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MURMURS®



DOUBLE CELEBRATIONS

NHCS WINS DUAL
NATIONAL AWARDS



AORTIC ANEURYSMS
– TICKING TIME
BOMBS

GETTING YOUTHS
TO TALK ABOUT
HEART ISSUES

ROAD DIVERSION
AT NHCS TILL 2017

HOW TO TELL IF
PATIENTS CAN
GET OUT OF BED
WITHOUT HELP

HEALING AND TEACHING

NHCS CARDIOLOGIST
RECEIVES NATIONAL
OUTSTANDING CLINICIAN
MENTOR AWARD



Over the years, Adj Prof Koh has created many educational programmes, most notably the AsiaPCR-SingLIVE course on interventional cardiology, for heart specialists across the world to come together, share their best practices, and ultimately enhance medical standards and patient outcomes.

There are doctors who are good at what they do, and then there are doctors who teach others to do better.

For his commendable contributions as both master physician and inspiring mentor for more than three decades, Adjunct Professor Koh Tian Hai, Senior Advisor at the National Heart Centre Singapore (NHCS) received the National Outstanding Clinician Mentor Award at this year's National Medical Excellence Awards ceremony on 21 August 2015.

Strong advocate of education and training

Progress can only be made when future generations surpass their predecessors.

Adj Prof Koh's forward-thinking approach is deeply ingrained in the institutional culture at NHCS, where he has groomed cohort after cohort of clinicians to keep their fingers on the pulse of new evidence-based medicine which will bring better outcomes and quality of life to patients.

This active search for better treatments has led to the introduction of many 'firsts' at NHCS, where Adj Prof Koh was its longest serving Medical Director for 11 years since 2003. These breakthrough treatments, such as novel minimally invasive treatment modalities, have earned NHCS a spot on the global map for pioneering complex cardiac therapies. These therapies give renewed hope for patients who would otherwise not have any viable treatment options.

Beyond our shores

Recognising the importance of collaboration in enhancing medical expertise as a whole, Adj Prof Koh has worked tirelessly to create programmes for NHCS to share its specialist knowledge with cardiovascular specialists, both local and international. In 2010, he forged a partnership with EuroPCR to launch the AsiaPCR-SingLIVE course which has gained significant traction as one of the premier cardiovascular interventional courses in Asia. This year's edition of the AsiaPCR-SingLIVE course has crossed the 2,000 mark in attendance by cardiologists, cardiac surgeons and healthcare professionals from all over the world, a ten-fold increase from when it first started.

Many doctors who have trained under Adj Prof Koh have gone on to assume senior leadership positions today in the Asia-Pacific region as heads of departments or hospital directors. His educational efforts were appreciated by the cardiology community, who elected him as President of the Singapore Cardiac Society from 2005 to 2007, and Emeritus Fellow of the Asian Pacific Society of Interventional Cardiology in 2008. Adj Prof Koh also received the Chien Foundation Award in 2012 for his contributions to education in the Asia-Pacific region.

An inspiring role model

Adj Prof Koh's meticulous attention to care is legendary and his commitment to the highest level of patient care has inspired many generations of cardiologists to follow in his footsteps. His judicious decision-making skills, eye for detail and openness to ideas have drawn many clinicians to seek him out for his invaluable guidance, knowledge and wisdom. During his tenure, Adj Prof Koh's passion in public healthcare has inspired numerous clinicians who have come under his wing, with the current Medical Director of NHCS being one of them.

Adj Prof Terrance Chua, who won the National Outstanding Clinician Award in 2013, succeeded Adj Prof Koh at the helm of NHCS the following year. Adj Prof Chua was responsible for the establishment of Singapore's first cardiac-dedicated nuclear imaging laboratory with the Singapore General Hospital's department of nuclear medicine in 1994.

Aside from Adj Prof Koh and Adj Prof Chua, the first doctor from NHCS to be honoured at the National Medical Excellence Awards in 2011 is pioneer cardiothoracic surgeon Dr C Sivathanan. Dr Sivathanan is the Co-Director of the Heart and Lung Transplant Programme at NHCS which he helped set up. He was instrumental in spearheading the use of mechanical heart devices in Singapore and laying a strong foundation for the current level of care and safety in cardiothoracic surgery intensive care that is now comparable with some of the top medical institutions in the world.



