

PRESS RELEASE

For Immediate Release

Six innovations awarded a total of \$2.4 million at Healthcare InnoMatch 2022 to accelerate healthcare transformation

Winning start-ups and SMEs will collaborate with Singapore's public healthcare clusters to test-bed their new, near-market-ready solutions for possible adoption

Singapore, 9 September 2022 – Six innovations have emerged winners at the Healthcare InnoMatch 2022 with their new, near-market-ready solutions that promise to strengthen healthcare transformation in Singapore and beyond, beating more than 250 applicants from 32 countries. A total of \$2.4 million is awarded for them to begin test-bedding at a public healthcare cluster they are paired with, with the aim of possible eventual adoption and scaling by healthcare institutions across Singapore and beyond Singapore.

Organised by the Centre for Healthcare Innovation (CHI) and supported by the Ministry of Health (MOH) and Temasek Foundation (TF), Healthcare InnoMatch is an annual challenge targeting today's healthcare issues to bring about timely, positive patient health outcomes. Echoing the national move towards the vision of a Healthier Singapore, the theme for 2022 is "Delivering Care Beyond Hospital Walls", with the aim to strengthen our focus on providing better care in the community and raise awareness of preventive health and early intervention.

This year, the challenge attracted a total of \$2.4 million in funding, allowing for twice the number of start-ups and SMEs to be selected as winners as compared to the inaugural year.

The winners were selected at a 'live' in-person finale, in which eight finalists pitched the value of their shortlisted innovations to a panel of judges. The panel comprised top leaders from the three national healthcare clusters, the Ministry of Health, Temasek Foundation and Integrated Health Information Systems.

The winners are (in no particular order of merit):

- CoNEX Healthcare (partnered with National Healthcare Group)
- FathomX (partnered with National University Health System)
- Kinexcs (partnered with Singapore Health Services)
- NuCalm (partnered with Singapore Health Services)
- QuantumTX (partnered with National University Health System)
- US2.AI (partnered with National Healthcare Group and Singapore Health Services)

The synopses of their winning proposals are in [Annexe](#).

"We are pleased to support CHI's efforts to spur healthcare innovation through Healthcare InnoMatch. Our Healthier SG strategy involves every stakeholder in our health ecosystem, and such efforts to foster closer public-private collaboration to co-create new and innovative

solutions will help us achieve better health outcomes for all Singaporeans more effectively," said Dr Cheong Wei Yang, Deputy Secretary (Technology), MOH.

Mr Lim Hock Chuan, Head, Programmes of Temasek Foundation, said, "We would like to congratulate the winners of this year's Healthcare InnoMatch. Their projects will help us push the boundary of the possibilities of healthcare in Singapore and beyond. The collaboration which we have created under the Healthcare InnoMatch provides a good platform for these innovations to be further developed and eventually implemented in hospital clusters. This will benefit the start-ups and innovators, the healthcare communities as well as patients and their families."

Collaboration with Public Healthcare Clusters

Launched in 2021, Healthcare InnoMatch is a global call for proposals from start-ups and small and medium-sized enterprises (SMEs). It serves as a platform for public healthcare providers and innovators from Singapore and beyond to solve pressing healthcare challenges through forward-thinking approaches and breakthrough technologies. It seeks innovative ideas that can transform the future of healthcare, such as through improving healthcare delivery, lowering barriers to affordable care, and bringing care closer to residents in the community.

For the first time, Healthcare InnoMatch sees all three public healthcare clusters in Singapore – National Healthcare Group, National University Health System and Singapore Health Services – collaborate to assess the clinical and operational feasibility of healthcare innovations using a common evaluation framework.

The winning projects have been paired and will be test-bedded with at least one public healthcare cluster, where they can further customise their products and gain constructive feedback from healthcare providers and patients before it is then scaled across the entire system if successful. This is designed to accelerate the development of their new, near-market-ready technologies, which can be time consuming and complex.

Winning projects would also be able to take advantage of the experience of test bedding their innovations at the public healthcare cluster level to prepare them for future larger-scale implementation and commercialisation beyond Singapore. Projects that are successfully test-bedded and adopted by our public healthcare clusters will benefit more patients and provide them with access to the latest solutions to improve their health outcomes.

