



## PRESS RELEASE

**6 January 2021**

### **THE NURSE WILL SEE YOU NOW ONLINE**

*Nurse-clinicians, enabled by technology, provide care for recovering heart attack patients through telehealth – a system that can be as good as cardiologists' face-to-face consultations*

**Singapore, 6 January 2021** — Recovering heart attack patients can be well cared for by highly trained experienced nurses supported by digital health tools, whose quality of care equals or even exceeds those provided by cardiologists.

These are the findings of a study involving 301 patients in three healthcare institutions in Singapore. Led by Associate Professor Mark Chan, Deputy Director of the Cardiovascular Disease Translational Research Programme, Yong Loo Lin School of Medicine, National University of Singapore and Senior Consultant at the National University Heart Centre, Singapore, the study showed that the nurse practitioners, equipped and supported by an array of digital health monitoring tools, were able to remotely monitor and assess the patients' health daily as well as hold weekly consultations with them. Where necessary, the nurses also adjusted the patients' medication doses, providing a level of care that A/Prof Chan and the team found was not usually available from busy cardiologists running heavy clinics.

### **THE NEED – CONTINUOUS MONITORING AND FREQUENT PERSONALIZED CARE INSTEAD OF LOW INTENSITY EPISODIC CARE**

Heart attacks are common in Singapore where 10,000 new heart attacks occur each year. In a heart attack, or acute myocardial infarction, arteries supplying heart muscle are abruptly blocked, causing heart muscle to die very quickly. Death of heart muscle can be rapidly fatal and even among heart attack survivors, dead heart muscle can cause a lifetime of suffering by leading to heart failure.

The pre-hospital and in-hospital management of heart attacks in Singapore is considered among the best in the world, with our public hospitals offering 24/7 emergency angioplasty treatment to open up blocked arteries in double-quick time. However, challenges remain in the care of heart attack patients after they leave the hospital. Ideally, heart attack patients should be reviewed early after discharge as the early post-discharge period is when they are most vulnerable to complications from the heart attack. It is also the most opportune window to adjust their medications for rapid healing of heart muscle.

### **THE PROBLEM – DELAY IN POST-DISCHARGE FOLLOW-UP**

Yet, the reality is that cardiologists in most healthcare systems around the world are unable to see heart attack patients within a month of discharge. The primary reason for this delay in post-discharge follow-up is due to the logistic challenge of accommodating frequent in-person

visits at specialist outpatient clinics in the hospital. The traditional mode of cardiologists seeing their patients infrequently in face-to-face visits, sometimes lasting as briefly as several minutes, is about to change and pave way for telehealth services.

### **MORE ATTENTIVE CARE FROM NURSE CLINICIANS ENABLED BY TECHNOLOGY**

Enter the allied health clinician, often a nurse practitioner or pharmacist with specialized training, who is increasingly taking over many patient-care roles. Armed with an array of digital health tools that enable these allied health clinicians to monitor and communicate with patients remotely, heart attack patients can now have timely yet more leisurely outpatient follow-up with adjustment of their medications during the critical early period of heart muscle recovery.

These were the findings of the clinical trial of remote follow-up and medication adjustment by allied health clinicians for 301 heart attack patients from three healthcare institutions – National University Heart Centre, Singapore, Tan Tock Seng Hospital and the National Heart Centre Singapore in the IMproving reModeling in Acute myoCardial infarction Using Live and Asynchronous TElemedicine (IMMACULATE) trial.

Through the use of remote monitoring devices, the allied health clinicians – experienced, senior nurses with master and doctorate degrees in advanced nursing care – were able to monitor the patients' blood pressure and heart rate daily and consult weekly with the patients, a level of care that has never been possible in the traditional model of face-to-face care with busy cardiologists. The trial was a randomised controlled trial, which means patients were equally assigned to the allied health clinician-led remote management versus traditional face-to-face care by cardiologists; randomised trials remain the gold standard for testing the efficacy of new treatment strategies as it balances out all other differences between the patient groups being compared. The trial, which has just been published in the prestigious medical journal, JAMA Cardiology, showed that allied health clinician-led remote management using digital health tools was as safe as in-person care by cardiologists. Moreover, patients assigned to remote allied health care showed a trend towards more optimal doses of key medications than cardiologist-led care.

A/Prof Chan, principal investigator of the IMMACULATE trial, explained that the trial results should reassure patients that nurses and pharmacists, can deliver as good if not better care than cardiologists. A/Prof Chan, a cardiologist himself who looks after heart attack patients, said that “time and again, research has shown that allied health colleagues with the right training do as well and sometimes better than cardiologists, at least when taking care of conditions that are of lower complexity and pathway-driven. The reasons for this are diverse but include, perhaps, greater willingness to follow evidence-based clinical protocols and perhaps greater empathy. Certainly, research has repeatedly shown that fewer variations in practice often lead to better patient outcomes for common conditions.”

“Technology has also removed many of the barriers posed by traditional models of care; artificial intelligence now gives an ‘Iron Man’ suit to the allied health practitioner and digital tools now enable interactions across both space and time beyond traditional in-person episodic care. Limitations of course exist with this model of allied health-led technology enabled care: first, large initial investments in training are needed to upskill the allied health providers, second, the reliance on technology will always bring along data security risks, a trade-off for convenience, and third, clinical pathways probably work for only approximately 50% of conditions in cardiovascular practice. There are still many patients with complex cardiovascular diseases and multiple co-morbidities that will require highly-specialized in-person ‘bespoke’ care by an experienced cardiologist; assigning the less complex patients to upskilled allied health practitioners then frees up specialist cardiologist to focus on the highly complex patients.”

