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New Tripartite Programme in Infectious Diseases for New Discoveries and Treatment to Advance Research in the Field and Tackle Key Disease Areas

1. A **TR**ipartite Programme in **I**nfectious **D**iseases for New Discoveries and Treatm**ENT** (TRIDENT) has been introduced by the National Healthcare Group (NHG), Agency for Science, Technology and Research (A*STAR), Nanyang Technological University, Singapore's (NTU Singapore) Lee Kong Chian School of Medicine (LKCMedicine) and National Centre for Infectious Diseases (NCID). The joint programme, which has set aside S\$9 million in funding, focuses on accelerating local research in infectious diseases, and enhancing knowledge and capabilities to tackle three priority disease areas. These disease areas – antimicrobial resistance (AMR), respiratory tract infections, and emerging infectious diseases – were identified based on major infectious diseases burden¹ for mortality and morbidity in Singapore.
2. TRIDENT will bring together infectious diseases researchers and clinicians of partner institutions² to collaborate on translational infectious diseases research. Its other objectives are to develop a centre of excellence for infectious diseases research and seed promising research ideas and capabilities, and increase the tripartite partners' competitiveness to vie for larger ecosystem grants. The programme also aims to drive and deliver translational infectious diseases research with impact on policies and practice for better patient outcomes. The programme is jointly funded by NHG, A*STAR, and NTU LKCMedicine. The TRIDENT Programme Office, hosted at NCID, oversees the administration and management of activities under the programme. NCID also provides clinical expertise in infectious diseases as part of the programme.
3. TRIDENT launched its first grant call for proposals on AMR in October 2023. AMR was selected as the first disease area to be funded under this programme as studies have demonstrated that the misuse and overuse of antibiotics can drive the evolution of drug-resistant bacteria causing antimicrobial treatments to become increasingly ineffective. Today, AMR is one of the biggest threats facing healthcare globally, and is projected to kill more people by 2050 than cancer³. The grant call focused on the development of innovative solutions to better understand the genetic foundations and mechanisms of AMR, as well as the development of novel diagnostics and therapeutics to provide new options for treating dangerous multidrug-resistant bacteria.

¹ Disease burden provides an in-depth look at diseases, injuries and risk factors that cause mortality and morbidity in Singapore across time, and also shows how the country compares internationally. Source:

<https://www.moh.gov.sg/resources-statistics/singapore-burden-of-disease-report-2017>

² Partner institutions refer to any institution under the NHG cluster, A*STAR Research Entities and LKCMedicine

³ Antimicrobial resistance could kill more people than cancer by 2050, experts say. Source:

<https://www.straitstimes.com/singapore/new-drugs-needed-or-antimicrobial-resistance-could-kill-more-people-than-cancer-by-2050>

4. TRIDENT will also focus on two other infectious disease areas – respiratory tract infections such as pneumonia and influenza, and emerging infectious diseases including vector-borne diseases such as dengue and Zika. The programme will utilise cutting-edge platforms and/or capabilities in applied genomics (i.e. developing clinical applications of whole genome sequencing and metagenomics), diagnostics development and validation, clinical trials in vaccines and therapeutics, data analytics and modelling, and implementation science to further research in these areas.
5. With a better understanding of various infectious diseases and the pathogens which caused them, TRIDENT aims to provide scientific evidence which supports new or improved interventions that result in effective prevention, control, and management of infectious diseases, and better inform the development of public health strategies.
6. Professor Benjamin Seet, Deputy Group CEO (Education and Research), NHG said, “COVID-19 is a stark reminder of our vulnerability to pathogens. While the pandemic as a global public health emergency is over, we continue to grapple with variants. At the same time, we face age-old challenges such as dengue, respiratory infections and tuberculosis, and have to deal with the rise of AMR. TRIDENT is a targeted programme that seeks to address pertinent gaps in our knowledge and ability to manage these challenges. It combines the clinical expertise at NCID, with the scientific and technological strengths of A*STAR and NTU, to find new and better ways to combat infectious diseases.”
7. Professor Lisa Ng, Executive Director, A*STAR’s Biomedical Research Council and A*STAR Infectious Diseases Labs said, “TRIDENT leverages the synergistic capabilities and expertise from the partner institutions to deliver excellent science for the identified priority disease areas. This collaborative endeavour will enhance our understanding of the biological underpinnings of these disease areas and open innovative avenues for novel therapeutics. In doing so, TRIDENT will facilitate Singapore’s resilience against future global infectious disease outbreaks.”
8. Professor Laurent Renia, Director, Respiratory and Infectious Disease Programme, NTU LKCMedicine said, “We are living in a world with new and emerging infectious diseases. As we head towards a ‘post-antibiotic’ era with antibiotics becoming vastly less effective in treating common infections, there is an urgent need for new treatments to tackle these health threats. Through LKCMedicine’s strength in bacteriology, our BSL-3 facility for research on highly virulent pathogens, and collaboration with the wider NTU scientific community in biomedical engineering, genomics and metagenomics, we can help to bring forth clinical research in TRIDENT that can be translated into new diagnostics and treatments for life-threatening infections. TRIDENT draws on the scientific synergy between LKCMedicine, NCID and A*STAR, which will enable groundbreaking research in infectious diseases.”
9. Professor David Lye, Director, Infectious Disease Research and Training Office, NCID and Chairman of TRIDENT’s Management Committee said, “The TRIDENT programme aspires to seed good ideas that can be developed into nationally and internationally funded competitive projects in infectious disease areas of national strategic importance. It is our contribution to developing the national infectious disease research capacity in preparation for the next major outbreak working on significant infectious disease challenges that are already here with us, such as AMR, respiratory infections like influenza and vector-borne infections like dengue.”

