PRESS RELEASE

Embargoed till Thursday, 1 July 2021, 12pm

National Healthcare Innovation and Productivity Awards 2021

Thye Hua Kwan Moral Charities, First Social and Welfare Organisation,
Bags the Top Award - Excellence Champion Medal

SINGAPORE, 1 July 2021 – While the COVID-19 outbreak has placed unparalleled demands on healthcare systems, it is through crises that innovations often emerge.

The healthcare sector in Singapore continues to demonstrate its resilience and ability to redesign processes and develop technology to ensure value-driven care for patients amidst the pandemic and other challenges such as an ageing workforce and population. The annual National Healthcare Innovation and Productivity (HIP) Awards has been a platform for holistic and innovative solutions to be introduced.

Launched in 2016 and supported by the Ministry of Health to foster a more hands-on effort in productivity and innovation, the National HIP Awards inspires and celebrates healthcare professionals who have pushed the boundaries with breakthrough ideas.

This year's seven winning projects from four healthcare institutions have achieved excellence in three award categories: "Care Redesign", "Automation, IT and Robotics Innovation", and "Workforce Transformation".

Award Winning Projects

The National HIP Excellence Champion Medal, the top award which recognises the most outstanding initiative that excels in multiple categories, goes to Thye Hua Kwan Moral Charities (THKMC), a first for a community care organisation. THK Home Care Services Division, successfully redesigned the care and service teams across five key care programmes to improve services for clients. Tapping on digital technology, the initiative cross trained staff and significantly enhances staff capability and allowed for flexible deployment of manpower whenever client loads are high in the programmes, which is crucial particularly during the COVID-19 pandemic. The use of body cameras enables safety surveillance, better service compliance and staff training; raising overall productivity and clients' satisfaction.

Khoo Teck Puat Hospital (KTPH), Singapore General Hospital (SGH) and National Healthcare Group Polyclinics (NHGP) received the Best Practice Medals in Care Redesign. KTPH introduced Singapore's first ambulatory emergency care service which provides same day assessment and management of selected patients with acute medical conditions referred from Emergency room to reduce the need for inpatient admissions. Subsequent outpatient visits are scheduled once an acute episode is over, reducing costs and improving patient experience.

SGH formed a multi-disciplinary workgroup to improve the quality and efficiency of the Code-Blue Teams, which are activated when patients suffer a cardiac arrest on Campus. Cardiac arrest response times were reduced to less than 5 minutes within 6 months of implementing the revamped system. Rapid treatment lowers the risk of brain damage and improves the chance of recovery.

Catalysed by the COVID-19 pandemic, the National Healthcare Group Polyclinics (NHGP) expanded and enhanced its suite of tele-consultation services to connect safely with patients, and reduce the risk of infection transmission. These services include Tele-Consultations (with Doctors), Tele-Consultations (with Care Managers), Tele-Wound Monitoring, Tele-Direct Observed Therapy (DOT), Tele-Dietetics, Tele-Physiotherapy and Tele-Psychology. 98% of the patients on these services reported a positive overall experience; and 94.5% expressed willingness to use these services again.

Tan Tock Seng Hospital (TTSH) picked up the Automation, IT and Robotics Innovation Best Practice Medal for Heart Track™, a mobile application for patients who just had heart procedure to exercise regularly at their own pace anywhere at their convenience. The automated prescription and remote monitoring system, which leverages on wearable technology, mobile application and gamification, provides personalised and self-directed exercise trainings for patients.

Another winner under the same award category, RadiLogic, is an artificial intelligence (AI) powered diagnostic tool jointly developed by the Agency for Science, Technology and Research (A*STAR) and TTSH. RadiLogic can interpret and rapidly flag-up abnormal chest X-ray findings of individuals being tested for COVID-19 to the radiologists for timely review.

TTSH also clinched the Workforce Transformation Best Practice Medal for empowering its staff and community partners to be skilled in process improvement methodology to improve patient care. The team redesigned training from classroom to digitally enabled microlearning modules, achieving higher take-up rates, productivity savings and wider outreach. This microlearning platform enables staff members to upgrade their job skills rapidly, anytime and anywhere.

The National HIP Medals are sponsored by the Ng Teng Fong Healthcare Innovation Programme, managed by the Tan Tock Seng Hospital Community Fund and the Centre for Healthcare Innovation.

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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, 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 sq m, it is a purpose-built innovation centre with MICE facilities, simulation and innovation labs and engagement spaces.

