

MEDIA FACTSHEET

Digital Therapeutics for Seniors:

A partnership between the Institute for Digital Medicine, NUS Yong Loo Lin School of Medicine, and Marsiling Grassroots Organisations and Sunlove Marsiling Senior Activity Centre

Aim of programme

One of the key challenges that Singapore faces today is its rapidly ageing population, and it is critical for healthcare services to remain accessible and affordable for the increasing number of seniors who live longer today, with varying health conditions.

To address the challenges of ageing, the **Institute for Digital Medicine (WisDM) at NUS Yong Loo Lin School of Medicine (NUS Medicine)** is pioneering efforts in the use of **digital medicine to improve healthcare outcomes through targeted healthcare solutions and more effective interventions**. To this end, the team at WisDM is embarking on its first partnership with a local community which will see the introduction of a digital therapeutics platform to allow seniors to remotely participate in multi-tasking training to address conditions such as cognitive decline, diabetes, Alzheimer's disease and others.

About the digital therapeutics platform

Digital therapy involves the use of software or apps for treatment. Examples of treatment can include driving changes in behaviour, such as exercising more, or eating healthier. In this study, the WisDM team will be using a game, known as "Multi-Attribute Task Battery", or "MAT-B" for multi-tasking training. By partnering with a leading animator, the game software has been re-imagined to make more user-friendly for seniors, so that users remain engaged with the digital therapy.

The game will be pre-loaded onto tablets to enable remote digital therapy, which is expected to increase uptake and sustained use by the seniors. On this portable, tablet-based game, users will have to complete multiple tasks in an air-flight control simulation setting, such as hitting a specific target, refueling oil tanks, and responding to audio commands.

All the data from the game, such as how long it takes for each user to complete the tasks, the levels of intensity they are completed at, and whether they are completed accurately, will be collected to track users' performance levels over time. The WisDM team will then be able to construct individual performance profiles that can provide information on what is needed to personalise digital therapy for these users, to best combat cognitive decline.

Benefits of the platform

Led by **Professor Dean Ho, Director of WisDM, and Associate Professor Christopher Asplund, a cognitive neuroscientist from the Division of Social Sciences (Psychology), Yale-NUS College, who is also part of the WisDM team**, a major goal of the programme's deployment of remote digital medicine and therapeutics is the prevention of seniors from becoming patients. Through this study, the WisDM team hopes to obtain key insights on predictors of disease onset, and further enhance the tool to enable long-term and remote monitoring and management for chronic illnesses, decrease acute hospitalizations, make care more efficient for the existing senior population, and ultimately substantially improve senior healthcare outcomes.

With the capacity to serve as a simultaneous intervention and diagnostic gaming tool, the instrument is capable of picking up early indications of cognitive decline in seniors—this could lead to **early intervention and improved healthcare outcomes**. This will enable senior communities to continue doing things they value, keeping an active lifestyle and maintaining their social life, while addressing preventable care dependency. More importantly, this will **empower seniors to be in control of their own health, and improve their overall quality of life in the long term**.

The tool also allows for **patient-centric care to be delivered to more people at lower costs**, with easier access to healthcare from their homes, making care more efficient for the existing ageing patient population and **reducing strain on the healthcare ecosystem**.

Prof Ho said, "Working with a team of behavioural scientists who will conduct user experience and user interface studies to ensure that this technology is used in a continuous manner, the project is expected to play a key role in driving digital medicine-enabled, decentralised healthcare for seniors."

Plans for the programme

In this study, the WisDM team will be partnering **Marsiling Grassroots Organisations (GROs), which have identified Sunlove Marsiling Senior Activity Centre (SAC)**, which serves 500 residents, as the institution to launch this pilot programme. The first tranche of the programme will involve up to 75 seniors aged 60 and above. Participants involved in the programme are residents who often engage in activities at the centre. Some of them also face certain ageing-related challenges and are undergoing treatments to manage their health conditions.

The WisDM team is working closely alongside Marsiling GROs and Sunlove Marsiling SAC to ensure that every aspect of the study, from the instruction manuals to layout of the game, is developed for optimal and sustained use by the community.

Following the introduction of the tool to the seniors at Sunlove Marsiling SAC, the WisDM team will be conducting subsequent engagement sessions to understand the community's needs. Studies will begin in March 2021 to gather user experience and user interface feedback information and ensure that the programme is suitable for rapid uptake and sustained use.

As users play the game, the scoring data will be sent to the WisDM team to construct individualised performance profiles while also looking at user outcomes over time, and implementing behavioural nudging and incentive design to study how to prolong user engagement with the digital medicine technologies.

The information collected will serve as the basis of downstream efforts to tailor the platform to each user's needs and to optimise their respective performance scores in a sustained

manner. With the results, the WisDM team will then ramp up the tool for further studies involving larger pools of residents, and aim to have results by the end of 2021.

Ms Lau Lu Ching, Assistant Secretary of the Marsiling Citizens' Consultative Committee, shared, "We believe that the partnership between WisDM, and Marsiling GROs and Sunlove Marsiling SAC can develop innovative digital healthcare for our silver generation. With support from family and the community, such a holistic approach helps lead to early intervention and treatment for a better quality of life for our seniors."