"The support from MOH and TF and the partnership with the three public healthcare clusters speak volumes about our aligned vision to enable our patients and the community greater access to sustainable healthcare innovations. Together, we're enabling cross-cluster adoption, and with a shared framework, we are able to speed up this adoption process. This capability is at the heart of our intent when we set up CHISEL and initiated Healthcare InnoMatch," said Associate Professor Wong Hon Tym, Clinical Director, CHI."

Healthcare InnoMatch 2021 Winner in Action

H-Man, a portable intelligent robotic device that assists stroke patients with therapy, is one of the Healthcare InnoMatch 2021 winners. Marrying research, technology, and innovation together, it seeks to improve patient care and coordinated care from the hospital to the home and into the community. Test-bedding of H-Man is near completion, and there is potential adoption to aid stroke patients in recovery. Patients can soon perform the rehabilitation exercises required to regain control of their arms and build strength without having to visit a clinic or hospital on a regular basis for therapy sessions.

CHISEL: Developing Innovations at Speed and Scale

Healthcare InnoMatch is a CHI Start-up Enterprise Link (CHISEL) initiative. Launched in November 2020, CHISEL is a platform to strengthen healthcare transformation. CHISEL facilitates a faster and more consistent adoption process for start-ups and SMEs to find suitable healthcare institutions to rapidly implement innovations using a sandbox approach.

Through a stage-by-stage approach, it will assist and enable start-ups and SMEs to demonstrate the value of their innovations in a simulated and/or clinical setting. CHISEL intends to present more innovations to the larger health community in the future through other initiatives similar to the Healthcare InnoMatch. These will give innovators access to more healthcare institutions, including public and private healthcare organisations and intermediate, long-term, and social care sectors.

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About the Centre for Healthcare Innovation

About the Centre for Healthcare Innovation

The Centre for Healthcare Innovation (CHI) is committed to transform healthcare, driven by its three thrusts: Promoting a culture of innovation through thought leadership, achieve better health and healthcare by enabling workforce transformation, and to catalyse value-based outcomes by effecting systems-level change.

Founded in 2016 on the concept of co-learning and collaboration, CHI and its network of likeminded local and international partners create thought leadership, as well as co-build initiatives and programmes to inculcate a culture of innovation within healthcare. Strengthened by this network, CHI has been able to customise and design signature programmes that aim to build a sustainable workforce via new andragogy and paradigms for our communities of carers and patients. To catalyse value-based outcomes and effect systems-level change, CHI's impactful platforms and initiatives drive innovation adoption and knowledge translation, consequently giving the healthcare community quicker access to the latest innovations.

CHI is enabled by our financial lever, the Ng Teng Fong Healthcare Innovation Programme that funds and supports healthcare innovation in collaboration with its partners through five (5) tracks – Strategic Training, Innovation, Community Enabling, Strategic Innovation, and Strategic Research. The programme is managed by the TTSH Community Fund and CHI.

Through meaningful and impactful collaborations, we will meet current and future healthcare challenges through innovative and value-driven care delivery to the populations we serve.

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 2022 Finalists' Project Synopses

CoNEX Healthcare
Project Name: PreSAGE®
<u>Summary</u> PreSAGE® is the only privacy-preserved image-based solution widely adopted in hospitals, nursing homes and now into residential homes. Powered by artificial intelligence and predictive analytics, PreSAGE can now accompany patients from hospital to home. This enables a continuous care cycle as patients recuperate and age in place in the comfort of their homes. Predicting and preventing falls, PreSAGE empowers clinical teams with data and insights into living patterns, behaviour changes, and even nocturnal activities that can guide interventions and rehabilitation. <u>What is the problem?</u> Falls at home is a very common occurrence, with many going unreported. Some fall multiple times a day until a serious fall occurs, requiring emergency response services and hospital admissions. More than 85% of elderly admissions into emergency departments are due to fall injuries at home. While there are numerous fall detection solutions with varying accuracy levels, these do not prevent fall occurrences that continue to take up valuable healthcare resources. PreSAGE aims to address this – fall prediction that enables clinical teams to intervene and thus prevent falls. Moreover, elderly monitoring at home has multiple challenges, primarily due to compliance and privacy. This is another gap PreSAGE addresses with its continuous, non-intrusive and privacy-preserved features. <u>Value proposition</u> PreSAGE empowers clinical teams with insights into patient recovery and health statuses to provide timely and effective personalised care and intervention, reducing unnecessary visits and utilisation of resources. Furthermore, patients can possibly be discharged earlier from hospitals to continue their recovery at home, where they can continue receiving 24/7 remote care. In case of adverse events, real-time notifications on patient conditions can also be sent to clinical teams for immediate intervention. <u>The impact</u> Preventing falls will reduce healthcare resource utilisation, from emergency response services, overloading ED visits, and taking-up valuable bed space in hospitals. Elderly patients already in hospitals can possibly be discharged earlier when they can continue their long-term recovery at home, reducing reliance on valuable healthcare resources. Clinical teams are now armed with insights into patients' recovery journey at home, where they can provide personalised and targeted care when needed, saving time from unnecessary treatment or tedious work such as history taking. Beyond fall prediction, it is even possible for PreSAGE to venture beyond fall prediction into observing dementia or frailty progression.