Excellence Champion Medal
Thye Hua Kwan Moral Charities (THKMC) Ltd
Project Title: "Productivity Enhancement in THK Home Care Services Division by Enhancing Staff Capabilities, Technology and Process Redesign"
Background: THK Home Care Services Division displayed excellence in innovation across all three categories of "Care Redesign", "Automation, IT and Robotics Innovation", and "Workforce Transformation". By digitalising its processes and redesigning the jobs, staff capabilities were enhanced, productivity and clients' satisfaction rates have also improved. In the past, five of their community programmes (1) Meals on Wheels (2) Medical Escort Transport (3) Home Personal Care (4) Interim Caregiver Service (5) Home Health Service, operated in silos, specialising only in one programme. As a result, the care for seniors became fragmented and slow. Key issues identified include declining productivity, low client satisfaction rates, and the need for cost effectiveness to ensure financial viability. Team Composition: The transdisciplinary team comprises doctors, nurses, healthcare assistants, nursing aides, drivers and administrative staff. Key Features: - The team embraced technology as an enabler to facilitate the redesign of their workflow and SOPs. Technology also gives them greater visibility into the actual ground situation and challenges to streamline their work process.   - New work processes (such as online remittance, usage of e-forms, secured data-sharing, remote monitoring, etc.) and an Enterprise Resource Planning (ERP) system were implemented to better manage all operations. This eliminates the need for staff to travel back-and-forth between client's place and office, saving number of manhours.   - Non-clinical staff were cross-trained across individual teams to maximise care efforts. Timely, when service demand is high during the pandemic.   - Body cameras were introduced to increase visibility of staff activities and service compliance at the client's home.   Impact: - In 2018, 100% of staff were trained in only 1 service. By 2020, 44% of staff were trained in 4 services, 19% were trained in 3 services, and 18% were trained in 2 services. This brings more flexible manpower deployment across programmes when service demand is high.   - The performance management systems contributed to a better management of the manpower efficiency and productivity.   - The Agency of Integrated Care (AIC) Client Satisfaction Survey increased from 57% to 80% (From 2018 to 2019)   - Visibility of programme performance through the Business Intelligence system increased in productivity by 18.2% in FY2020/2021.   - Body cameras enabled safety surveillance, disputes resolution, staff training and future learnings.

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Automation, IT and Robotics Innovation (AIR) Best Practice Medal
Tan Tock Seng Hospital
Project Title: "Digital Transformation: Cardiac Rehabilitation Anytime Anywhere with Heart-Track™"
Background: Patients who had undergone coronary revascularisation procedure post-acute myocardial infarct (AMI) are strongly encouraged to start cardiac rehabilitation (CR) to reduce cardiovascular mortality and achieve better quality of life. It is crucial for these patients to perform exercise regularly and safely to minimise hospital readmission for repeat cardiac event. Heart-Track™ uses gamification and wearable technology to deliver personalised CR based on in-built algorithm to automate prescription based on patients' baseline and automate progression based on patients' performance. The tracker enables the care team to monitor these patients remotely. Based on an early survey, 80% of the patients surveyed prefer using digital technology over centre-based CR programme. Team Composition: The team involves physiotherapists, cardiologists and cardiac nurses. Key Features: • Heart-Track™ is a carefully designed patient-activation care model. It aims to minimise the heavy reliance on healthcare workers to deliver care, whereby shifting "provider of care" to patient-led collaborative care in the community. • Leveraging on wearable technology, mobile application and gamification principles, patients can rehabilitate safely and effectively anytime, anywhere at their convenience, while retaining a high element of personalised care from the medical team. • To make CR livelier and more enjoyable, gamification components such as the use of an avatar has been incorporated for users to unlock achievement and milestones according to exercise compliance. Impact: • From the preliminary data of the ongoing clinical study, Heart-Track™ is found to be non-inferior to conventional centre-based CR programme in terms of clinical effectiveness and safety. Overall, 83% of users rated satisfied or very satisfied with Heart-Track™ • Heart-Track™ is built to be a cost-efficient option, where the care team can progressively move CR towards a more proactive and preventive care model. In future, patients do not need to take time away from work and travel from afar to attend centre-based CR programme. Heart-Track™ will pave for a more sustainable continuum of care from hospital into the community.

