

## PRESS RELEASE

### SARCOPENIC OBESITY – AN EMERGING HEALTH CONCERN FOR SINGAPORE

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*For Immediate Release*

Singapore is seeing a steady increase in the prevalence of frailty conditions given its rapidly ageing population. Between 5.3 per cent and 6.2 per cent of community-dwelling older adults in our country are frail, which leads to higher risks of falls, disabilities and an overall diminished quality of life.<sup>1</sup> One of the main causes of frailty is Sarcopenia, an age-associated loss of skeletal muscle mass and reduced muscle function. Studies have shown that the prevalence of Sarcopenia is significant in Asian populations, ranging from 7.3 per cent to 12.0 per cent in large population studies.<sup>2</sup>

To better understand and address the challenges of the rising rates of Sarcopenia in Singapore, researchers from Tan Tock Seng Hospital (TTSH)'s Institute of Geriatrics and Active Ageing (IGA) conducted the Geri-LABS<sup>3</sup> study between 2013 and 2018. It is a longitudinal study on a local cohort of 200 community-dwelling older adults aged 50 years and above, which seeks to develop methods to predict those at risk of Sarcopenia and its link to frailty and functional declines.

One of the key findings of the study is **Sarcopenic Obesity** – commonly known as the 'Fat Frail'. In recent years, Sarcopenic Obesity has emerged as a global phenomenon exacerbated by the confluence of two public health concerns: an ageing population and an obesity epidemic. Sarcopenic Obesity has been associated with functional impairment, increased mortality and reduction in quality of life in older persons. The prevalence of Sarcopenic Obesity in overseas studies ranged from 1.3 per cent to 15.4 per cent in men, and from 0.8 per cent to 22.3 per cent in women<sup>4</sup>. There is a lack of consensus about how to define Sarcopenic Obesity, and it has yet to be well studied in Singapore.

In the Geri-LABS study, the prevalence of Sarcopenic Obesity was **6.2 per cent in men and 12.4 per cent in women**. Key findings from the Geri-LABS study include:

- (i) **Sarcopenic Obesity was associated with poorer health outcomes compared to either Sarcopenia or Obesity alone.** Results showed that those suffering from Sarcopenic Obesity have poorer performance in muscle function via grip strength, Short Physical Performance Battery (SPPB), and gait speed, as compared with those who suffer from either Sarcopenia or

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<sup>1</sup> Singapore Longitudinal Ageing Studies (SLAS) 2017, the Healthy Older People Everyday (HOPE) study 2017

<sup>2</sup> LK Chen, J Woo, P Assantachai, et al. Asian Working Group for Sarcopenia: 2019 consensus update on sarcopenia diagnosis and treatment. In preparation.

<sup>3</sup> Geri-LABS: Longitudinal Assessment of Biomarkers for characterisation of early Sarcopenia and predicting frailty and functional decline in community-dwelling Asian older adults Study

<sup>4</sup> John A. Batsis, Dennis T. Villareal. *Sarcopenic obesity in older adults: aetiology, epidemiology and treatment strategies*. Nature Reviews/Endocrinology, Vol 14/ September 2018/ 513.

Obesity. Worsening physical performance in these areas may lead to increased risk of falls, fractures and overall frailty.

- (ii) **Among the commonly used obesity definitions, waist circumference most accurately identifies Sarcopenic Obesity, as compared with Body Mass Index (BMI) and fat mass percentage.** Among the three widely-used definitions of obesity, BMI has the lowest detection rate (0.5 per cent) of Sarcopenic Obesity, compared with waist circumference (10.5 per cent) and fat mass percentage (10 per cent). In addition, waist circumference, which measures central obesity, consistently identified individuals with the worst muscle function and Instrumental Activities of Daily Living (IADL) outcomes. In contrast, fat mass percentage does not distinguish body fat distribution and not surprisingly, did not show an association between Sarcopenic Obesity and poorer physical performance. These results pave the way for harmonisation of obesity definition in Sarcopenic Obesity for Asian populations.
- (iii) **Blood and imaging biomarkers may be able to help predict poorer functional outcomes for patients with Sarcopenic Obesity.** Blood levels of Monocyte Chemotactic Protein-1 (MCP-1), which is produced by fat and inflammatory cells in the body in response to excess fat deposition, was found to be higher in sarcopenic obese older adults (148.8 pg/ml), compared with sarcopenic (96.6 pg/ml) or obese (116.2 pg/ml) adults. This supports the putative role of chronic inflammation in the pathogenesis of Sarcopenic Obesity. Using MRI images at the mid-thigh section, the amount of fat infiltration into muscle can be quantified to yield the Inter-Muscular Adipose Tissue (IMAT) ratio. IMAT ratio was found to be the highest among the sarcopenic obese group, and was also shown to be associated with poor grip strength, SPPB and gait speed. Our results support the potential role of MCP-1 and IMAT ratio as early blood and imaging biomarkers that can predict poor functional outcomes in older adults with Sarcopenic Obesity.