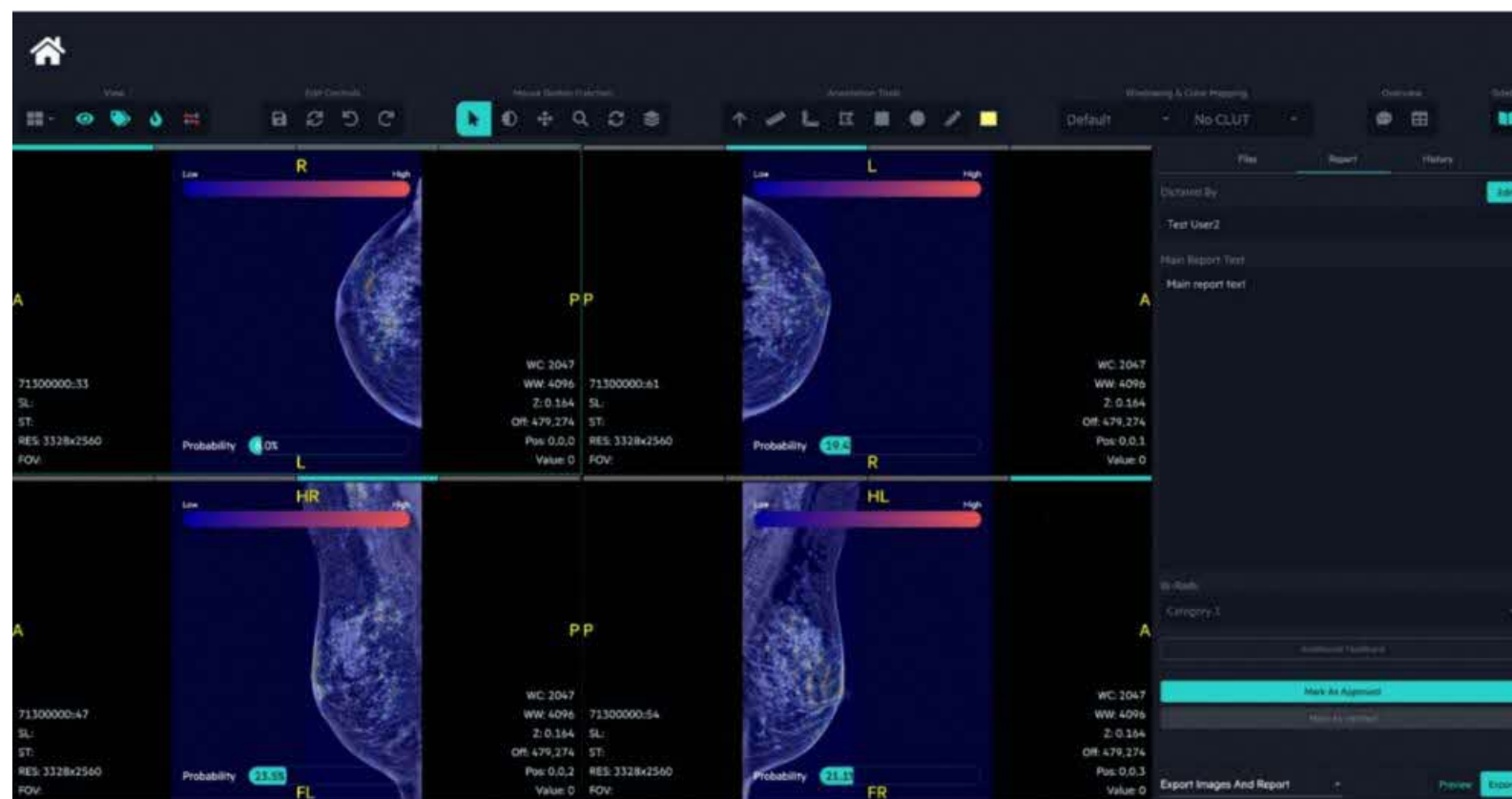


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FathomX
Project Name: FxMammo
<u>Summary</u> FxMammo is an AI assistant that analyses mammograms to assist early detection of breast cancer. With deep learning technologies and clinically validated parameters, the software improves both the efficiency and accuracy of existing methods, thereby reducing the burden on clinicians. The technology utilises an algorithm that gathers information from four AI models, each analysing one of the four views obtained from the digital mammogram scan. The product is developed following international standards like IEC62304, IEC62366, and ISO14971. It is also approved by the Singapore Health Sciences Authority as a Class B device. <u>What is the problem?</u> There is a difference in quality and expertise between junior trainee radiologists and senior radiologists specialising in reading mammogram images. This difference is evident in a clinical setting where junior radiologists need approval from a senior radiologist when reading a mammogram image during breast cancer screening/diagnosis. However, an ageing population in Singapore would mean more women will need to go for a mammogram. Currently, approximately 200,000 women are going for screens, but there are only about 20 breast specialised radiologists. There is a capacity gap between the number of trained qualified radiologists and the number of patients. <u>Value proposition</u> FxMammo aims to serve as an AI Assistant to help ease the workflow by serving as a tool with a high accuracy level. It empowers a junior radiologist to use the tools to make the right decision. This allows the capacity issue to be resolved in dealing with many mammogram screens. The technology has undergone multiple clinical validation studies to prove its accuracy and is in line with global standards. It has a specific niche focus on reading dense breast datasets that are more prevalent among Asian Women. The purpose of test bedding is to set up and monitor several milestones in a local healthcare cluster by tracking key clinical milestones in the form of false recalls, cancer detection for interval cancers and accuracy measured by AUC for a junior radiologist using the AI. FathomX has strong experience in integration, test-bedding and deployment with risk management processes set in place to mitigate errors and will be able to execute a smooth test bed of FxMammo across this project. <u>The impact</u> • Minimum of 10% reduction in false positive rates among junior trainee radiologists • Minimum improvement of 10% of cancer detection (sensitivity) among junior trainee radiologists

- Overall performance (ROC-AUC) of a junior trainee radiologist equipped with FxMammo AI is equivalent to that of a breast imaging specialist (no statistically significant differences will be found).