Automation, IT and Robotics Innovation (AIR) Best Practice Medal
Tan Tock Seng Hospital
Project Title: "Efficient Interpretation of Chest X-rays with Artificial Intelligence: RadiLogic Solution"
Background: During the early phase of the COVID-19 pandemic, there was a high surge in demand for chest X-Ray (CXR) diagnosis. At the peak of the pandemic in Singapore last year, there were more than 500 CXRs performed a day, over and above those patients who presented to the Emergency Department for non-COVID-19 related illnesses. This led to a strain on manpower resources, diagnostic quality and turnaround time. Radiologists have to identify abnormal CXR quickly and accurately for COVID-19 screening so that doctors can intervene appropriately. However, qualified manpower cannot be rapidly augmented as radiologist expertise is a specialised skill. The team leveraged on artificial intelligence (deep learning) to develop a specific tool to detect pneumonia (lung infection) as an abnormal CXR is one of the admission criteria for suspected COVID-19 patients. This system would help to prioritise the positive cases for urgent radiologist review. Team Composition: Radiologists from TTSH and scientists from A*STAR. Key Features: - Utilising data from CXRs done in the National Centre for Infectious Diseases (NCID) and TTSH, the team worked with A*STAR to create RadiLogic, an AI solution that can analyse each CXR within three seconds with an accuracy of up to 96%   - RadiLogic flags up abnormal cases, allowing any radiologist to prioritise interpretation of NCID screening CXRs and thus facilitate patient diagnosis and subsequent disposition.   Impact: 20% reduction in the average turnaround time for cases in June 2020 compared to March 2020, from 10 mins to 8 mins.   - Junior residents found the tool easy to use and that it increased their level of diagnostic confidence   - Increase productivity while preserving diagnostic accuracy in a time of scarce resources   - Contributed in department's efforts to ensure Business-As-Usual (BAU) in spite of the surge in demand that came with the pandemic.   - Faster CXR reports ensured that radiologist reporting did not become bottlenecks for patient disposition workflow at NCID.

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Care Redesign Best Practice Medal
Singapore General Hospital
Project Title: "To Improve the Code Blue (cardiac arrest) Response Time to less than 5 minutes within 6 months in Singapore General Hospital (SGH) Campus"

Background:
When the heart stops beating, it is critical that Code Blue is activated immediately, and resuscitation is initiated early. Our project aimed to speed up SGH's Code Blue response to less than 5 minutes within 6 months. We also seized the opportunity to improve the quality of the Code Blue response with the latest equipment and best practice guidelines. When the patient is treated within the golden 5 minutes, it lowers the risk of brain damage and improves the chance of recovery.

Team Composition:
Medical, Nursing, Respiratory Therapy, Communications, Call Centre and Telecommunications, and Clinical Quality and Performance Management

Key Features:
- Code Blue is a medical emergency. We need a specialised team to provide efficient and effective care. Previously, each discipline assigned a doctor on duty to respond to Code Blue for its own patients. Now, the Code Blue team comprises of a doctor, nurse and respiratory therapist specially trained in resuscitation skills and equipment – resulting in a more rapid and effective resuscitation effort.
- Our Code Blue teams are now organised by location so that the team nearest to the patient is activated – cutting down the time taken to reach the patient.

Impact:
- Code Blue response time improved to 4.3 minutes within 6 months
- Achieved more successful resuscitations, with rate improving to 76.5%
- Revamped Code Blue model has been implemented throughout all inpatient and outpatient services across SGH
- Revamped Code Blue system to be adopted in new buildings on SGH Campus

Care Redesign Best Practice Medal
Khoo Teck Puat Hospital
Project Title: "Introducing Singapore's first Ambulatory Emergency Care (AEC) Service"
Background:

Background:
- KTPH has seen an increase in both attendances and admissions through the Emergency Room. This has placed increased pressure on KTPH to best manage the increasing workload and provide timely care for its patients.
- From 2015 to 2018, KTPH experienced an increase in number of admissions by 22%, of which, General Medicine (GM) saw a 7.7% increase. The Departments of General Medicine and Emergency Medicine hence were keen to address the increasing demand by piloting the clinical concept of Ambulatory Emergency Care (AEC).
- AEC is well-established in many hospitals in the UK to reduce hospital admissions, costs and to improve patient experience. In Singapore, this concept has not been tested.

Objectives:
To test the local feasibility of this new model of seeing, diagnosing and treating patients with acute medical conditions without hospital admission. The idea was to compress a few days of hospital stay into a few hours (8-23) and a few clinical reviews (as an outpatient) over subsequent days to reduce inpatient admissions and cost.

Team Composition:
The core team includes Emergency Medicine Department (ED) and GM Operations, senior specialists from ED and GM, junior doctors and representatives from nursing and pharmacy. Extended team members include representatives from departments of Diagnostic Radiology and Cardiovascular Medicine as well as Bed Management unit and Patient Service Centre.