Past National Outstanding Clinician Award winners Adj Prof Terrance Chua (top) and Dr C Sivathanan received the awards in 2013 and 2011 respectively.



Adj Prof Koh Tian Hai, Senior Advisor, NHCS (left) receiving the National Outstanding Clinician Mentor Award from Minister for Health Mr Gan Kim Yong at the award ceremony on 21 August 2015.

WHEN NIGHTINGALES SOAR

NHCS NURSE WINS PRESIDENT'S AWARD FOR NURSES 2015

Mdm Teo Lee Wah assesses the health of stable patients during their follow-up visits to the Heart Failure Ancillary Clinic at NHCS. Photo courtesy of Singapore Health.



For nurses, there is no recognition more prestigious than the President's Award for Nurses.

Mdm Teo Lee Wah, a Senior Nurse Clinician and Advanced Practice Nurse specialising in heart failure at the National Heart Centre Singapore (NHCS), is among the bumper crop of seven winners to receive the highest accolade of the nursing profession on 31 July 2015.

The President's Award for Nurses recognises Singapore's top nurses for their outstanding professional competence, leadership and innovation, as well as their role in nurturing and inspiring young nurses. It was presented to Mdm Teo for her concerted efforts that have changed the way heart failure patients are treated in Singapore.



Mdm Teo Lee Wah receiving the President's Award for Nurses from President Tony Tan Keng Yam, with Minister for Health Mr Gan Kim Yong, First Lady Mrs Mary Tan and Chief Nursing Officer Ms Tan Soh Chin (far right) on stage at the Istana on 31 July 2015.

In 2007, she and a team of healthcare professionals developed the heart failure programme at NHCS to improve the health, survival and quality of life of patients through medical therapy. The 50-year-old nurse also played a key role in spearheading the heart failure ancillary clinic, a nurse-led clinic for stable heart failure patients and patient education initiatives.

While most people would expect a typical clinic consultation session to be between a doctor and a patient, Mdm Teo runs the weekly heart failure ancillary clinic independently with a pharmacist. Patients with stable heart failure will see Mdm Teo on their follow-up visits where she assesses the health of patients, adjusts their medications and monitors for any adverse reactions to the change in medications.

Mdm Teo explained what goes on during her clinic sessions: "We teach heart failure patients to monitor their symptoms, manage fluid retention and recognise signs of the disease worsening early."

Advanced Practice Nurses like Mdm Teo are a relatively new breed of nurses who have acquired the expert knowledge base, complex decision-making skills and clinical competencies for extended practice. They are trained in the diagnosis and management of common medical conditions, including chronic illnesses.

"When I first joined nursing 30 years ago, I never expected that I will be running a clinic on my own one day," said the mother of three.

Indeed, having nurses to follow up with heart failure patients has significantly reduced the re-hospitalisation rates. Mdm Teo added that witnessing the patients' improved quality of life as they transit from inpatient to outpatient care has given her a great sense of job satisfaction.

Lifelong learning for better patient care

Nurses who wish to pursue the path of Advanced Practice Nurses will first need to possess a considerable amount of experience, a master's degree and a certificate in a particular specialty.

Over her three-decade career, Mdm Teo has earned numerous qualifications to become the Advanced Practice Nurse she is today. Since graduating from the School of Nursing in 1985, she has gone on to obtain a bachelor's degree in health science, two master's degrees and an exercise specialist certificate from the American College of Sports Medicine. She was recently awarded a nursing scholarship in July 2015 by the SingHealth Alice Lee Institute of Advanced Nursing to pursue her Doctor of Nursing Practice Degree at Duke University, USA, in 2016.



Mdm Teo Lee Wah celebrates her award with senior leaders from SingHealth and the National Heart Centre Singapore and her fellow nurses at the Istana.

Mdm Teo is also a firm believer of education and research. She chairs the Nursing Research and Peer Review Council at NHCS and she is an adjunct lecturer for the nursing undergraduate and master programmes at the Alice Lee Centre for Nursing Studies, National University of Singapore Yong Loo Lin School of Medicine.

