Duke-NUS grants TIIM Healthcare exclusive licence to commercialise technology for intelligently triaging sepsis patients using novel in-hospital mortality risk measurements

- *Novel technology invented by clinician-scientists at Duke-NUS Medical School combines traditional and new measurements to predict in-hospital mortality among patients presenting with sepsis at emergency departments.*
- *TIIM Healthcare will exclusively commercialise the technology with the goal of augmenting clinicians' accuracy and analytical powers when triaging septic patients, enabling prioritisation of limited hospital resources and delivering timely interventions for the prevention and treatment of complications.*

SINGAPORE, 23 September 2022 – Duke-NUS Medical School and TIIM Healthcare have signed an exclusive IP licensing agreement that will enable the latter to commercialise an innovative new technology designed to help hospital emergency care providers quickly and efficiently identify sepsis patients at higher risk of dying.

The new technology—developed by Professor Marcus Ong, Director of the Health Services & Systems Research (HSSR) Programme at Duke-NUS Medical School; Associate Professor Liu Nan, also from the HSSR Programme; and their colleagues from Duke-NUS Medical School— uses selected heart rate variability measurements, specifically HRV and HRnV[1], to assess the severity of sepsis in patients presenting with the condition in hospital emergency departments.

The team has piloted a novel scoring system incorporating HRV, HRnV, vital signs and quick sequential organ failure assessment (qSOFA) to predict in-hospital mortality (IHM) among sepsis patients over a 30-day stay on the emergency ward. The technology does not require laboratory-analysed blood tests and the risk assessment results can be generated within 10 minutes, which means it can be used for continuous monitoring of IHM risk among warded sepsis patients.

Sepsis, a potentially life-threatening condition caused by the body's dysregulated response to infection affects more than 50 million people annually, resulting in more than five million deaths worldwide in both adult and paediatric populations.

Early goal-directed therapy initiated within the first six hours of sepsis diagnosis has been shown to significantly decrease IHM rates, which are estimated to be 14 per cent in emergency wards and 30 to 50 per cent, overall. Identifying patients who have a higher mortality risk from sepsis enables limited hospital resources to be prioritised for this group and timely interventions for the prevention and treatment of complications.

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[1] novel heart rate n-variability parameters invented by the team to provide enhanced prognostic information to complement traditional HRV parameters

Quotes

Prof Marcus Ong, Director, HSSR Programme, Duke-NUS Medical School, and **Senior Consultant, Department of Emergency Medicine, Singapore General Hospital** (senior author of the study): "Early risk stratification in septic patients using a quick and efficient triage tool would have great value in the emergency department."

Assoc Prof Liu Nan, HSSR Programme, Duke-NUS Medical School (first author of the study): "HRnV is a novel representation of beat-to-beat variation that can provide multiple sets of parameters from the same electrocardiogram (ECG) record. HRnV significantly increases the amount of extracted information to be used as the predictors to enhance machine learning model performance."

Mr Cheng Keng Liang, co-founder and CEO, TIIM Healthcare: "Our mission at TIIM Healthcare is to make health care more efficient with intelligent risk stratification for triage. When integrated with our platform, this new technology has the potential to augment clinicians' accuracy and analytical powers to triage septic patients more effectively. This is something we are very excited about."

Dr Guo Dagang, co-founder and CTO, TIIM Healthcare: "With our constant focus on technological innovation to transform health care with intelligent risk stratification, this new technology is a perfect fit to be integrated with our platform, marking a new technological milestone for us."

Dr David Wang, Director, Centre for Technology and Development (CTeD), Duke-NUS Medical School: "We are very delighted to complete the licence agreement with TIIM. CTeD works closely with our scientists and industry partners to facilitate bench-to-bedside translation. HRnV technology is yet another invention successfully transferred from Duke-NUS to industry partners for commercialisation, bringing artificial intelligence-enabled disease prediction and risk stratification solutions to triage patients and to more efficiently manage visits to the hospital."

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About Duke-NUS Medical School
Duke-NUS is Singapore's flagship graduate entry medical school, established in 2005 with a strategic, government-led partnership between two world-class institutions: Duke University School of Medicine and the National University of Singapore (NUS). Through an innovative curriculum, students at Duke-NUS are nurtured to become multi-faceted 'Clinicians Plus' poised to steer the healthcare and biomedical ecosystem in Singapore and beyond. A leader in ground-breaking research and translational innovation, Duke-NUS has gained international renown through its five signature research programmes and 10 centres. The enduring impact of its discoveries is amplified by its successful Academic Medicine partnership with Singapore Health Services (SingHealth), Singapore's largest healthcare group. This strategic alliance has spawned 15 Academic Clinical Programmes, which harness multi-disciplinary research and education to transform medicine and improve lives.

For more information, please visit www.duke-nus.edu.sg

About TIIM Healthcare
TIIM Healthcare's mission is to make healthcare more efficient with intelligent risk stratification for triage. We use ECG to examine a patient's heart rate variability to evaluate a patient's autonomic nervous system function. Using this, in combination with novel AI techniques, aiTriage is able to generate an accurate and objective risk score that doctors can use to make a quicker triage decision, with greater certainty.

Find out more at www.tiimhealthcare.com

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