**Associate Professor Lim Wee Shiong, Research Lead, IGA, and Senior Consultant, Department of Geriatric Medicine, TTSH,** says, “With rising obesity rates and the fast ageing population in Singapore, the emerging impact of Sarcopenic Obesity cannot be ignored. Through the Geri-LABS study, we have provided further insights into the definition, impact and potential blood/imaging biomarkers of Sarcopenic Obesity. We hope that this will pave the way for future local studies that will shed light on early diagnosis and prognostication, as well as viable intervention strategies for Sarcopenic Obesity.”

Key insights from the Geri-LABS study have been incorporated into the *Asian Working Group for Sarcopenia (AWGS) 2019* consensus update. The first AWGS consensus on sarcopenia and diagnosis<sup>5</sup> is an influential report which has invigorated sarcopenia research and practice in Asia, and has been cited over 1,000 times in scientific publications.

A/Prof Lim and his team will be sharing the Geri-LABS findings at the 17<sup>th</sup> Singapore Health and Biomedical Congress (SHBC) organised by the National Healthcare Group (NHG) on 10 to 11 October 2019 at Max Atria@Singapore Expo. This year’s SHBC centred on the theme “Sustainable Healthcare through Innovation” will feature a new track titled ‘Living with Frailty: Unravelling the Impact of Metabolic Diseases’, where both international and local experts will discuss key concepts in sarcopenia as well

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<sup>5</sup> Chen, L. K., Liu, L. K. Lee, J. S et al. (2014). Sarcopenia in Asia: consensus report of the Asian Working Group for Sarcopenia. *Journal of the American Medical Directors Association*, 15(2), 95-101.

as share insights on its prevention and treatment, including rehabilitation, exercise and nutritional interventions. (See *Fact Sheet on SHBC 2019*)

## **MOU INKED BETWEEN NHG AND LKCMEDICINE TO DRIVE ‘BENCH TO BEDSIDE’ RESEARCH**

Aligned with the continued push for healthcare research and innovation, NHG and the Nanyang Technological University (NTU) Lee Kong Chian School of Medicine (LKCMedicine) will be signing a **Memorandum of Understanding (MOU)** to establish a **Joint Programme for Translational Research** during the Opening Ceremony of SHBC. This Programme will leverage strategically on the expertise and resources of both partners, and streamline them into setting up joint translational research centres to improve health outcomes in the following six areas:

- (i) Ageing/rehabilitation
- (ii) Dermatology
- (iii) Infectious diseases
- (iv) Mental health
- (v) Metabolic-vascular diseases
- (vi) Population health

**Professor James Best, Dean, NTU LKCMedicine, says,** “As a new and innovative medical school with a vision to redefine medicine and transform healthcare, LKCMedicine is pleased to have our researchers collaborate with clinicians from NHG in bringing translational research from the bench to the bedside. We have identified these key research focus areas that are of deep significance to the health of Singaporeans. This is an extension of our strong partnership with NHG to provide innovative medical education to our growing student cohort all aiming to be doctors of the future.”

**Professor Steven Thng, Clinical Director, NHG Translational Research Office; Senior Consultant, National Skin Centre (NSC); and Executive Director of the Skin Research Institute of Singapore (SRIS), says,** “The integration of biomedical, digital and engineering sciences with NHG’s national centres of medicine will enable the targeted translation of research work into applicable clinical solutions. These will help address evolving healthcare needs in the population, and ultimately deliver better and value-based care to our patients beyond the hospital to the community.”

