PRESS RELEASE

The Centre for Healthcare Innovation and Temasek Foundation Collaborate to Enable Start-ups and SMEs to Enhance Patient Care Through Emerging Healthcare Innovations

Three teams won the inaugural Healthcare InnoMatch, receiving up to S$1.2 million in combined funding and hospital partnerships to test-bed and develop innovative healthcare solutions

SINGAPORE, 24 August 2021 – The Centre for Healthcare Innovation (CHI) and Temasek Foundation have announced three teams who emerged tops in the inaugural "Healthcare InnoMatch by Temasek Foundation and CHI", a platform to seek solutions that can enhance patient care and deliver positive health outcomes. The winners, listed below (in no order of merit), were selected during a virtual finale where four finalists pitched the value of their innovations to a panel of judges including representatives across all three local healthcare clusters.

- Articares Pte Ltd, Singapore (paired with Tan Tock Seng Hospital)
- Epilog-NV, Belgium (paired with the National University Hospital)
- RootAlly AI, Singapore (paired with Singapore General Hospital)

Leveraging on artificial intelligence and data analytics, the finalists' innovative ideas revolve around tele-rehabilitation, prediction with actionable insights and real-time remote monitoring to personalise treatment for patients with cognition-related conditions. These concepts and ideas are promising to meet the challenges of an aging workforce and population, more so during the COVID-19 pandemic. The synopses of their proposals are in the Annexe.

The Healthcare InnoMatch is an open call for proposals targeting today's healthcare challenges for quick and safe access use of new and emerging healthcare innovations to benefit patients. Winners of the Healthcare InnoMatch are individually matched to a local healthcare institution (HCI). Subsequently, they will receive access to real-use cases in a hospital simulated environment for test-bedding and customising their near market-ready health innovations to suit local context and population. Within six months, they will complete their test-bedding, in compliance with regulations and institutional policies. Outcomes from test-bedding can be shared with other HCIs across the three local healthcare clusters for procurement options after a successful evaluation, to adopt for large scale mainstream use.

Supported by Temasek Foundation, the Healthcare InnoMatch will provide up to S$1.2 million in project development funding for start-ups and SMEs, which will support them in meeting test-bedding requirements, such as manufacture, customisation, purchase

of consumables, as well as in terms of analytics, evaluation, protocol planning and data management needs.

Opening on 23 November 2020 and closing on 12 February 2021, the first Healthcare InnoMatch sought proposals in any of the three following themes: (i) Frail No More; (ii) Reducing Hospital Acquired Infections; and (iii) Digitalisation to Enhance Patient Care, Journey and Experience. The four finalists were chosen after a rigorous shortlisting process from 144 teams from over 30 countries.

A first in Singapore, three of the largest local public hospitals – Singapore General Hospital (SGH), National University Hospital (NUH) and Tan Tock Seng Hospital (TTSH), representing three local healthcare clusters, came together to review the operational feasibility of these innovations based on a common evaluation framework. This will accelerate the process from last mile innovation to care delivery, bringing innovators a step closer to benefit patients at Singapore's HCIs.

Accelerate Test-bedding Innovative Solutions at Scale

The Healthcare InnoMatch is an initiative of CHI under its CHI Start-up Enterprise Link (CHISEL). Launched in November 2020, CHISEL was set up as a platform to strengthen healthcare transformation. Adopting a sandbox approach, CHISEL will facilitate for faster and consistent adoption process for start-ups and SMEs to find suitable HCIs to implement new innovation rapidly at scale. It will support and enable start-ups and SMEs to demonstrate the value of its innovations in a simulated and/or clinical setting, through a stage-by-stage approach.

Through initiatives like the Healthcare InnoMatch, CHISEL plans to present more innovations to a wider health community in the future. This will expand to both public and private healthcare organisations, including intermediate and long-term care, and social care sectors.

"We were delighted to be inundated by 144 teams from all over the world when we made the call, each of them bringing wonderful new ideas to this thematic challenge. Whittling down the field to the final four was a 'pleasant nightmare' to say the least, and it took the combined might of allies from across all three hospitals, working together with common principles, criteria and goals to decide the best of the best. This unprecedented consensus forms the essence of CHISEL and InnoMatch: if healthcare can unite to evaluate and procure innovations at scale and at speed, everyone wins: the start-ups and SMEs, the providers and of course, our patients," said Associate Professor Wong Hon Tym, Clinical Director, CHI.