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About the National Healthcare Group

The National Healthcare Group (NHG) is a leader in public healthcare in Singapore recognised for the quality of its medical expertise and facilities. Care is provided through an integrated system of primary care polyclinics, acute care and tertiary hospitals, and national specialty centres. Together, we provide comprehensive and innovative healthcare to address the unique needs of our patients and the population we serve.

As the Regional Health Manager for 1.5 million residents in Central and North Singapore, NHG through its Central, Woodlands, and Yishun health networks collaborates with private general practices, public and community health and social care providers to keep residents well and healthy.

The 22,000 healthcare professionals in NHG are committed towards building healthier and resilient communities, and Adding Years of Healthy Life to the people we serve.

More information is available at www.nhg.com.sg.

About the Agency for Science, Technology and Research (A*STAR)

A*STAR is Singapore's lead public sector R&D agency. Through open innovation, we collaborate with our partners in both the public and private sectors to benefit the economy and society. As a Science and Technology Organisation, A*STAR bridges the gap between academia and industry. Our research creates economic growth and jobs for Singapore, and enhances lives by improving societal outcomes in healthcare, urban living, and sustainability. A*STAR plays a key role in nurturing scientific talent and leaders for the wider research community and industry. A*STAR's R&D activities span biomedical sciences to physical sciences and engineering, with research entities primarily located in Biopolis and Fusionopolis. For ongoing news, visit www.a-star.edu.sg.

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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 and Singapore Centre for Environmental Life Sciences Engineering – and various leading research centres such as the Earth Observatory of Singapore, Nanyang Environment & Water Research Institute 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

About Lee Kong Chian School of Medicine

Lee Kong Chian School of Medicine (LKCMedicine) trains doctors who put patients at the centre of their exemplary care. The School, which offers both undergraduate and graduate programmes, is named after local philanthropist Tan Sri Dato Lee Kong Chian. Officially opened on 28 August 2017, LKCMedicine aims to be a model for innovative medical education and a centre for transformative research. The School's primary clinical partner is the National Healthcare Group, a leader in public healthcare recognised for the quality of its medical expertise, facilities and teaching. Graduates from the five-year undergraduate medical degree programme will have a strong understanding of the scientific basis of medicine, with an emphasis on technology, data science and the humanities.

Visit www.ntu.edu.sg/medicine for more information.

About the National Centre for Infectious Diseases

The National Centre for Infectious Diseases (NCID) is a purpose-built facility designed to strengthen Singapore's capabilities in infectious disease management and prevention. NCID houses clinical services, public health, research, training and education and community engagement functions under one overarching structure. In addition to the clinical treatment of infectious diseases and outbreak management, the expanded roles and functional units of NCID include the Infectious Disease Research and Training Office, the National Public Health and Epidemiology Unit, the National Public Health Laboratory, the National HIV Programme, the National TB Programme, the Antimicrobial Resistance Coordinating Office, and the Infection Prevention, Control and Outreach Office of NCID. Benchmarked to international standards and best practices, NCID will enhance Singapore's ability to effectively manage infectious diseases.

Visit www.ncid.sg for more information.