PRECISE
Precision Health Research Singapore

Singapore launches next phase of National Precision Medicine Programme

- *New national body established to further research insights, improve patient outcomes and create new economic opportunities for the biomedical technology industry*

SINGAPORE, 7 April 2021 - Precision medicine is part of Singapore's Research, Innovation and Enterprise (RIE) 2025 strategic goal to transform and protect the health of every Singaporean. Identified as a priority by the Ministry of Health, precision medicine aims to understand how genomic, phenotypic, lifestyle and clinical factors contribute to the health of Singaporeans. It also supports the responsible use of health data in clinical applications with the longer-term goal of addressing Singapore's healthcare challenges in a sustainable and clinically cost-effective manner.

2 Singapore's National Precision Medicine (NPM) strategy is a 10-year plan to enhance and accelerate Singapore's biomedical research, health outcomes and economic growth. NPM is a whole-of-government effort to establish the necessary frameworks and infrastructure to realise precision medicine on a national scale, to ultimately improve public health, enhance disease prevention and to identify the right treatments for the right individuals and groups.

3 Phase II of Singapore's NPM strategy will start in April 2021 with a four-year horizon and it aims to:

a. Further research insights into the Asian phenotype by analysing the genetic makeup of 100,000 healthy Singaporeans and up to 50,000 patients with specific diseases;

b. Improve patient outcomes by piloting the implementation of precision medicine in clinical practice; and

c. Create new economic opportunities for Singapore's healthcare and biomedical technology industry by attracting and anchoring overseas companies while yielding new opportunities for home-grown enterprises.

4 To achieve this, **Precision Health Research, Singapore** (**PRECISE**), has been set up, as the central entity to drive NPM.

Furthering research insights into Asian Genomes

5 Precision medicine is a fast-growing medical approach, which takes into account a patient's individual variables including genetics, lifestyle as well as other environmental factors. A more comprehensive understanding of disease-causing factors provides earlier, faster and more accurate diagnoses, optimises treatments by prescribing the right drug at the right time, informs the development of new drugs and therapies, and enhances disease prevention.

6 Governments around the world – including the US, UK, Denmark, Finland and Japan – have initiated national genomics programmes to harness the benefits of precision medicine. However, most current programmes have largely focused on Caucasian populations or lack genetic diversity. Many conditions, such as cancer and heart disease which can have different presentations among Asians, remain underrepresented.

7 With its multi-ethnic population which captures 80 per cent of Asia's genetic diversity, Singapore is well-placed to address knowledge gaps in Asian-specific precision medicine and complement global efforts.

8 The NPM Strategy was launched in 2017, supported under Singapore's RIE 2020 plan. NPM Phase I culminated in the world's largest genetic databank for multi-ethnic Asian populations. Completed in October 2019, the NPM Phase I databank comprises the complete genetic data of 10,000 healthy Singaporeans, serving as a reference for Asian genetic normality and underpinning the subsequent development of precision medicine for Singaporeans and patients across Asia.

9 In NPM Phase II, PRECISE will collaborate with research and clinical partners from the Singapore ecosystem, including the Agency for Science, Technology and Research (A*STAR), Lee Kong Chian School of Medicine, National Healthcare Group, National University Health System, National University of Singapore, and SingHealth Duke-NUS Academic Medical Centre to study the genetic makeup of 100,000 healthy Singaporeans and up to 50,000 people with specific diseases. The genetic data will be integrated with detailed lifestyle, environmental, and clinical data to yield rich insights into factors that contribute to Asian diseases and conditions.

10 "A study with this degree of genetic diversity of the population, coupled with this level of phenotyping, is unparalleled. This a powerful approach for identifying factors which determine why some Singaporeans, but not others, develop certain diseases. With insights into these disease-causing factors, researchers and doctors can develop new approaches that will not only benefit patients in the short term but for decades to come. Additionally, as this will require big data analysis to generate insights, we have also stepped up efforts to ensure a secure and trustworthy data environment by actively working with various government agencies to build a robust infrastructure with safeguards in place to preserve data security and privacy," said Professor John

Chambers, Chief Scientific Officer of PRECISE and one of the principal investigators supervising and coordinating the SG100K population cohort study. SG100K seeks to recruit 100,000 healthy participants to further research insights into the Asian genome and how it impacts health and disease. Prof Chambers is also the Professor of Cardiovascular Epidemiology and the President's Chair in Cardiovascular Epidemiology at the Lee Kong Chian School of Medicine in Nanyang Technological University.

Piloting the use of precision medicine in clinical practice

11 Singapore's rapidly ageing population and increased prevalence of chronic diseases have changed healthcare demands fundamentally. To ensure that healthcare delivery evolves to address these demands and remain future-ready, precision medicine remains a key focus of the Human Health and Potential Domain under the RIE2025 plan.