Mr Lim Hock Chuan, Chief Executive of Temasek Foundation Liveability, said, "Through our partnership with the Centre for Healthcare Innovation, we hope to attract start-ups and businesses to participate in Healthcare InnoMatch. We will work towards

developing a vibrant industry marketplace where innovations can be test-bedded and implemented in our local healthcare setting. When these innovations are widely adopted, they will greatly benefit patients and their caregivers, and lead to a better healthcare outcome."

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For media queries, please contact:

Jasmine Chia
Communications Senior Executive
Tan Tock Seng Hospital
DID: 6357 8038
HP : 9841 1634
Email: jasmine_cy_chia@ttsh.com.sg

Joshua Wong
Associate Director
Temasek Foundation
HP: 8180 0741
Email: joshuawong@temasekfoundation.org.sg

About the Centre for Healthcare Innovation

The Centre for Healthcare Innovation (CHI) Co-Learning Network was launched in October 2016 and currently has 37 local and international partners from Academia, Strategic Agencies, Healthcare, and Industry. Hosted by Tan Tock Seng Hospital and the National Healthcare Group, the network has three strategic thrusts to drive healthcare innovation: Build Thought Leadership, Drive Workforce Transformation, and Enable Healthcare Training.

The Network is founded on the concept of Co-Learning – the idea that we learn better together as a Community of Practice. We are an open learning platform, an ecosystem of
value-enabling alliances. Through our network, like-minded local and overseas innovation partners will co-learn and collaborate by co-building thought leadership in healthcare innovation, co-transforming the workforce for our future, and co-developing new training and andragogy. We will meet current and future healthcare challenges through innovative and value-driven care delivery to the populations we serve.

The CHI Co-Learning Network is enabled by our financial lever, the $52-million Ng Teng Fong Healthcare Innovation Programme that funds and supports healthcare innovation in collaboration with its partners through three tracks – Training, Innovation and Community Enabling. The programme is managed by the TTSH Community Fund and is the proud sponsor of the National Healthcare Innovation & Productivity (NHIP) Medals.

The Ng Teng Fong Centre for Healthcare Innovation (CHI) is a nine-storey conference, training and innovation building that aims to transform our healthcare workforce to be future-ready. At 25,000 sqm, it is a purpose-built innovation centre with MICE facilities, simulation and innovation labs and engagement spaces. For more information, visit www.chi.sg.

About Temasek Foundation

Temasek Foundation supports a diverse range of programmes that uplift lives and communities in Singapore and beyond. Temasek Foundation's programmes, made possible through philanthropic endowments gifted by Temasek, strive towards achieving positive outcomes for individuals and communities now, and for generations to come. Collectively, Temasek Foundation's programmes strengthen social resilience, foster international exchange and regional capabilities, advance science, and protect the planet.

For more information, visit www.temasekfoundation.org.sg.

ANNEXE: Healthcare InnoMatch 2021 Finalists' Project Synopses

Category: Frail No More
Articares Pte Ltd, Singapore
Project Name: "Smart Robot Therapists at Home"

Summary:

Articares presented a scalable solution for **robotics-assisted telerehabilitation at home**. Its system provides intelligently adaptable therapy exercise at home while enabling remote monitoring by clinicians.

What is the problem?

With the growth of aged population in Singapore, demand for rehabilitation and preventive exercise for seniors is expected to grow steadily in the coming years.

- **For people with motor or cognitive impairment** (e.g. stroke, dementia), the available offer of therapy hours is insufficient at every stage of the patient's journey, especially after hospital discharge.
- Insufficient offer of rehabilitation services post-discharge is compounded by barriers such as limited ambulation, lack of transportation, lack of caregivers and financial burden.

Value proposition:

- **H-Man, a smart, portable therapy robot** developed by Articares and clinically validated, is used to treat upper-limb sensorimotor impairments with personalised and minimally supervised training exercises. H-Man is the first robotic rehabilitation device specifically designed and approved for home use (CE Class IIA).
- **CARE Platform, a cloud-based telecommunication software**, keeps the clinician up to date on the patient's progress via downloadable reports. The Platform allows adjusting the therapy settings from the clinician's own location when necessary.

The impact:

Robotic telerehabilitation will deliver superior clinical value in four areas:

1. Improved sensorimotor and functional outcomes for patients, compared to conventional therapies.
2. Faster recovery through increased therapy session frequency and patient compliance.
3. Increased productivity for clinicians, by providing them with the capability to plan and monitor the patient's therapy programme remotely.
4. Reduction of direct and indirect healthcare costs, compared to conventional and in-clinic robotic therapy.