Key Features:
- The AEC service was established in the Extended Diagnostic Treatment Unit (EDTU), and consists of 4 designated beds for the AEC unit, where the patient is evaluated, diagnosed and treated by the GM team.
- In close proximity to the AEC unit beds is a designated area with four recliner chairs for the follow-up of these patients usually on subsequent days. This allows for a better patient experience as they are seen by the same doctors in the same physical space to complete their acute episode of care.
- Once the acute episode is over, care is transferred to outpatient clinics or community-based care as appropriate.
- Close collaboration with other specialities enabled a hassle-free workflow.

Impact:
- Demonstrated that acute hospital admissions in Singapore could be reduced safely by diverting patients to AEC.
- Provide same day diagnosis and treatment for patients suitable for AECU-type care in order to avoid unnecessarily admission.
- Bill size reduced significantly, bringing cost savings for patients.

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Care Redesign Best Practice Medal
National Healthcare Group Polyclinics
Project Title: "Implementing tele-consultation services for the care of chronic conditions"

Background:
During the COVID-19 pandemic, the National Healthcare Group Polyclinics (NHGP) extended its teamlet care model beyond face-to-face consultations to encompass tele-consultation services, as part of supporting safe distancing measures at all six polyclinics.

Objectives:
The vision of a 'virtual' polyclinic model presents patients with stable chronic conditions with the alternative to visit the clinics physically only when required.

Team Composition:
A multi-disciplinary workgroup was formed comprising key members from clinical services, nursing services, operations, pharmacy and the polyclinics.

Key Features:
- All members from the multi-disciplinary workgroup contributed domain expertise during process development and the rapid 'Plan-Do-Study-Act' (PDSA) cycles.
- The comprehensive suite of tele-consultation services includes: Tele-Consultations (with Doctors), Tele-Consultations (with Care Managers), Tele-Direct Observed Therapy (DOT), Tele-Dietetics, Tele-Physiotherapy and Tele-Psychology.
- To ensure sustainability, technology was leveraged upon to streamline process and optimise the use of resources.

Impact:
- From Feb to Nov 2020, a total of 139,845 tele-consultations were conducted. This resulted in a reduction of about 14,000 physical polyclinic visits per month.
- An evaluation conducted to assess the clinical impact of tele-consultations on patient outcomes and to understand patients' perceptions of the service showed that (a) for patients with stable chronic conditions, video consultations were not inferior to in-person consultations, (b) 98% had good overall experience with doctor-led tele-consultations, and (c) 94.5% expressed willingness to use a tele-consultation service again.
- The integration of tele-consultation services as part of NHGP's chronic care delivery model affords patients greater accessibility to healthcare services, and supports safe distancing measures during the Covid-19 pandemic.

Workforce Transformation Best Practice Medal
Tan Tock Seng Hospital
Project Title: "Redesigning Lean Training from Classroom to Digitally-Enabled Microlearning"
Introduction: The "*Identifying Waste, improving through 6S*" course is a signature training programme in TTSH for newly onboard staff. It equips staff with basic Lean knowledge to redesign and streamline their work processes for bringing higher quality of care and value to patients. Every year, an average of 400 staff are trained in 6S and DOWNTIME through classroom delivery. However, classroom delivery method posed problems on: (1) limitation in training capacity – as the hospital expands over the years in staff strength and into the community partners, it would take another 9 years to train all staff; (2) labour intensiveness – an average of 91 workdays were required on the trainers to carry out the classroom training; and (3) high logistics & admin overhead – the" Go-and-See" segment requires a lot of admin efforts to identify & coordinate with site owners.
Objectives: • The aim was (1) to convert the classroom training to Microlearning, to allow learners to learn anytime, anywhere; (2) Job redesign for existing trainers to become coaches on the ground; (ii) productivity savings; and (iii) scalability to a larger audience
Team Composition: Kaizen Office and Nursing

Key Features:
• The Microlearning module was rolled out to all TTSH staff via NHG eLearn on 1 July 2020. Microlearning module was planned to enhance staff learning experience through
  ➢ Delivery of course content in bite-size modules
  ➢ interactive and experiential learning
  ➢ Formative assessment at key intervals of the course
  ➢ Allows for reflection and learning feedback

Impact: • **Higher take-up rate** – From July 2020 to March 2021, about 670 active staff had enrolled for the course, a more than 50% increase compared to the annual classroom enrolment of about 400. • **Productivity savings** – **reduction of more than 90% class preparation effort** required, as compared to traditional classroom delivery method (savings of minimally 80 man-days) • Wider outreach to community partners – From Feb 2021, the module has been offered beyond TTSH, through AIC Learning Institute