NEWS RELEASE

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New NTU Singapore research centre on lung health to fill gap in Asian-centric respiratory disease, develop personalised and targeted treatment

The TARIPH Centre to include Singapore's first patient panel for respiratory diseases

To better tackle respiratory diseases in Singapore, **Nanyang Technological University, Singapore (NTU Singapore)** has set up a new research centre designed to address lung diseases in an Asian context.

The Academic Respiratory Initiative for Pulmonary Health (TARIPH) Centre for Respiratory Research Excellence, spearheaded by **NTU's Lee Kong Chian School of Medicine (LKCMedicine)**, aims to fill a clinical and knowledge gap on respiratory diseases among Asians, given that current research is largely Euro-centric.

It brings together local and international research partners to improve lung health for Singaporean and Asian patients by developing personalised and precision-tailored treatment for chronic respiratory diseases such as asthma, chronic obstructive pulmonary disease (COPD) and bronchiectasis.

The TARIPH Centre has also set up Singapore's first **patient panel for respiratory medical research**. Patients with respiratory diseases are enlisted as research partners to help shape research design, directions and implementation on what matters to them and fellow patients, contributing to a greater understanding of the needs of Asian patients.

The centre was officially launched today by **Deputy Prime Minister and Coordinating Minister for Economic Policies, Mr Heng Swee Keat**.

Professor Joseph Sung, **NTU's Senior Vice President (Health and Life Sciences) and Dean of NTU LKCMedicine**, said: "Advancing research that benefits the wider population and improves patient outcomes is an integral part of NTU LKCMedicine's vision as a medical school. With Singapore ramping up its efforts in driving preventive health and ensuring early intervention for chronic diseases, including respiratory

diseases, the LKCMedicine-led TARIPH Centre is a timely introduction as its translational research on respiratory medicine will be instrumental in understanding our patients, shaping healthcare policies, and developing targeted therapeutics suited for Singaporeans and the wider Asian population."

TARIPH Co-Academic Lead and LKCMedicine Assistant Dean (Research) **Associate Professor Sanjay H. Chotirmall**, Provost's Chair in Molecular Medicine, said: "Situating the research in Singapore with our multi-ethnic population sets the TARIPH Centre apart from other researchers in the region. Access to a diverse population like Singapore's means researchers at the Centre can study how respiratory diseases affect different Asian ethnic groups. This wider lens will lead to more personalised treatment for Asian populations and the individual patient, improving quality of life for people with asthma, bronchiectasis, and COPD, among other lung diseases."

International partnerships to tackle Asian-centric lung disease

The TARIPH Centre brings together 46 local and international organisations and over 500 doctors, scientists, industry partners, policy makers and patients to spearhead transformative research on lung diseases in Asians.

This includes hospitals from all three healthcare clusters[1], the National University of Singapore and international partners from across Asia, Australia, Europe, the United States, and the United Kingdom, among others.

Emerging evidence has shown that current treatment for respiratory diseases, which were historically derived from non-Asian populations, is less effective for the Asian patient because of differences in environment, genetics, metabolism, and cultural beliefs.

For example, Singapore's tropical climate results in high levels of fungi in indoor and outdoor air, leading to specific allergic responses that are seen in high frequency in Asian populations with lung diseases as compared to non-Asian counterparts.

Previously, TARIPH researchers discovered how *Neisseria,* a type of bacteria, previously thought to be harmless in the lung within a Euro-centric context, may cause infection in Asian patients with bronchiectasis.

The TARIPH centre will focus on five key research areas: Respiratory Diseases, Interdisciplinary Innovations, Disease Registries and Clinical Trials, Health Economics and Patient Advocacy and Environmental Science.

[1] The three healthcare clusters in Singapore are the National University Health System (NUHS) in the west; the National Healthcare Group (NHG) in the central region; and Singapore Health Services (SingHealth) in the east.

Researchers will study respiratory diseases, understand how genes, proteins and metabolites interact to affect lung diseases, and discover biomarkers. They will develop innovations for lung patient care through the latest science and technological advances, such as including the use of artificial intelligence and wearables to improve care and achieve cost-effective, better patient outcomes.

By leveraging disease registries and clinical trials, researchers will seek new approaches for early detection, treatment, and disease prevention by better understanding how specific lung diseases affect Asian and Singaporean patients. The researchers will also investigate the complex interactions between the environment and lung diseases, such as how air microbiomes, air quality and pollutants can affect the well-being of patients in order to find ways to reduce triggers.

The team will also advance the understanding of cost-effective therapies in partnership with patients and caregivers who will provide new research directions while providing advice to enhance and optimise existing ones.

Information about the TARIPH Centre's research projects can be found in Annex A.