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Category: Digitalisation to Enhance Patient Care, Journey and Experience
RootAlly AI, Singapore
Project Name: "AllyCare –Your Ally for Tele-Rehabilitation"
Summary: **Artificial Intelligence (AI) based Tele-Rehabilitation System that therapists can use to deliver remote rehabilitation** to the patients with engagement similar to one-on-one sessions but service more people at once. What is the problem? The rehabilitation services industry provides therapies to help people regain their functional capabilities so that they can return to their daily activities normally or near-to-normal. The number of providers of centre-based care facilities for non-residential long-term care facilities has increased by approximately four times from 35 to 143 within the period of 2011 to 2019. **The demand for rehabilitation services continues to climb as the population ages rapidly in Singapore**. Even though there is an increase in the number of infrastructures made available for rehabilitation services, **there are insufficient healthcare workers to cater to the demand.** The pandemic has forced the various industries to revamp their operations so that they can operate remotely to minimise the risk of infection. Value proposition: • AI-based real-time monitoring and secure mobile app (privacy preserved). • It is based on the latest deep learning algorithms tailored for human pose estimation. It can identify and track the movement of human joints captured in live video or stored video files, without requiring any wearable accessories on the human body. • Data processing is done entirely on user's smartphones to ensure privacy. Only end-of-session reports are sent back to the hospital for review. The impact: • Rehabilitation from the safety of home for elderly: The prototype system can be deployed on a mobile platform, allowing flexibility in the location and time of physical therapy rehabilitation exercises. • There is less reliance on community hospitals and day care centres. • The number of people accessing rehabilitation is not limited to the availability of healthcare workers. • The number of people that can access quality rehabilitation concurrently is increased. • Monitoring can be achieved through data points with staff feedback in the loop. • The cost of rehabilitation can be potentially lowered because it does not require practitioners, health care workers, or doctors to block out the timing to conduct rehabilitation sessions. • **Virtual assistant** will advise the user on how to perform the rehabilitation with tips on posture corrections for the exercises.

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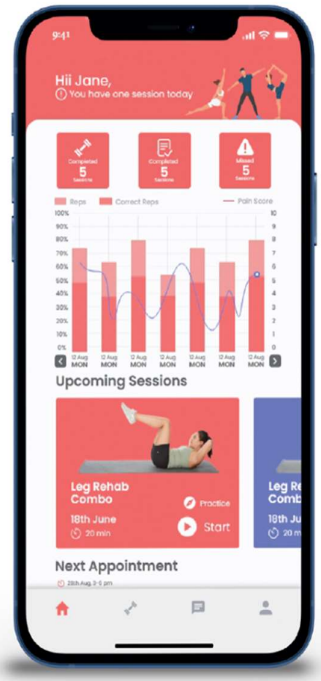
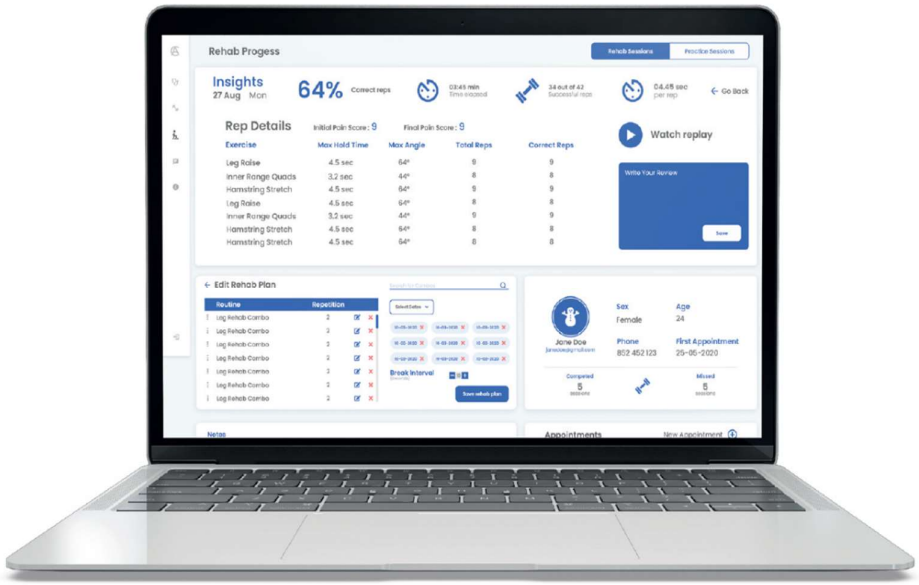


Patient App

Patients get access to rehabilitation plans and receive real time feedback during rehabilitation



Command Center Dashboard

Therapists have overview of patients' rehabilitation progress and can focus on noteworthy patients, communicate with patients and customize rehabilitation plans.

