nhcs.com.sg**

GENERAL ENQUIRIES
Tel **(65) 6704 8000**
Fax **(65) 6844 9030**
Email **nhcs@nhcs.com.sg**

CARDIOVASCULAR REHABILITATION AND PREVENTIVE CARDIOLOGY PROGRAMME

Cardiovascular Rehabilitation and Preventive Cardiology Programme is an integral component of cardiac care. Incorporating primary and secondary prevention programmes, the Cardiovascular Rehabilitation and Preventive Cardiology Programme comprises a multi-disciplinary team to help heart patients better manage their conditions and get back on their feet through:

- Cardiovascular Risk Factor Modification
- Dietary and Metabolic Counselling
- Exercise Prescription
- Exercise Testing
- Health Education
- Pharmaceutical Counselling
- Psychological Counselling
- Supervised Exercise Programmes on Inpatient and Outpatient Settings

OUR SPECIALISTS

Assoc Prof Tan Swee Yaw *Director and Senior Consultant*
Dr Ho Jien Sze *Associate Consultant*
Dr Huang Zijuan *Associate Consultant (Sengkang General Hospital)*

FOR THE FULL LIST OF NHCS SERVICES AND SPECIALISTS, PLEASE VISIT **www.nhcs.com.sg**.

THE ROAD FROM RESEARCH TO CURE

Ageing populations. High prevalence of diabetes. Sedentary lifestyles. These are some factors that lead to a rising number of people in Singapore and Asia suffering from cardiovascular disease, mirroring the global trend. Heart diseases are striking down not only the elderly but also young people in the prime of their lives at a much quicker pace than before.



Research has shown that cardiovascular disease affects the Asian population differently from the West, due to the variety in genetic make-up and lifestyles in Asia, which makes up 60% of the world's total population. Yet, much of the studies on cardiovascular disease have been done in the United States and Europe. Thus, it is crucial to conduct research that involves the local and Asian populations to develop meaningful and targeted treatments for this part of the world.

Through the National Heart Research Institute Singapore (NHRIS), NHCS is committed to further develop large patient cohorts to be studied in depth by leveraging the latest advanced research techniques in genetics, imaging, biomarkers, and novel approaches (such as using wearable technology to track movement and sleep patterns). This will help to achieve targeted therapeutic molecule breakthroughs using unique patient samples and DNA, coupled with rigorous outcome care delivery trials, to test the effectiveness of treatments for the Asian population.



SingHEART

The SingHEART programme aims to aid in the understanding of how cardiovascular disease develops in the Asian population, through genetic screening and health profile analysis. SingHEART is a large-scale study to identify more complex interactions between lifestyle and cardiovascular disease risk factors. It hopes to expand its recruitment of healthy volunteers to 10,000. With a larger sample size, it will help to identify subtler and more complex relationships to enhance the development of more accurate and targeted treatments for those with cardiovascular disease.

CARDIAC GENETICS

The advent of next-generation gene sequencing has greatly increased the potential of genetics to uncover cardiovascular disease. Genetics, combined with system biology, can uncover previously undiscovered aspects of disease, allowing new targets to be identified for diagnostic evaluation or treatment. Therefore, to truly tap into the potential of genetics, work has already begun in building the foundation of a large, observable cohort of both patients and healthy volunteers to understand the genetic variation of the Asian population. Funds garnered for such research can help expand the NHCS Biobank, which is a bio-repository established to collect and store biospecimens from patients with cardiovascular disease. This enables future work linking data on genetic traits to clinical data and the biological disease manifestations.

STEM CELLS

Using stem cells harvested from human skin, NHRIS researchers have been able to grow beating heart muscle cells. This landmark development has not only led to a whole host of scientific advances, it has also validated the use of a drug used previously to treat cystic fibrosis to cure irregular heart rhythms. Leveraging on this advancement in stem cell technology, researchers hope to study heart muscle deficiencies in a controlled laboratory environment, and uncover specific abnormalities of the heart. The ultimate goal is to expedite the screening of drugs that could potentially mitigate or treat these heart abnormalities, with minimal side-effects for patients in the future.

NEW BIOMARKERS AND DRUG TARGETS

Through NHCS' large patient cohorts and access to clinical samples for genetic and molecular studies, researchers are making unprecedented insights into cardiovascular disease in the region. This presents new opportunities to turn these research insights and discoveries into new biomarkers and targets for drug development. The development of new biomarkers and drug targets in pre-clinical programmes requires extensive research and testing, including clinical trials, before they can be translated to clinical care. Drug target discovery to drug development typically takes at least 10 to 15 years, but with strong research infrastructure, this timeline can be shortened by approximately five years.

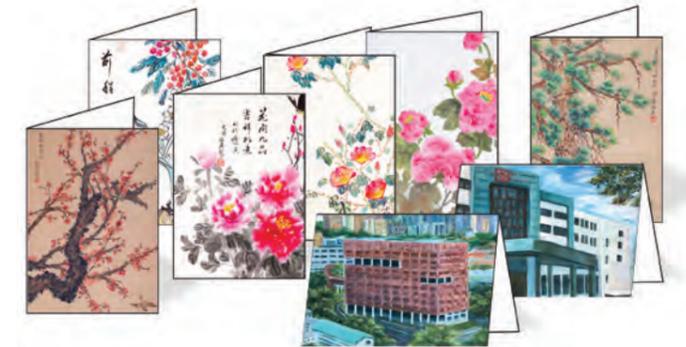
ADVANCED IMAGING

There is a need to develop capabilities in advanced imaging in order to expand the ability to monitor and assess hypertensive patients through the use of metabolic imaging. Funds received towards this endeavour will be used to invest in NHCS' imaging facilities, which are key diagnostic resources with both clinical and research applications. Strengthening the cardiac imaging facilities at the Centre will allow healthcare professionals to better understand how diseases like diabetes, hypertension and heart failure alter the chemistry of the heart, which can potentially lead to the identification of new targets for medical treatments.

