National University Heart Centre Singapore

National University Hospital

MEDIA RELEASE

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NUHCS AND NUH LEAD CARDIAC CARE WITH SAFER, LESS INVASIVE IMAGING FOR HIGH-RISK PATIENTS

New multi-functional cardiac imaging capability will benefit range of patients, including older adults and those living with renal conditions, among others

The National University Heart Centre, Singapore (NUHCS) is the first tertiary centre in Singapore to deploy the Photon-Counting Computed Tomography (PCCT) capability for a high workload of complex cardiac cases. Photo credit: National University Health System (NUHS)

(From left to right) Mr Steven Bell, Senior Vice-President, Diagnostic Imaging and Advanced Therapies, Asia Pacific and Japan, Siemens Healthineers; Adjunct Professor Mark Edward Puhaindran, Chairman, Medical Board, National University Hospital (NUH); Professor Aymeric Lim, Chief Executive Officer, NUH; Associate Professor James Yip, Executive Director and Senior Consultant, NUHCS; Professor Khong Pek Lan, Head and Senior Consultant, Department of Diagnostic Imaging, NUH; Adjunct Associate Professor Lynette Teo, Senior Consultant, Department of Diagnostic Imaging, NUH.

SINGAPORE — The National University Heart Centre, Singapore (NUHCS) is the first tertiary centre in Singapore to deploy a new generation of cardiac imaging technology – known as the Photon-Counting Computed Tomography (PCCT) – for a high workload of complex cardiac cases.

As Singapore's population ages and the burden of heart disease continues to rise, the need for safer, more efficient cardiac diagnostics has never been greater. By 2030, nearly one in four Singaporeans will be aged 65 or older, and cardiovascular disease already accounts for nearly one in three deaths in the country.

In response to this evolving need, the NUHCS and the Department of Diagnostic Imaging at the National University Hospital (NUH) are strengthening care for high-risk cardiovascular patients with the PCCT. This introduces a new approach to imaging for these patients who might previously have to undergo an invasive coronary angiogram[1] for cardiologists to visualise their coronary anatomy, before diagnosing and treating their condition.

"With Singapore's ageing population, we are seeing more patients with complex cardiac conditions who may not tolerate invasive coronary angiogram well," said Associate Professor James Yip, Executive Director and Senior Consultant, NUHCS.

"Our priority is to continually evolve how we deliver care – making it safer, more precise, and less burdensome for patients. This advancement allows us to reduce reliance on invasive diagnostics while maintaining a high level of clinical confidence, ultimately improving patient outcomes and experience."

Patient-centred cardiac care

A 90-year-old man with severe aortic stenosis[2] was the first patient from NUHCS to benefit from this new capability, undergoing evaluation and subsequently treatment using this advanced imaging approach.

A Transcatheter Aortic Valve Implantation (TAVI) is a common minimally invasive treatment option that replaces the narrowed aortic valve without open-heart surgery. Traditionally, patients undergoing TAVI may require both a computed tomography (CT) scan and an invasive coronary angiogram to assess their heart condition adequately pre-procedure. However, invasive angiography carries additional risks, discomfort, and recovery time, particularly for older patients. It also typically requires higher doses of contrast media, which can pose further risks to the kidney function for those already suffering from renal disease. In Singapore, kidney disease affects more than 500,000 people.

With the introduction of the next generation PCCT scanner, clinicians were able to obtain clear and detailed images of the patient's coronary arteries using a single scan, avoiding the need for the invasive procedure. This allowed the team to minimise the use of contrast media as well, which was a key clinical consideration as the patient also had underlying kidney issues.

[1] A coronary angiogram is an invasive diagnostic imaging test that uses contrast media and X-rays to visualise the coronary arteries and detect any narrowing or blockages in blood flow to the heart.

[2] Aortic stenosis occurs when the aortic valve becomes narrowed and stiff, making it harder for blood to flow from the heart to the rest of the body. This forces the heart to work harder and in severe cases can lead to symptoms such as breathlessness, chest pain, fainting, and heart failure.

The 90-year-old patient's care team comprising (from left to right) Adjunct Associate Professor Lynette Teo, Senior Consultant, Department of Diagnostic Imaging, National University Hospital (NUH); Associate Professor James Yip, Executive Director and Senior Consultant, National University Heart Centre, Singapore (NUHCS); and Dr Ivandito Kuntjoro, Senior Consultant, Department of Cardiology, NUHCS. Photo credit: National University Health System (NUHS)

Professor Khong Pek Lan, Head and Senior Consultant, Department of Diagnostic Imaging, NUH, shared: "Many cardiac patients come in with conditions that result in fast heart rates, heavy calcification, or with existing stents that can make it challenging to obtain clear, reliable images. With this new capability, we can visualise coronary arteries and cardiac structures in a single CT scan with much greater clarity, even in difficult cases, while using less contrast media. This enables us to make confident decisions while offering high-risk patients such as older adults and those with kidney disease a safer diagnostic journey."