While she recognises that further education helps nurses do their jobs better, she believes that the basics are still the most important.

"A good nurse needs passion for the job as well as empathy and patience," said Mdm Teo, "We must understand that patients may feel irritable and anxious when they are sick, and it is our job to reassure them and ensure they are well cared for."

Our nurses, our pride

Mdm Teo's trophy is the fourth one that NHCS has clinched in its history.

Ms Lim Suh Fen, Deputy Director, Nursing who oversees the NHCS Cardiac Clinics won the President's Award for Nurses in 2010.

Ms Lim is one of the pioneer figures who established the ambulatory services at NHCS when it was first opened.

Assoc Prof Lim Swee Hia, Senior Director, Special Projects at NHCS and the Singapore General Hospital bagged the prestigious award in 2002 when she was the Director of Nursing at NHCS. Under her astute leadership, she transformed the landscape of cardiac nursing, expanding its scope and elevating its image.

The other winner is Ms Tan Ah Pang who is now Deputy Director, Nursing at the SingHealth Alice Lee Institute of Advanced Nursing. She received the award in 2003 for her significant contributions towards the development and restructuring of nursing education programmes in her capacity as a senior nurse clinician with the Nursing Development Unit at NHCS.

AORTIC ANEURYSMS

TICKING TIME BOMBS

The aorta is the largest artery in the human body, extending from the heart to the abdomen, and its main job is to distribute oxygenated blood to the rest of the body. The consequences of a diseased aorta may be dire, even fatal.

In the case of aortic aneurysms, the aorta swells due to protracted periods of untreated high blood pressure and/or weakening of the aortic wall, which may be caused by the accumulation of plaque in the artery (a process known as atherosclerosis) or certain genetic conditions, such as Marfan's syndrome.

Aneurysms can occur anywhere along the aorta. They may develop within the chest (thoracic aneurysms), in the abdominal cavity (abdominal aneurysms), or in both (thoraco-abdominal aneurysms).

Finding an aneurysm

Thoracic aneurysms are often found during routine medical tests, as they have no symptoms when the initial swelling is mild. When it gets larger, however, patients may experience symptoms such as deep, throbbing chest or back pain, difficulty in swallowing, shortness of breath, coughing or hoarseness in their voice. Nonetheless, symptoms will vary depending on the site and severity of the aneurysm.

Aneurysms may first be picked up through a physical examination, blood pressure check, heart murmurs or any pulsating lumps in the abdomen, groin or legs. Subsequent tests such as a coronary angiogram, echocardiogram, computed tomography (CT) or magnetic resonance imaging (MRI) scans can help to confirm the diagnosis and monitor the aneurysm's progression.

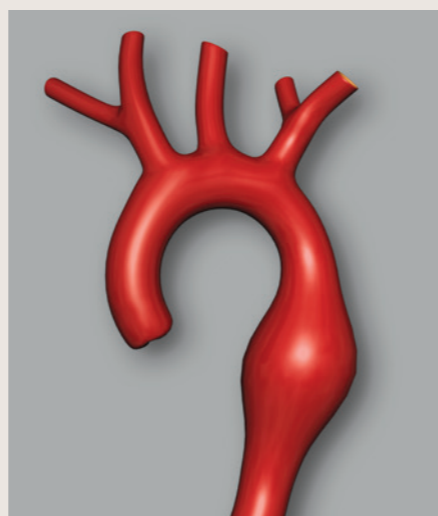
Aneurysms generally call for aggressive treatment of high blood pressure to ease the force pushing against the weakened arterial wall. Medications such as beta blockers are thus prescribed for this reason. The risk of an aortic aneurysm rupturing increases with its size, hence surgical intervention may become necessary at some point in order to avoid a medical emergency and possible death.



Adj Asst Prof Soon Jia Lin

Consultant
Department of Cardiothoracic Surgery
National Heart Centre Singapore

Adj Asst Prof Soon is the Director of the Cardiothoracic Surgery Residency Training Programme for the SingHealth Duke-NUS Cardiovascular Sciences Academic Clinical Programme.