Partner us as we chart our course towards the betterment of cardiovascular medicine, potentially changing the landscape of healthcare with new and innovative therapies.

CARDS OF HOPE

National Heart Centre Singapore is pleased to partner one of our patients, Mrs Wong-Mah Jia Lan, to reproduce her paintings on the covers of this special set of greeting cards. We hope that the funds raised from the sale of these cards will further support our pursuit of research and clinical excellence, and bring hope to our patients.



Each pack of cards contains 8 greeting cards with envelopes, at \$15 per pack.

Part of the sales proceeds will benefit NHCS Heart to Heart Fund (managed by SingHealth Fund) in support of Cardiovascular Medical Research.

Kindly email development@nhcs.com.sg for the purchase of the cards.



The road from medical discovery to applied therapies, and eventually attaining clinical impact, is a long one that spans many years. NHCS strives to align and carry out its research initiatives in a systematic and sustainable way to make an impact on the lives of patients not only in Singapore, but also in the Asia-Pacific region.

To support NHCS' research efforts, please contact the NHCS Development team at development@nhcs.com.sg.



 National Heart Centre Singapore
SingHealth

THE UNEASY PATH TO BECOMING A PERFUSIONIST

Perfusionists – you may not have heard of them but they play a key role in a cardiac surgical team. They are responsible for keeping patients alive during open-heart surgeries. Though crucial, perfusionists are somewhat of a rare commodity – the path to becoming one is not easy.



NHCS organises a Perfusionist Training & Learning Workshop once a year to impart technological expertise and knowledge for fellow perfusionists in Singapore and across the region.

Perfusionists are allied health professionals who operate the cardiopulmonary bypass machine (heart-lung machine) which take over the function of the heart and lung, and deliver oxygenated blood throughout the patient's body, during cardiac surgeries. In the simplest terms, a perfusionist has to halt a patient's heart and then keep the patient alive while the surgeon isolates and operates on the deliberately stopped heart. A perfusionist is integral to the success of any open-heart surgery. Given the nature of their work, one might think that there would be some proper education framework available for such expertise. Yet, in Singapore, there is no formal perfusion study or course available.



Perfusionist training and education in Singapore has traditionally been an apprenticeship system. Most, if not all, perfusionists, in Singapore learnt the ropes through on-the-job training. A typical new recruit will be a fresh university graduate with a biological science or life sciences background. At NHCS, a trainee perfusionist will be assigned to a senior perfusionist who will guide him or her through the two-year on-the-job training, imparting both theoretical knowledge and practical skills. The progress of the trainee's training and development is characterised by several milestones: from the set-up of the heart-lung machine and management of the cardiopulmonary bypass procedure, to the operation of various accessory devices and equipment.

The quality of such training is highly reliant on how well a senior perfusionist passes on the knowledge. It is not simply about giving instructions and demonstrating the techniques of setting up and operating the heart-lung machine. Senior perfusionists have to excel at designing and presenting clinical information, communicating subject matters and addressing queries, helping trainees improve, assessing trainees' progress and more.

To be an effective trainer, senior perfusionists must first have sound knowledge and technical expertise in perfusion, as well as a wealth of experience in handling different situations. Equally important is the actual 'soft skills' when it comes to teaching – a willingness to teach, a systematic teaching approach, patience, and a keen sense of self-improvement.

Perfusionists continue to learn on the job even though they have acquired the fundamental skills and know-how. Clinical simulation exercises involving different case scenarios and emergencies in various settings, such as power failure and poor venous return, are conducted monthly, with the single objective of training all perfusionists to be able to react and respond in low-volume but potentially life-threatening situations to safeguard patient safety during surgeries. Apart from the monthly simulation exercises, perfusionists also attend training workshops to gain additional experience and keep themselves abreast of the latest perfusion technology and trends.

Perfusion is just one of the many aspects of the healthcare industry that benefits from such training and education frameworks. At NHCS, we are always looking at ways to help seniors impart their knowledge to their juniors effectively, which will ultimately translate to improved patient care. This means, training the trainers of tomorrow will in turn help to keep more hearts beating for many years to come.

Chief Perfusionist of NHCS, Tane Chan, who had been a perfusionist with NHCS for more than 20 years, has helped train and groom many perfusionists. When asked what keeps her motivated all these years, Tane replied,

“It gives me great gratification in knowing that the perfusionists whom I have trained have remained committed and passionate in improving the quality of life of cardiac patients.”



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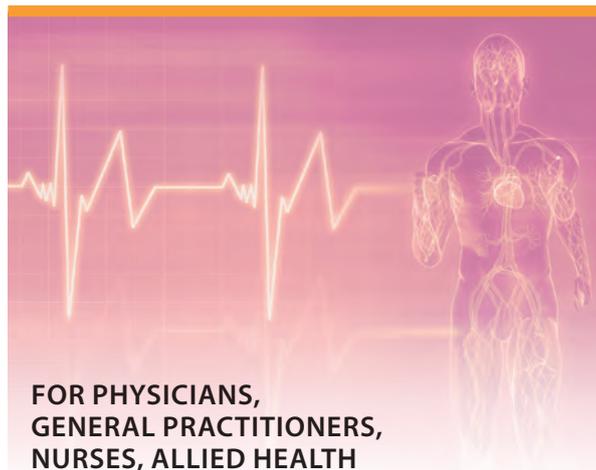
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APPOINTMENTS AND PROMOTIONS



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