WisDM: Delivering research aligned to national priorities

WisDM is one of nine new Translational Research Programmes (TRPs) at NUS Medicine aimed at creating a strong and coherent scientific base to deliver impactful and meaningful research outcomes for the School and Singapore's health system. Besides Digital Medicine, the other areas are Cancer, Cardiovascular Disease, Healthy Longevity, Human Potential, Immunology, Infectious Diseases, Precision Medicine and Synthetic Biology. These nine key focus areas, which are multi-disciplinary, and health and disease-based will create greater synergies and collaboration between basic scientists and clinician scientists, strengthen programmatic research and deliver research outcomes to address clinically relevant issues and applications that are aligned to national priorities.

An accomplished scientist in the field of biomedical science, Prof Ho became the first NUS academic to be elected a Fellow of the United States National Academy of Inventors (NAI), the highest professional accolade for academic inventors, in 2018. Dean is also a Fellow of the American Institute of Medical and Biological Engineering (AIMBE) and Society for Laboratory Automation and Screening, as well as a Fulbright Scholar. He is also a recipient of the NSF CAREER Award, Wallace H. Coulter Foundation Translational Research Award, and V Foundation for Cancer Research Scholar Award, among others. Prof Ho was recently named to the Asia Tatler Gen.T List, which honours young leaders who are shaping the future of the region. Prof Ho has appeared on the National Geographic Channel Program "Known Universe" to discuss his discoveries in drug delivery and imaging. He has also served as the President of the Board of Directors of the Society for Laboratory Automation and Screening (SLAS), a 26,000+ member global drug development organization comprised of senior executives from the pharmaceutical and medical device sectors, as well as academic thought leaders.

About Marsiling GROs and Sunlove Marsiling SAC

The Marsiling GROs are part of the 1,800 GROs under the People's Association (PA), managed by volunteers who work with PA to organise a wide range of programmes and activities to cater to the needs and interests of residents from all walks of life residing in the Marsiling division. With its mission to **build and bridge communities in achieving "One People, One Singapore" – a resilient and cohesive community that stands united and stays together, regardless of race, language or religion**, Marsiling GROs aim to reach and engage all residents in the Marsiling division to promote social cohesion and national unity.

A charitable organisation dedicated to serve the community, **Sunlove Marsiling SAC is committed to providing and improving care for less fortunate seniors**. Services provided by the centre are free for seniors aged 60 years old and above, who require help with daily living activities and have little or no family support. The centre organises and participates in community-based projects to meet the needs of the community, and encourages seniors living around the designated areas to participate in active ageing. A communal space for seniors to socialise with their peers and find meaningful support, the centre also conducts purposeful activities such as art and craft and exercise sessions to keep them engaged. At the heart of Sunlove Marsiling SAC is its mission to love and respect people, and treat them with kindness.

About the National University of Singapore (NUS)

The National University of Singapore (NUS) is Singapore's flagship university, which offers a global approach to education, research and entrepreneurship, with a focus on Asian perspectives and expertise. We have 17 faculties across three campuses in Singapore, with more than 40,000 students from 100 countries enriching our vibrant and diverse campus community. We have also established our NUS Overseas Colleges programme in more than 15 cities around the world.

Our multidisciplinary and real-world approach to education, research and entrepreneurship enables us to work closely with industry, governments and academia to address crucial and complex issues relevant to Asia and the world. Researchers in our faculties, 31 university-level research institutes, research centres of excellence and corporate labs focus on themes that include energy; environmental and urban sustainability; treatment and prevention of diseases; active ageing; advanced materials; risk management and resilience of financial systems; Asian studies; and Smart Nation capabilities such as artificial intelligence, data science, operations research and cybersecurity.

For more information on NUS, please visit www.nus.edu.sg

About the NUS Yong Loo Lin School of Medicine (NUS Medicine)

The NUS Yong Loo Lin School of Medicine is Singapore's first and largest medical school. Our enduring mission centres on nurturing highly competent, values-driven and inspired healthcare professionals to transform the practice of medicine and improve health around the world.

Through a dynamic and future-oriented five-year curriculum that is inter-disciplinary and inter-professional in nature, our students undergo a holistic learning experience that exposes them to multiple facets of healthcare and prepares them to become visionary leaders and compassionate doctors and nurses of tomorrow. Since the School's founding in 1905, more than 12,000 graduates have passed through our doors.

In our pursuit of health for all, our strategic research programmes focus on innovative, cutting-edge biomedical research with collaborators around the world to deliver high impact solutions to benefit human lives.

The School is the oldest institution of higher learning in the National University of Singapore and a founding institutional member of the National University Health System. It is Asia's leading medical school and ranks among the best in the world (Times Higher Education World University Rankings 2019 by subject and the Quacquarelli Symonds (QS) World University Rankings by Subject 2019).

For more information about NUS Medicine, please visit <https://medicine.nus.edu.sg/>