Aneurysms of the aorta which occur within the chest are called thoracic aneurysms and patients may experience symptoms like deep, throbbing chest or back pain and hoarseness in their voice when the swelling gets worse.

A deadly, ticking time bomb

When an aneurysm continues expanding, the inner wall lining of the aorta may tear. This is referred to as aortic dissection. Eventually, the blood vessel will rupture from the force of the blood pressure if left untreated. When aortic dissection happens, patients may experience a sudden ripping sensation in the chest or severe back pain between the shoulder blades.

Aortic dissection can be categorised into two types. Type A aortic dissection involves the part of the aorta nearest to the heart, making it the deadliest type and this is a medical emergency which can quickly turn fatal. It is estimated that half of these patients will die within 48 hours without treatment. A tear in the aorta beyond the point where it gives off blood supply to the left arm is classified as Type B aortic dissection. This type can generally be treated with medication to control the patients' blood pressure in the first instance.

Putting aside the danger and high mortality rate associated with the condition, aortic dissection is a rare complication that strikes about two to five out of 100,000 people worldwide. Surgical treatment for aortic dissection is similar to that for aortic aneurysm, though this major surgery may not be suitable for some patients due to factors such as overall frailty and other coexisting medical conditions.

During the operation, surgeons will reconstruct the dissected or aneurysmal aorta using a synthetic graft and, at the same time, replace or repair the aortic valve if it is found to be damaged. If necessary, a coronary artery bypass graft surgery may also be performed to restore blood circulation to the patient's heart. In order to repair this main pipeline in the human body, all blood flow in the patient's body will have to be stopped. For a certain period of time, the patient's body temperature will be lowered to induce deep hypothermia in order to keep the patient 'alive' despite having no blood flow. Modern techniques have made these complex procedures safer.



Proper management of our blood pressure and cholesterol levels, as well as regular exercise and not smoking, are the best ways to prevent the development of aneurysms.

There are also less invasive methods of repairing the torn distal aorta, but the best course of action is still prevention. Men above the age of 50 are the main targets for aortic aneurysm, and their risk multiplies if they are smokers. Regular aerobic exercise, not smoking and good control over one's blood pressure and cholesterol levels are indeed the best ways to prevent, or at least slow down, the development of aneurysms. If you experience any of the symptoms, you must seek prompt medical attention to avoid letting a mild swelling in the aorta turn into a medical crisis.



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- Coronary artery bypass graft surgery (on- and off-pump)
- Heart transplantation, mechanical heart assist device implantation and extra-corporeal membrane oxygenation (ECMO)
- Valve replacement/repair surgery
- Lung transplantation
- Lung resection for tumour
- Aortic aneurysm and dissection repair, including endovascular, or "key-hole", aortic repair
- Peripheral vascular arterial surgery
- Minimally-invasive cardiothoracic surgery

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Adj Assoc Prof Chua Yeow Leng	Senior Consultant
Adj Assoc Prof Lim Chong Hee	Head, SingHealth Duke-NUS Lung Centre, Senior Consultant
Adj Asst Prof Tan Teing Ee	Senior Consultant, Director, Cardiothoracic Surgery Intensive Care Unit
Dr Lim See Lim	Senior Consultant
Asst Prof Victor Chao	Senior Consultant, Director, Vascular Laboratory
Dr Naik Madhava Janardhan	Senior Consultant
Adj Asst Prof Soon Jia Lin	Consultant
Dr C Mathew Jose	Consultant
Dr Ong Boon Hean	Associate Consultant (away on HMDP)
Dr Philip Pang	Associate Consultant (away on HMDP)
Dr Soo Ing Xiang	Associate Consultant

For the full list of NHCS services and specialists, please visit www.nhcs.com.sg.

AS EASY AS 1, 2, 3 AND 4

NHCS TEAM DEVELOPS MOBILITY STATUS INDICATORS FOR BETTER PATIENT CARE

While most of us will not have any problems getting out of bed, it is a different story for heart patients who have just undergone a procedure or surgery.



