

MEDIA RELEASE

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NEW AI TOOLS HELP DOCTORS IDENTIFY PATIENTS WITH HIGH BLOOD CALCIUM LEVELS, LONG WAIT TIMES

CalSense flags abnormal readings to allow for early detection and medical intervention

SINGAPORE — A new artificial intelligence (AI) tool developed by the National University Health System (NUHS) can flag out cases of hypercalcemia, or high calcium levels in the blood, to doctors in real time, prompting faster medical interventions for patients.

CalSense, short for calcium sensing, features a live dashboard which gathers, processes and displays results of patients' blood tests.

From January to July 2023, a total of 26,000 blood tests on calcium levels were done at the institutions under NUHS, of which 1,600 were flagged by CalSense as abnormal, that is, having a reading higher than 2.6 millimoles per litre (mmol/L). The normal calcium range is around 2.2 to 2.6mmol/L.

Hypercalcemia is usually a result of overactive parathyroid glands, which control the body's blood calcium levels. Other causes of hypercalcemia include cancer, certain medical disorders, some medications, and excessive consumption of calcium and vitamin D supplements.

Associate Professor Ngiam Kee Yuan, Group Chief Technology Officer, NUHS, said: "CalSense allows us to automate a process that previously had to rely on doctors to run through blood test results when patients return for a clinical review. It flags out cases that require prompt interventions across our network of hospitals, national specialty centres and polyclinics in real time, reducing the administrative work of doctors and expediting medical care."

A/Prof Ngiam, who is also Head and Senior Consultant, Division of General Surgery (Thyroid & Endocrine Surgery), National University Hospital (NUH), said that overseas data has shown that it takes four years on average from the presentation of symptoms of hypercalcemia to surgical treatment, hence CalSense is deployed to shorten this process.

Dr James Lee, Assistant Group Chief Technology Officer, NUHS, said: "If patients do not receive timely treatments, they may suffer complications from hypercalcemia, which may include osteoporosis and fractures, kidney stones, kidney failure, mental disorders and even potentially sudden cardiac death.



"For patients whose high calcium levels are related to cancer, this could also mean a delayed cancer diagnosis should this go uninvestigated," added Dr Lee, who is also Associate Consultant, Division of General Surgery (Endocrine & Thyroid Surgery), NUH.

Real-time data across NUHS institutions

CalSense is hosted within an AI data dashboard network, known as Endeavour AI, which can also display other medical information of patients across NUHS hospitals and clinics.

Besides reading blood calcium levels, CalSense also trawls through other investigative test results to identify a patient's underlying cause of hypercalcemia more accurately. CalSense is developed with funding support from the Ministry of Health.

Dr Lee explained that patients may be put through blood tests if they show symptoms of hypercalcemia, such as abdominal pain, bone pain, muscle weakness, excessive thirst and frequent urination, among others. They could also have such blood tests ordered as part of screening for other medical conditions.

Other potential uses of this AI tool include a cancer registry, monitoring of diabetic patients and even post-operative complications.

Better resource allocation in Emergency Department

Another pivotal project hosted by Endeavour AI, known as Pathfinder, is being trialled in NUH's Emergency Department (ED). Its goal is to provide real-time visibility into bed occupancy rates for better resource allocation. It also tracks the waiting time of patients in the ED and even offers predictive insights into daily attendance figures up to a month in advance.

Dr Ian Mathews, Deputy Group Chief Technology Officer, NUHS, and Senior Consultant, Department of Emergency Medicine, NUH, said: "This project will empower us to make more informed decisions about how best to allocate our resources, including manpower, hospital bed utilisation and the coordination of essential support services, such as our NUHS@Home programme."



Chinese Glossary

National University Health System (NUHS)	国立大学医学组织 (国大医学组织)
National University Hospital (NUH)	国立大学医院(国大医院)
Ministry of Health (MOH)	卫生部
Associate Professor Ngiam Kee Yuan Group Chief Technology Officer National University Health System	严居渊副教授 集团首席技术官 国立大学医学组织
Head and Senior Consultant Division of General Surgery (Thyroid & Endocrine Surgery) National University Hospital	主任兼高级顾问医生 甲状腺与内分泌外科 国立大学医院
Dr James Lee Assistant Group Chief Technology Officer National University Health System	李伟杰 助理集团首席技术官 国立大学医学组织
Associate Consultant Division of General Surgery (Endocrine & Thyroid Surgery) National University Hospital	副顾问医生 甲状腺与内分泌外科 国立大学医院
Dr Ian Mathews Deputy Group Chief Technology Officer National University Health System Senior Consultant Department of Emergency Medicine National University Hospital	Dr lan Mathews 副集团首席技术官 国立大学医学组织 高级顾问医生 急诊科 国立大学医院

For media enquiries, please contact:

Joan CHEW Group Communications National University Health System Email: joan_chew@nuhs.edu.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.

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