The MOU will be signed by Prof Thng and Professor Naomi Low-Ber, Vice Dean, Education, NTU LKCMedicine. Witnesses to the MOU signing will be Professor Lim Tock Han, Deputy Group Chief Executive Officer (Education and Research), NHG, and Professor Michael Ferenczi, Vice Dean, Faculty Affairs, NTU LKCMedicine.

## **NEW TECH-BASED HEALTHCARE INNOVATIONS IN THE PIPELINE**

Generating relevant data and research studies becomes meaningful when they bring about translatable and tangible health outcomes. Complementing NHG’s growing focus on translational research is the use of technology to design novel applications for clinical practice to improve patient care and safety, and even upstream, to strengthen population health.

SHBC 2019 will showcase several technology-based innovations facilitated by the NHG Centre for Medical Technologies and Innovations (CMTi). These innovations, which are co-developed by NHG Institutions and industry partners, include a specialised mattress that detects pressure areas, redistributes and alleviates pressure spots for patients; an ultrasound-guided device that increases

accuracy and ease of placement of spinal needles in the lumbar spine; and 3D-printed foods for patients with swallowing difficulties. (See *the Annex for details on Tech-Based Healthcare Innovations facilitated by CMTi*)

**Associate Professor Thomas Law, Clinical Director, NHG CMTi; and Group Chief Data and Strategy Officer, NHG,** says, “We chose to focus on developing these technological enablers in order to aid healing, to address common and complex healthcare problems, to improve clinical processes, foster self-care, and encourage greater health ownership by both patients and staff in our Institutions, and people in the community. We hope that these innovations will eventually pave the way for better health for our population.”

For information about SHBC 2019, visit [www.shbc.com.sg](http://www.shbc.com.sg).

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For more information, please contact:

Nathalie Ng  
Senior Executive  
Group Corporate Communications  
**National Healthcare Group**  
Tel: 6496 6229/ 9615 5410  
Email: [Nathalie\\_TM\\_Ng@nhg.com.sg](mailto:Nathalie_TM_Ng@nhg.com.sg)

Benetta Lim  
Executive  
Group Corporate Communications  
**National Healthcare Group**  
Tel: 6496 6268/ 9222 1291  
Email: [Benetta\\_SM\\_Lim@nhg.com.sg](mailto:Benetta_SM_Lim@nhg.com.sg)

#### **About the National Healthcare Group**

The National Healthcare Group (NHG) is a leader in public healthcare in Singapore, recognised at home and abroad for the quality of its medical expertise and facilities. Care is provided through an integrated network of six primary care polyclinics, acute care and tertiary hospitals, national specialty centres and business divisions. Together they bring a rich legacy of medical expertise to our philosophy of integrated patient-centred care.

NHG’s vision is “Adding Years of Healthy Life”. This vision goes beyond merely healing the sick to the more difficult and infinitely more rewarding task of preventing illness and preserving health and quality of life. With some 18,000 staff, NHG aims to provide care that is patient-centric, accessible, seamless, comprehensive, appropriate and cost-effective.

As the Regional Health System (RHS) for Central Singapore, it is vital for NHG to partner and collaborate with stakeholders, community advisors, and voluntary welfare organisations. Together with our patients, their families and caregivers, we aim to deliver integrated healthcare services and programmes that help in Adding Years of Healthy Life to all concerned. More information is available at [www.nhg.com.sg](http://www.nhg.com.sg).

#### **About the Institute of Geriatrics and Active Ageing**

The Institute of Geriatrics and Active Ageing (IGA) was set up to establish new directions for geriatric care in Singapore. Through research innovations and continuous education, the institute aims to enable the delivery of holistic care to improve the health independence, safety, and quality of life for the elderly.

#### **About the NHG Centre for Medical Technologies and Innovations**

Previously known as “Clinical Innovation Committee”, NHG Centre for Medical Technologies and Innovations (CMTi) was renamed in 2017 to support the drive of MedTech innovations within the cluster. NHG CMTi plays a pivotal role in facilitating the co-development projects with partners and works closely with government agencies such as Enterprise Singapore (ES), Economic Development Board (EDB) and National Healthcare and Innovation Centre (NHIC), to develop implementable solutions for clinical problem statements.