New patient panel to co-develop patient-focused research

The TARIPH Centre will work with Singapore's first patient panel for respiratory medical research through the **TARIPH Patient Network**, where patients and their caregivers work closely with clinicians and researchers providing their voices to respiratory medicine research.

For instance, patients will be able to share lived experience, their unmet needs, problems and benefits of their current treatment, and the emotional impact of living with the disease.

Instead of merely being research participants providing data for research, patients in the panel are research partners who co-develop patient-focused research with researchers. They will refine research questions, identify outcomes that matter to patients most, co-create patient-friendly materials for research, co-design solutions for healthcare improvement initiatives, perform user testing of study devices and materials, guide investigators on engaging patients and provide patient perspectives on research data analysis and interpretation with a patient's view.

There are currently ten members in the patient panel, comprising nine patients and one carer, living with asthma, bronchiectasis, and other chronic lung conditions. All members are trained through a "Patients as Research Partner" (PREP) Workshop.

Associate Professor John Arputhan Abisheganaden, Head and Senior Consultant in the Department of Respiratory and Critical Care Medicine at Tan Tock Seng

Hospital and TARIPH's Co-Academic Lead, said: "Patients are experts of their medical condition. Including their voices to respiratory medicine research is beneficial in providing inputs on research direction and design so that studies and projects carried out by the Centre are patient-focused and address real-world issues that matter to patients. This will ultimately help us to find treatments so that they can cope better with their chronic lung disease and live their life well."

Mr Lim Joo Kwan, co-chair of the TARIPH Patient Network and a patient who was diagnosed with bronchiectasis four years ago, said: "Having lived with a lung disease, I know what it is like to feel breathless, to experience chest tightness or to be worried about how my condition will progress. I am therefore heartened to put my lived experience and insights to use by working with researchers and clinicians in the TARIPH Centre. I hope this can lead to better understanding of lung diseases, which then leads to finding a cure, better diagnosis and treatment."

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About Nanyang Technological University, Singapore

A research-intensive public university, Nanyang Technological University, Singapore (NTU Singapore) has 33,000 undergraduate and postgraduate students in the Engineering, Business, Science, Medicine, Humanities, Arts, & Social Sciences, and Graduate colleges.

NTU is also home to world-renowned autonomous institutes – the National Institute of Education, S Rajaratnam School of International Studies, Earth Observatory of Singapore, and Singapore Centre for Environmental Life Sciences Engineering – and various leading research centres such as the Nanyang Environment & Water Research Institute (NEWRI) and Energy Research Institute @ NTU (ERI@N).

Under the NTU Smart Campus vision, the University harnesses the power of digital technology and tech-enabled solutions to support better learning and living experiences, the discovery of new knowledge, and the sustainability of resources.

Ranked amongst the world's top universities, the University's main campus is also frequently listed among the world's most beautiful. Known for its sustainability, NTU has achieved 100% Green Mark Platinum certification for all its eligible building

projects. Apart from its main campus, NTU also has a medical campus in Novena, Singapore's healthcare district.

For more information, visit www.ntu.edu.sg

Annex A: TARIPH Centre research project examples

The TARIPH Centre will work on the following research projects:

Patient Voices in Respiratory Research Survey: This survey of over 1,000 patients with lung conditions at public hospitals across Singapore aims to understand the patient experience in living with a lung condition, and how it has affected a patients' quality of life. The study will also shed light on patient's perceptions of clinical and medical research.

Started in July 2023, this survey reaches out to patients with chronic lung conditions such as asthma, bronchiectasis, COPD (chronic obstructive pulmonary disease) and interstitial lung disease. Non-English speaking patients can also respond to surveys that are translated to Chinese, Malay and Tamil. This ensures a diversity of perspectives are captured to reflect the voices of the patient community.

The findings will help the TARIPH research team direct research towards areas that matter most to patients.

Molecular clinical studies on respiratory Asian populations: Researchers are studying cohorts of Singaporeans with chronic obstructive pulmonary disease (COPD) (more than 1,000 patients), bronchiectasis (more than 1,000 patients) and severe asthma (more than 300 patients) by performing multi-omics analysis to decipher molecular signatures in Asian patients.

This will enable the team to discover novel biomarkers for earlier diagnosis and to develop targeted therapeutics for Asian patients. Patients recruited in Singapore or Asia for these clinical studies will be matched with patients in non-Asian settings through our international partnerships for the purpose of comparator studies.

Environmental work: There is substantial evidence that air quality affects respiratory morbidity and mortality. Centre researchers, in collaboration with NTU's Singapore Centre for Environmental Life Sciences Engineering (SCELSE), have sampled air in over 150 individual home environments of respiratory patients and applied state-of-the-art sequencing technologies to understand the relationships between air quality, microbial content (air microbiomes) and clinical outcomes.

For more information on TARIPH, visit https://www.ntu.edu.sg/tariph