Patients at the NHCS wards will have one to four hearts marked beside their care instructions on the panels installed at every bed. Multi-language posters and brochures are also used to educate patients and caregivers on the level of care required for the number of hearts indicated.



The new mobility status indicators help patients, caregivers and healthcare professionals tell how much assistance patients need to leave their beds at a glance.

These patients run a higher risk of falling, which prompted healthcare staff at the National Heart Centre Singapore (NHCS) to put up pictorial signs that say “Ask for help; don’t fall” at the inpatient beds.



Fall risk tags are hung at the patients’ beds, with yellow tags signifying moderate fall risk and red tags for high risk.

The signs worked so well that 85 per cent of patients and caregivers would check with the nurses before a patient leaves the bed. This, however, created a new challenge for healthcare workers in the busy wards.

“We studied the situation and found that our nurses received more than 80 queries a day on whether a patient is able to leave the bed independently,” said Ms Yeoh Lee Shien, a nurse clinician at the Post Anaesthesia Care Unit, NHCS and leader of the project team, “And of these queries, about two in five patients are fit to walk on their own.”

It became clear that more could be done to reduce the frequency of the queries and improve efficiency in the wards.

More hearts mean more help needed

After much brainstorming and fine-tuning, the team came up with a comprehensive mobility indicator system which allows patients, caregivers and healthcare professionals to instantly tell if patients can leave the bed unassisted or otherwise.

In the new indicator system, an additional field marked with one to four hearts is added to the bedside panel which displays the individual patient’s name, doctor-in-charge and special care instructions. The more hearts there are on the panel, the more help patients will need to leave their beds.

“For patients with a one-heart status indicator, they will be able to walk on their own without any help, but patients indicated with four hearts will need to stay in bed at all times,” explained Ms Suriani Binte Zahari, Nurse Clinician at NHCS’ Cardiothoracic Surgery Intensive Care Unit and a member of the project team.

The nurses will update the mobility status of each patient at the start of every shift, and physiotherapists will do the same when they routinely assess patients in the morning. In addition, patients who have just undergone a procedure or surgery, say a coronary angiogram done via the femoral artery, will have their mobility status updated to three or four hearts as they will need to refrain from leaving their beds for the first six hours.

Ms Lee Chin Hian, Acting Assistant Director, Nursing, NHCS and the project team’s facilitator explained the benefits of such a practice: “Regular updates lend real-time accuracy and greater responsiveness to the status indicator system as it closely follows the patient’s medical condition and recovery during his or her hospital stay.”

To augment the effectiveness of the bedside markers on mobility, patients and their caregivers are also educated on what the different numbers of hearts mean through multi-language posters and brochures. The materials also include important “do’s and don’t’s on fall prevention, such as standing up slowly for patients on medication for high blood pressure and wearing non-slip footwear.

Improving communication and safety

The mobility indicator system serves as a quick reference on the individual patient’s mobility status, helping to forge better communication among healthcare professionals and caregivers. Patients now have a clearer picture of their own condition with the new system, where those indicated with one heart no longer need to verify with the nurses before taking a walk.

The reduced number of mobility-related enquiries have eased the nurses’ workload and helped them to better concentrate on their core duties in delivering quality patient care.

The new system proved to have been a boost to patient safety as well, as the number of falls per year went down significantly by 35 per cent after the project went into full force. Now that a single glance at the mobility indicator is all it takes to tell how much help a patient needs in order to leave the bed, potential falls and related injuries can be more effectively prevented.

This project was recognised for its positive impact on patient safety and the team was awarded a gold award at the Team Excellence Symposium in March 2015. Aside from Ms Yeoh, Ms Suriani and Ms Lee, the other team members include NHCS senior staff nurses Ms Chang Xiu Lan, Ms Esther Low and Ms Liang Ming, as well as cardiac physiotherapist Ms Lim Xue Ling.

RESEARCH HIGHLIGHT



Circulation. 2014 Oct 28;130(18):1607-16. Doi: 10.1161/CIRCULATIONAHA.114.011085. Epub 2014 Aug 28.

Left ventricular hypertrophy with strain and aortic stenosis.