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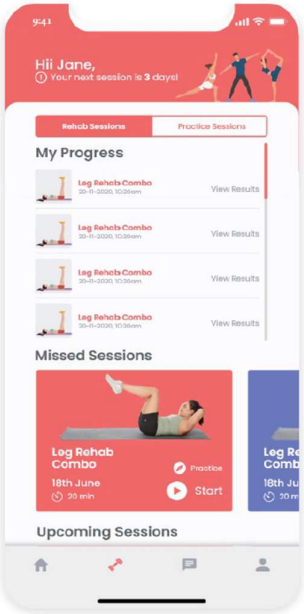
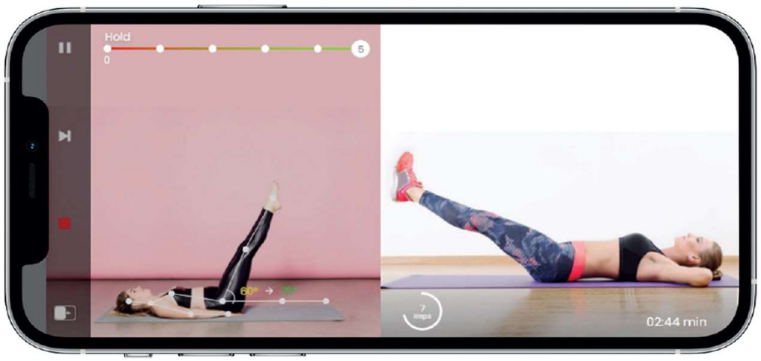
Patient App

- Perform rehabilitation anywhere
- Receive real-time posture feedbacks
- Screencast video on external display
- Keep track of past rehabilitation sessions
- Have additional practice outside of rehabilitation schedule
- Get notified of upcoming consultations and rehabilitations





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Category: Digitalisation to Enhance Patient Care, Journey and Experience

Epilog-NV, Belgium

Project name: "Epilog – EEG Solutions"

Summary:
Epilog is specialised in providing electroencephalogram (EEG) insights to improve patient care. EEG (using electrodes to measure electrical brain activity) is crucial in the diagnosis, prognosis and monitoring of **epilepsy patients.** The EEG report or "passport " (with all measured parameters) provides parameters of the brain health. It is liken to a test for epileptic brains similar to a blood control test for cholesterol patients.

With Epilog's EEG solution, epilepsy patients can be monitored in hospital or at home. It potentially can be used for other neurological diseases. Epilog has standardised objective parameters that can track patients' health over time and support tele-health.

What is the problem?
- 25,000 epilepsy patients in Singapore, of which 1/3 is having regular seizures despite treatment
- EEG recording mostly in the hospital, routinely or overnight
- Standardised interpretation still a challenge
- Analysis and reporting of the EEG data time-consuming and subjective

Value proposition:
- Epilog is offering this EEG "passport" or report (with analysed EEG data together with patient reported outcomes) in a remote and secured cloud-based platform.
- Report is easily accessible by the Health Care Personnel (HCP) to intervene almost real-time through tele-health.
- Patients can be closely monitored on the effect of their treatment and eventually predict seizure clusters, so they can move towards a more "predictable life".
- The information can also be easily integrated in the Electronic Medical Record Exchange.

The impact:
- It potentially limits the use of other expensive and interventional techniques (e.g. invasive EEG, nuclear imaging, treatment).
- It saves a lot of time or resources versus manual or visual analysis.
- It optimises workflow.
- Epilepsy patients do not necessary have to come to the hospital. They can stay in their familiar environment when closely being monitored remotely through the EEG report or passport which is easily accessible by the HCP on the platform. With home diagnostics, there is less hospitalisation costs.
- Long-term monitoring and analysis increase potentially the success rate of the next treatment: less budget and better quality of life.

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Examples of visualisations in the EEG passport