Successful tracking of these milestones would mean that the AI tool performs well to augment a junior radiologist in a Singapore setting and can be used to augment the process of breast cancer screening/diagnosis in Singapore.



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Kinexcs
Project Name: KIMIA Recovery Management System <u>Summary</u> KIMIA Recovery Management System is a post-surgical recovery management product comprising a smart wearable sensor device built upon patented and proprietary sensing technologies. It allows remote monitoring of the joint condition and provides regular live feedback to patients. It comes with an AI-based digital therapist that allows for guided at-home exercises and proprietary algorithms used to detect complications during the post-surgical recovery period (such as wound infection, excessive discharge, or bleeding). <u>What is the problem?</u> There is a chronic need for home-centric post-operative care that is engaging and effective, reduces post-surgical complications, and cuts down the number of hospital visits without adversely affecting patient outcomes. The solution promises to reduce the required number of post-operative outpatient visits by up to 80%/patient (from 5 post-operative visits to 1 visit), provide tools for remote and early detection of post-operative complications such as wound infection/excessive discharge or bleeding or joint stiffness, thereby reducing the risk of such complications from progressing. In addition, deliver a possible improvement in patient compliance, recovery experience and outcomes. <u>Value proposition</u> The innovation will reduce the number of post-operative clinical visits and save costs for payers while improving clinical outcomes, patient compliance, motivation, engagement, and satisfaction. It is estimated to save up to 80% of visits for post-surgical patients, i.e., from 5-6 post-operative visits to 1-2 trips, saving an estimated up to \$600 in costs per patient. Early detection of complications is another key advantage. In a trial with Total Knee Replacement (TKR) patients at Singapore General Hospital, KIMIA Recover solution is able to detect complications such as wound infection, excessive wound discharge and bleeding in about 10% of patients and alert the care providers promptly. <u>The impact</u> In Singapore, a total of up to 5,000 patients undergo TKR/THR surgeries every year and will benefit from the innovation, which will enable: 1. 24-hour discharge (Enhanced Recovery After Surgery (ERAS) program) to be expanded from the current 600 patients to the entire batch of 3,000 patients at Singapore General Hospital and up to 5,000 patients in Singapore 2. Detect and mitigate costs associated with post-operative complications for a TKR patient of >\$500k across 10% of patients who experience such complications 3. Enable savings of up to \$700/patient by a reduction in post-operative specialist outpatient consultation visits and physiotherapy visits to zero