Shah AS, Chin CW, Vassiliou V, Cowell SJ, Doris M, Kwok TC, Semple S, Zamvar V, White AC, McKillop G, Boon NA, Prasad SK, Mills NL, Newby DE, Dweck MR.

ABSTRACT

BACKGROUND: ECG left ventricular hypertrophy with strain is associated with an adverse prognosis in aortic stenosis. We investigated the mechanisms and outcomes associated with ECG strain.

METHODS AND RESULTS: One hundred and two patients (age, 70 years [range, 63-75 years]; male, 66%; aortic valve area, 0.9 cm² [range, 0.7-1.2 cm²]) underwent ECG, echocardiography, and cardiovascular magnetic resonance. They made up the mechanism cohort. Myocardial fibrosis was determined with late gadolinium enhancement (replacement fibrosis) and T1 mapping (diffuse fibrosis). The relationship between ECG strain and cardiovascular magnetic resonance was then assessed in an external validation cohort (n=64).

The outcome cohort was made up of 140 patients from the Scottish Aortic Stenosis and Lipid Lowering Trial Impact on Regression (SALTIRE) study and was followed up for 10.6 years (1254 patient-years). Compared with those without left ventricular hypertrophy (n=51) and left ventricular hypertrophy without ECG strain (n=30), patients with ECG strain (n=21) had more severe aortic stenosis, increased left ventricular mass index, more myocardial injury (high-sensitivity plasma cardiac troponin I concentration, 4.3 ng/L [interquartile range, 2.5-7.3 ng/L] versus 7.3 ng/L [interquartile range, 3.2-20.8 ng/L] versus 18.6 ng/L [interquartile range, 9.0-45.2 ng/L], respectively; P<0.001) and increased diffuse fibrosis (extracellular volume fraction, 27.4±2.2% versus 27.2±2.9% versus 30.9±1.9%, respectively; P<0.001). All patients with ECG strain had midwall late gadolinium enhancement (positive and negative predictive values of 100% and 86%, respectively).

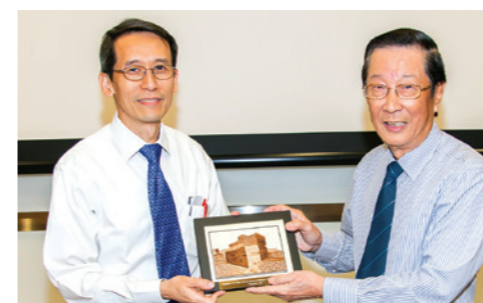
Indeed, late gadolinium enhancement was independently associated with ECG strain (odds ratio, 1.73; 95% confidence interval, 1.08-2.77; P=0.02), a finding confirmed in the validation cohort. In the outcome cohort, ECG strain was an independent predictor of aortic valve replacement or cardiovascular death (hazard ratio, 2.67; 95% confidence interval, 1.35-5.27; P<0.01).

CONCLUSION: ECG strain is a specific marker of midwall myocardial fibrosis and predicts adverse clinical outcomes in aortic stenosis.

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SOWING THE SEEDS OF CURIOSITY

NHCS ORGANISES FIRST SINGYOUTH HEART CHALLENGE



Adj Prof Terrance Chua, Medical Director, NHCS presenting a token of appreciation to the guest-of-honour Dr Charles Toh at the inaugural SingYouth Heart Challenge on 5 September 2015.

Dr Toh is one of Singapore's pioneer cardiologists who played a pivotal role in the founding the ASEAN Federation of Cardiology.

"What we enjoyed most was being able to exchange knowledge and gain greater insights about cardiovascular disease through the sharing session and presentations during the SingYouth Heart Lecture," said Ms Tiffany Tsui, leader of the team from River Valley High School which snagged the award for Best Oral Presentation, with their study on the perception of youths on their cardiovascular risk factors.

Adj Assoc Prof Ching Chi Keong, Adj Assoc Prof Yeo Khung Keong and Prof Stuart Cook introduced students to the latest treatments and the role of genetics in heart disease during the event's lecture segment.

Another winning team which walked away with the Best Poster Presentation award shared their plans for their prize.