12 Precision medicine has already seen success in the treatment of rare genetic diseases in Singapore. For over two decades, the Genetics Service at KK Women's and Children's Hospital (KKH) has been providing clinical care to paediatric patients with genetic disorders, tapping on a precision medicine approach to disease treatments. Through BRIDGES (**B**ringing **R**esearch **I**nnovations for the **D**iagnosis of **GE**netic diseases in **S**ingapore), 412 families were analysed over the last six years by genomic researchers at SingHealth, A*STAR and Duke-NUS. As a result, 160 children with rare and undiagnosed conditions were able to receive proper diagnoses that led to tailored clinical management and improved health outcomes in at least one of three families. At 39 per cent, BRIDGES has demonstrated a diagnostic yield that is on par with 25 to 40 per cent in similar research programmes worldwide. Precision medicine has helped to improve understanding of the causes to genetic disorders, and helped clinicians to assess and identify evidence-based, therapeutic targets for developing precise treatments to the conditions.

13 "While the field of precision medicine has seen considerable progress in recent years, there remains an urgent need for research findings to be translated into standard clinical practice. In NPM Phase II, we will be working with doctors, healthcare institutions and the Ministry of Health to find ways to apply precision medicine to improve the health of Singaporeans in a way that is affordable and maximises the benefit to the patient," said Professor Tai E Shyong, Chief Medical Officer at PRECISE. He is also a Senior Consultant in the Division of Endocrinology at the National University Hospital and Professor at the National University of Singapore's Yong Loo Lin School of Medicine, Saw Swee Hock School of Public Health and Duke-NUS Medical School.

PRECISE
Precision Health Research Singapore

Creating new economic opportunities for Singapore's healthcare and biomedical technology industry

14. Making precision medicine a reality in Singapore requires a long-term and concerted commitment from both the Government and the industry. In addition to expanding research efforts and establishing national clinical workflows, NPM Phase II will continue to partner the National Research Foundation Singapore (NRF), A*STAR, the Economic Development Board, and the Heath Promotion Board to catalyse the next phase of growth for Singapore's healthcare and biomedical technology industry by attracting and anchoring overseas companies in Singapore, and creating new opportunities for home-grown enterprises.

15. Executive Director of PRECISE Professor Patrick Tan said: "Pharmaceutical, biotechnology, and data science companies are a key component of Singapore's NPM strategy. They bring our research from bench to bedside by developing and manufacturing new drugs and therapies for patients. PRECISE will be looking to develop meaningful public-private partnership models to facilitate growth and drive innovation across the healthcare and biotechnology industry – creating higher-value jobs, nurturing the next generation of scientists and clinicians and strengthening Singapore's status as the region's leading medical hub to deliver precision medicine based treatments." Professor Tan is also the Executive Director of the Genome Institute of Singapore at A*STAR and Professor at Duke-NUS Medical School.

About Precision Health Research, Singapore (PRECISE)

Precision Health Research, Singapore (PRECISE) is the central entity set up to coordinate a whole of government effort to implement Phase II of Singapore's 10-year National Precision Medicine (NPM) strategy.

NPM Phase II aims to transform healthcare in Singapore and improve patient outcomes through new insights into the Asian genome and data-driven healthcare solutions. NPM Phase II will also enhance the breadth and depth of the Precision Medicine-related industry by attracting and anchoring overseas companies in Singapore, while yielding new opportunities for home-grown companies.

PRECISE is a business unit under the Consortium for Clinical Research and Innovation Singapore (CRIS), a subsidiary of Ministry of Health Holdings. NPM Phase II and PRECISE is supported by the National Research Foundation Singapore and the Singapore Ministry of Health's National Medical Research Council.

For more information, visit www.npm.sg.

About the Consortium for Clinical Research and Innovation Singapore (CRIS)

The Consortium for Clinical Research and Innovation Singapore (CRIS) was established in 2020 to strengthen synergies and promulgate strategies for national-level clinical research and translation programmes that are under the stewardship of the Ministry of Health (MOH).

CRIS brings together the following five research platforms and programmes as business units under a single management and governance structure:

1. Singapore Clinical Research Institute (SCRI)
2. National Health Innovation Centre Singapore (NHIC)
3. Advanced Cell Therapy and Research Institute, Singapore (ACTRIS)
4. Precision Health Research, Singapore (PRECISE)
5. Singapore Translational Cancer Consortium (STCC)

The business units cover a broad spectrum of activities, both in research and corporate functions – from clinical trials, medical technology development, precision medicine, cell therapy manufacturing, to cancer translation.

CRIS aims to make a positive difference to Singapore patients and researchers by ensuring that these clinical research platforms and programmes are at the cutting edge of capability development and innovation, through facilitated collaborations and enduring partnerships with research and biomedical entities and communities across the public sector and industry.

For media queries, please contact:

Clarissa Ho
Strategic Communications Manager, PRECISE
Mobile: 9632 1253
Email: clarissa.ho@precise.cris.sg