Globally, the KIMIA Recover solution will be scaled to benefit more than 2 million TKR patients.

Kinexcs KIMIA[®] Recover

a smart knee recovery management solution, built upon validated proprietary technology



Unique knee joint wearable device built upon proprietary sensing technologies



Continuous Monitoring generating personalized knee health data



Data Analytics guiding patients along the optimal trajectory of recovery path

KINEXCS



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Project Name: NuCalm®
Developed by: NuCalm
<u>Summary</u> NuCalm® is the world's first and only patented neuroscience technology clinically proven to reduce stress and improve sleep quality without drugs by balancing the human autonomic nervous system. Without pharmacological intervention, side effects and compromise, NuCalm delivers preventive self-care beyond hospital walls, providing significant tangible benefits for Singaporeans to manage baseline stress and anxiety for better health and performance. <u>What is the problem?</u> Stress negatively impacts mental health, emotional control, and well-being. Medical research estimates that as much as 90% of all illness and disease is related to stress. Existing methods to address stress-related issues – including psychosocial support and medical interventions – are resource-intensive on healthcare systems and unpredictable across the population. Some national studies have found that 60-80% of primary care doctor visits are stress related. Considering its wide-reaching impacts, stress is better managed as preventive self-care rather than institutional. Social stigmas associated with poor stress management and mental health further reinforce self-care as a meaningful mode. However, the initiation of help-seeking behaviour tends to be symptomatic, requiring any effective solution to be easily scalable within healthcare systems for a smooth transition of care. <u>Value proposition</u> • Patented – NuCalm has been awarded 2 patents, including "Methods and devices for applying dynamic, non-linear oscillations and vibrations" to elicit a physiological state change in humans. • Safe and effective – Clinically proven. No drugs or side effects. • Fast-acting – The benefits of NuCalm take effect in minutes. • Predictable and repeatable results – Peer-reviewed research has consistently found that NuCalm predictably induces parasympathetic nervous system dominance. • No habituation – NuCalm was invented to treat addiction and provide self-regulation. • Portable and easy deployment – NuCalm comprises three easily self-administered components. • Accelerate recovery – According to research by Dr C.K. Peng at Harvard Medical School, 20 minutes of NuCalm is equivalent to 2 hours of restorative sleep. <u>The impact</u> Anyone with a high-stress lifestyle or poor sleep quality will experience significant tangible benefits by using NuCalm to reduce stress and improve sleep quality without drugs.

Multiple studies have provided clear evidence that Singapore is a society of high-stress density. NuCalm can help Singaporeans better manage baseline stress and anxiety. When scaled, this can build towards a more stress-resilient, balanced, and healthy community and reduce healthcare system burden and cost.

Specific to patient healthcare, NuCalm has been clinically proven to provide life-changing benefits for patients facing medical anxiety (including cancer diagnosis), depression, and Post-Traumatic Stress Disorder (PTSD).