## GLOSSARY

林伟雄副教授 高级顾问医生, 老年医科部门 研究组领导, 老年医学与乐龄研教学院 陈笃生医院	Associate Professor Lim Wee Shiong Senior Consultant, Department of Geriatrics Medicine Research Lead, Institute of Geriatrics and Active Ageing (IGA) Tan Tock Seng Hospital
唐天源教授 临床主任, 转化研究室, 国立健保集团 执行主任, 新加坡皮肤研究院 高级顾问医生, 全国皮肤中心	Professor Steven Thng Clinical Director, NHG Translational Research Office, National Healthcare Group Executive Director, Skin Research Institute of Singapore (SRIS) Senior Consultant, National Skin Centre
廖泳杰副教授 临床主任, 国立健保集团附属医疗技术与创新 中心 资讯与策略总监, 国立健保集团	Associate Professor Thomas Lew Clinical Director, NHG Centre of Medical Technologies and Innovations Group Chief Data and Strategy Officer, National Healthcare Group
詹姆斯·贝斯特教授 李光前医学院院长 南洋理工大学	Professor James Best Dean, Lee Kong Chian School of Medicine, Nanyang Technological University
新加坡卫生与生物医学大会	Singapore Health & Biomedical Congress
肌少性肥胖症 “胖弱”	Sarcopenic Obesity “Fat Frail”

## **ANNEX**

Some prototypes of Tech-Based Healthcare Innovations to be showcased at SHBC 2019 are:

### **NHG HealthApps: A Health and Wellness Platform for Patient Activation and Healthcare Ownership**

NHG HealthApps is a digital platform that houses a suite of apps targeting wellness, disease management, patient education, healthcare staff training and education. The multi-apps platform will encourage health ownership among users through core feature apps that monitor dietary intake, vital signs and physical activity. It will also personalise care by allowing clinicians to ‘prescribe’ apps that they deem necessary for patients, and facilitate relationship-based care between healthcare professionals and patients. NHG will be piloting the HealthApps among its staff for the next three years to ensure an intuitive and seamless user experience before rolling it out to patients and the population in Central Region.

### **Smart Automated Body-Pressure Redistributor (SABPR)**

Targeted to prevent development of pressure ulcers in bed-bound patients, the Smart Automated Body-Pressure Redistributor (SABPR) comprises a specialised mattress-overlay designed to sense body-pressure, map out high-pressure regions, and intelligently redistributes the underlying body-support to lower the pressure in high-pressure regions patients, as well as provide pressure relief for weight-bearing parts of the body. The mattress will minimise the need for healthcare professionals and caregivers to manually turn patients at regular intervals, as well as improve pressure alleviation for these patients. A pilot observational trial will be carried out at Tan Tock Seng Hospital (TTSH) next year to calculate the incidence of pressure ulcer development in patients using the SABR mattress.

### **An ultrasound-guided, real-time imaging system for lumbar puncture**

Lumbar puncture (spinal tap) is a bedside procedure performed at the lower lumbar region and is both a therapeutic and diagnostic procedure, primarily used in neurology for the diagnosis of various acute or chronic neurological conditions to obtain cerebrospinal fluid (CSF) for tests. The technology enables real-time, calibrated and accurate needle entry into the lumbar, and minimises unsuccessful attempts. The technology also enhances the accuracy of needle entry, reduces unnecessary trauma and pain for patients, and shortens the time taken by clinicians to complete the procedure.

### **Improving nutrition through 3D printed food**

Preparation of pureed food items for patients with dysphagia or swallowing difficulties can be time-consuming and labour intensive. These texture-modified diets tend to look unappetising, which result in poor intake, and unhealthy weight loss and malnutrition in patients. With 3D Food Printing (3DFP), we aim to automate the production of texture-consistent and more visually appealing food presentation. This project, which is a collaboration between Khoo Teck Puat Hospital (KTPH) and Nanyang Technological University (NTU) and co-funded by the National Additive Manufacturing Innovation Cluster (NAMIC), aims to develop 10 types of food inks and to demonstrate the capabilities of a prototypical food printer.