The patient subsequently underwent a smooth TAVI procedure and was discharged without complications after two days. Post-procedure assessments showed stable and improved kidney function, and no additional interventions were required.

Advances that meet evolving healthcare needs

This approach ultimately reflects a broader move towards less invasive, more patient-centred cardiac care with tangible benefits, including:

- Avoiding unnecessary invasive procedures, which reduces procedural risks, discomfort, and hospital stays

- Lower contrast media usage, which improves safety for patients with renal impairment
- Clearer imaging in complex cardiac cases, including patients with calcified arteries or prior stents
- Consistent diagnostic quality in patients where optimal heart-rate control is difficult

As Singapore's healthcare system adapts to the demands of an ageing society, these improvements translate into a safer, smoother, and more efficient care experience. The benefits are also applicable to wider populations, including paediatric patients. Ultimately, these developments underscore NUHCS and NUH's commitment to delivering the best in cardiovascular care, and to continually advance its capabilities to meet Singapore's evolving healthcare needs.

Chinese Glossary

National University Heart Centre, Singapore (NUHCS)	新加坡国立大学心脏中心 (国大心脏中心)
National University Hospital (NUH)	国立大学医院 (国大医院)
Photon-Counting Computed Tomography (PCCT)	光子计数计算机断层扫描 (光子计数 CT)
Aortic stenosis	主动脉瓣狭窄
Transcatheter Aortic Valve Implantation (TAVI)	经导管主动脉瓣置换术
Associate Professor James Yip Executive Director & Senior Consultant National University Heart Centre, Singapore (NUHCS)	叶伟麟副教授 总主任兼高级顾问医生 国大心脏中心
Professor Khong Pek Lan Head & Senior Consultant Department of Diagnostic Imaging National University Hospital (NUH)	孔碧兰教授 主任兼高级顾问医生 影像诊断科 国大医院

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About the National University Heart Centre, Singapore (NUHCS)

The National University Heart Centre, Singapore (NUHCS) is an academic, national specialist centre under the National University Health System (NUHS). NUHCS brings together the resources, expertise and capabilities in the areas of Cardiology, Cardiothoracic and Vascular Surgery to better meet the needs of the growing number of patients with heart disease and raise the future generation of medical professionals.

As one of two national heart centres in Singapore for the treatment and management of complex cardiovascular diseases, NUHCS offers six core clinical programmes including Heart Failure & Cardiomyopathy, Structural Heart Disease, Acute Coronary Syndrome, Heart Rhythm, Congenital & Structural Heart Disease and Women's Heart Health. The centre has been awarded two institutional Peaks of Excellence for its Minimally-invasive Cardiothoracic Surgery and Aortic Centre Programme, and has been ranked top in Singapore for three consecutive years in 2022, 2023 and 2024 for the specialty of Cardiac Surgery in Newsweek's "World's Best Hospital" Award.

Comprising a team of internationally-recognised cardiologists and surgeons from the cardiothoracic and vascular specialties, NUHCS serves as a referral national centre for cardiothoracic and vascular conditions and provides a comprehensive approach to the treatment of these patients. The holistic patient-care approach is backed by leading translational research at the Cardiovascular Research Institute (CVRI) and Cardiovascular Metabolic Translational Program, all of which complements these advanced quaternary clinical services to deliver state-of-the-art treatment solutions to the most challenging heart, lung and circulatory diseases.

NUHCS services span across four locations to serve the western and central locations in Singapore:

- NUHCS at National University Hospital (NUH), Kent Ridge - Main Operations
- NUHCS Heart Clinic @ Ng Teng Fong General Hospital (NTFGH)
- NUHCS Heart Clinic @ Jurong Medical Centre (JMC)
- NUHCS Heart Clinic @ Alexandra Hospital (AH)

For more information, visit: https://www.nuhcs.com.sg.

About the National University Hospital

The National University Hospital (NUH) is Singapore's leading university hospital. While the hospital at Kent Ridge first received its patients on 24 June 1985, our legacy started from 1905, the date of the founding of what is today the NUS Yong Loo Lin School of Medicine. NUH is the principal teaching hospital of the medical school.

Our unique identity as a university hospital is a key attraction for healthcare professionals who aspire to do more than practise tertiary medical care. We offer an environment where research and teaching are an integral part of medicine, and continue to shape medicine and transform care for the community we care for.

We are an academic medical centre with over 1,200 beds, serving more than one million patients a year with over 50 medical, surgical and dental specialties. NUH is the only public and not-for-profit hospital in Singapore to provide trusted care for adults, women and children under one roof, including the only paediatric kidney and liver transplant programme in the country.

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The NUH is a key member of the National University Health System (NUHS), one of three public healthcare clusters in Singapore. For more information, visit www.nuh.com.sg

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