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QuantumTX
Project Name: QTX Magnetic Mitohormesis <u>Summary</u> Post-stroke disability is a major health and socioeconomic burden. Community rehabilitation improves outcomes but is arduous with poor compliance. Supplementary Muscle activation using a novel Singapore-developed muscle-mitochondria activating technology, Magnetic Mitohormesis (MM). It can supplement existing community rehabilitation programmes to improve post-stroke recovery and functional independence. <u>What is the problem?</u> There are 80,000 chronic stroke patients (26 new strokes every day). Two in three face chronic disabilities after 3 months, and one in two suffer chronic disabilities at 1 year. Recovery and rehabilitation are challenging, and compliance with community rehab programmes is poor (only 1 in 20 compliant after 1 year). These stroke-related disabilities cost the Singapore healthcare system \$180Million annually and add a significant socioeconomic burden (3,300-4,000 hours per patient per year) to caregivers. Regular rehabilitation exercise is key to providing the necessary muscle activation and retraining to enhance the body's recovery response. The progress can be slow and discouraging for many with stroke impairments and poor functional control. <u>Value proposition</u> MM provides supplementary muscle activation without additional physical exercise. It can be easily deployed in the community and integrates easily into existing rehab programmes to boost muscle activation, leading to enhanced recovery outcomes. This ground-breaking technology from NUS uses safe and gentle magnetic signals to activate muscle-mitochondria and trigger localises and systemic adaptive responses similarly to exercise. Prior scientific studies have shown that MM improves muscle energetics needed for recovery and regeneration, resulting in the higher release of pro-regenerative signals from activated muscle. Community studies with hundreds of seniors have shown that 12 weekly sessions improve balance, walking speed and lower-limb strength by 14%-27%. Pilot clinical trials have shown higher muscle energetics and recovery trends of 25% faster return to baseline. <u>The impact</u> QuantumTX intends to work with Day Rehab Centres to integrate MM as a supplementary muscle-activation platform to improve stroke patients' post-stroke recovery outcomes and functional independence. MM Devices are easy to site, brief 10-minute sessions integrate easily with existing programmes and devices require minimum assistance to operate.

By improving the functional independence of 10% more patients with chronic stroke-related disabilities (or 600 more patients), we hope to reduce significantly post-stroke disability-related healthcare costs (~\$9.8million annually) as well as reduce the significant socioeconomic burden to caregivers (2.4million hours saved annually). Further, patients with lower levels of disabilities will enjoy more healthy and active lives. Resultantly reducing their risk of developing long-term chronic diseases too.



ANNEXE: Healthcare InnoMatch 2022 Finalists' Project Synopses

Us2.AI
Project Name: Us2.AI <u>Summary</u> Us2.AI is an AI-driven solution to acquire and analyse cardiac ultrasound images to diagnose Heart Failure (HF) by nurses in a primary care setting, providing clinical decision support to non-cardiac-expert medical practitioners. It is integrated with point-of-care (PoC) ultrasound devices with an AI assistant to guide the acquisition of images by novices combined with automated interpretation and serves as a one-of-a-kind solution to diagnose HF in a primary care setting at a fraction of the costs of a traditional echocardiographic exam. <u>What is the problem?</u> There is an urgent need for early identification and aggressive HF prevention among high-risk individuals with diabetes mellitus (DM). DM is a disease of epidemic proportions. In Singapore, the number of >40y individuals with DM will increase to ~600,000 in 2030; by 2050, 35% of Chinese and 50% of Malay & Indian males aged 60-69y will have DM. HF is among the most common long-term complications of DM and—with macrovascular disease—accounts for over half the mortality and morbidity among patients with DM. Cardiovascular complications contribute 20-49% of the direct costs of treating DM. Direct and indirect productivity loss costs among working-age adults with DM in Singapore will be US\$1.87 billion by 2050 <u>Value proposition</u> Echocardiography remains the most used cardiac imaging modality. It is considered the primary method for assessing cardiac structure and function in the diagnosis of HF. A regular echocardiographic study takes at least 45 minutes, including 15 minutes to acquire images and 30 minutes for a full review. Staff must be highly trained, requiring at least 4-years of full-time training to acquire and interpret echocardiographic images. This reliance limits cost-effectiveness and accessibility in primary care settings. Us2.AI is the only solution that can completely automate a complete echocardiogram report with zero manual intervention on devices 1/10 the price of standard CART-based machines; in other words, it's the only scalable, practical solution available to address this epidemic at affordable price points. <u>The impact</u> Diabetes mellitus (DM) is a disease of epidemic proportions, with a projected increase in worldwide prevalence from 360 million in 2011 to 552 million by 2030. Asia harbours 60% of the global diabetes population (4.7 billion), with the highest prevalence in Southeast Asia. Therefore, there is an urgent need for early identification and aggressive HF prevention among high-risk DM individuals in Asia. The impact of this solution will be to deliver a low-cost, fast, full functionality and accurate, FDA and HAS cleared, patented solution that increases access to healthcare and drives productivity gains, making cardiac analysis affordable and understandable in the hands of non-specialists.