A/Prof Chan and the same team of investigators spanning all three healthcare clusters are now embarking on a far more ambitious trial of 6,000 heart attack patients in partnership with the Ministry of Health (MOH), MOH Office for Healthcare Transformation (MOHT), Health Promotion Board (HPB), Institute for Digital Medicine (WisDM) and Integrated Health Information System (IHIS), in which more advanced digital tools are paired with wireless devices and wearables to enhance patients well-being. Called “Acute Myocardial Infarction: Allied Health-Oriented, Patient-Centred Technology-Enabled (AMI-HOPE)” care, the much larger study will be completed in 2023 and the results known in 2024.

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### **About National University of Singapore (NUS)**

The National University of Singapore (NUS) is Singapore’s flagship university, which offers a global approach to education, research and entrepreneurship, with a focus on Asian perspectives and expertise. We have 17 faculties across three campuses in Singapore, with more than 40,000 students from 100 countries enriching our vibrant and diverse campus community. We have also established our NUS Overseas Colleges programme in more than 15 cities around the world.

Our multidisciplinary and real-world approach to education, research and entrepreneurship enables us to work closely with industry, governments and academia to address crucial and complex issues relevant to Asia and the world. Researchers in our faculties, 31 university-level research institutes, research centres of excellence and corporate labs focus on themes that include energy; environmental and urban sustainability; treatment and prevention of diseases; active ageing; advanced materials; risk management and resilience of financial systems; Asian studies; and Smart Nation capabilities such as artificial intelligence, data science, operations research and cybersecurity.

For more information on NUS, please visit [www.nus.edu.sg](http://www.nus.edu.sg).

### **About the NUS Yong Loo Lin School of Medicine (NUS Medicine)**

The NUS Yong Loo Lin School of Medicine is Singapore’s first and largest medical school. Our enduring mission centres on nurturing highly competent, values-driven and inspired healthcare professionals to transform the practice of medicine and improve health around the world.

Through a dynamic and future-oriented five-year curriculum that is inter-disciplinary and inter-professional in nature, our students undergo a holistic learning experience that exposes them to multiple facets of healthcare and prepares them to become visionary leaders and compassionate doctors and nurses of tomorrow. Since the School’s founding in 1905, more than 12,000 graduates have passed through our doors.

In our pursuit of health for all, our strategic research programmes focus on innovative, cutting-edge biomedical research with collaborators around the world to deliver high impact solutions to benefit human lives.

The School is the oldest institution of higher learning in the National University of Singapore and a founding institutional member of the National University Health System. It is Asia's leading medical school and ranks among the best in the world (Times Higher Education World University Rankings 2019 by subject and the Quacquarelli Symonds (QS) World University Rankings by Subject 2019).

For more information about NUS Medicine, please visit <https://medicine.nus.edu.sg/>

### **About the National University Heart Centre, Singapore (NUHCS)**

The National University Heart Centre, Singapore (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. A key centre for the treatment and management of complex cardiovascular diseases, its core clinical programmes include heart failure, structural heart disease, acute coronary syndrome, vascular medicine and therapy, women's heart health and heart rhythm.

Comprising a team of cardiovascular specialists and experts from a multitude of medical and surgical disciplines, the NUHCS provides a comprehensive and holistic approach to the treatment of patients with heart problems. This approach is backed by cutting edge knowledge and information gathered by the Cardiovascular Research Institute (CVRI).

The CVRI focuses on developing niche research work in creating new knowledge in support of NUHCS' core clinical programmes by working in close collaboration with both local and international renowned research institutes such as the Agency for Science, Technology and Research (A\*STAR) and New Zealand's Christchurch School of Medicine and Health Sciences.

Partnerships are formed with various medical institutes as NUHCS is a selected training centre for international physicians. Education and training ensures that our medical professionals are kept abreast. Nurturing the next generation, our specialists are also actively involved in conducting workshops and teaching programmes for our medical undergraduates.

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

### **About the National University Health System (NUHS)**

The National University Health System (NUHS) aims to transform how illness is prevented and managed by discovering causes of disease, development of more effective treatments through collaborative multidisciplinary research and clinical trials, and creation of better technologies and care delivery systems in partnership with others who share the same values and vision.

Institutions in the NUHS Group include the National University Hospital, Ng Teng Fong General Hospital, Jurong Community Hospital and Alexandra Hospital; three National Specialty Centres - National University Cancer Institute, Singapore (NCIS), National University Heart Centre, Singapore (NUHCS) and National University Centre for Oral Health, Singapore (NUCOHS); the National University Polyclinics (NUP); Jurong Medical Centre; and three NUS health sciences schools – NUS Yong Loo Lin School of Medicine (including the Alice Lee

Centre for Nursing Studies), NUS Faculty of Dentistry and NUS Saw Swee Hock School of Public Health.

With member institutions under a common governance structure, NUHS creates synergies for the advancement of health by integrating patient care, health science education and biomedical research.

As a Regional Health System, NUHS works closely with health and social care partners across Singapore to develop and implement programmes that contribute to a healthy and engaged population in the Western part of Singapore.

For more information, please visit <http://www.nuhs.edu.sg>.