"We are going to donate half the amount we won to the President's Challenge," said Mr Ma Ningzhi who led the Serangoon Junior College team behind the project on ventricular septal defect, "We believe that by contributing back to the community, the effort we have put in as a team will achieve its maximum value."

The odds of young people talking about matters of the heart versus real cardiovascular disease are a hundred to one.

Nonetheless, it is important to get youths interested in their heart health as coronary artery disease can start developing from as early as their twenties with habitual consumption of fast food.

The National Heart Centre Singapore (NHCS) invited tertiary students to participate in its first SingYouth Heart Challenge and Lecture to ignite their interest in heart disease and learn more about the symptoms, treatments and progressive technology through paper research. A total of 18 teams from 10 schools submitted their heart-related abstracts on topics ranging from dangers of self-medicating to how television dramas affect the layperson's ability to accurately spot someone who is having a heart attack.

The submissions impressed Assistant Professor Calvin Chin, Consultant, Department of Cardiology, NHCS who was one of the judges at the event.

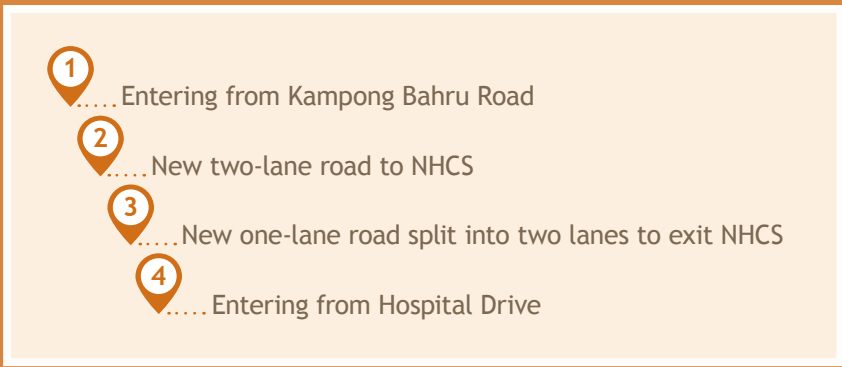
He said: "The SingYouth Heart Challenge has provided students unique opportunities to explore medicine. I am truly amazed by the work and effort put in by some of these students and the presentations clearly demonstrated their enthusiasm and creativity."

The participating teams were guided and mentored by two students from the NUS Yong Loo Lin School of Medicine. One of the mentors, Ms Tey Min Li who is in her third year, described her involvement in the SingYouth Heart Challenge as "a fulfilling experience, knowing that the mentees could possibly be the future of medicine".

The lecture, presentations and award ceremony were held on 5 September 2015 at the NHCS Lecture Theatre and graced by guest-of-honour Dr Charles Toh who presented the three awards for the best poster presentation, oral presentation and abstract.



ROAD DIVERSION IN FRONT OF NHCS



Visitors to the National Heart Centre Singapore (NHCS) would have noticed new traffic diversions at its driveway since October 2015.

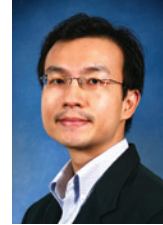
A hoarded island now splits the one-way traffic flow for vehicles entering NHCS, or dropping off patients and visitors at Level 1. The diversion will remain effective until 2017 in order to facilitate the construction of the mixed-use healthcare facility across the road, which will house the Outram Community Hospital. Directional signs have been put up to help drivers safely navigate the U-turn into NHCS.

PROMOTIONS



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NHCS
Subspecialty interest:
Heart failure and heart
transplantation



ASST PROF HO KAY WOON

Senior Consultant,
Department of Cardiology,
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Subspecialty interest:
Interventional cardiology



DR FAM JIANG MING

Consultant,
Department of Cardiology,
NHCS
Subspecialty interest:
Interventional cardiology



DR NADIRA HAMID
(away on HMDP till July 2016)

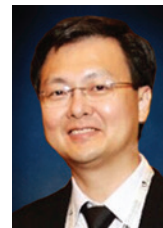
Consultant,
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DR SOO ING XIANG

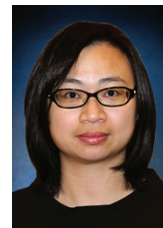
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