Building Innovation at SGH: From Concept to Care

A/Prof Tan Hiang Khoon Chief Executive Officer

22 May 2025



Singapore General Hospital

SingHealth



SINGAPORE GENERAL HOSPITAL (SGH)

Aging Population

We operate in the context of healthcare mega trends.

Shrinking Workforce

🔅 Chronic Disease Burden

Rising Healthcare Costs

Technological Advancements

Blurring of Phygital Boundaries

Sustainability

Żà



Innovating for the Future of Care



SGH Campus 20-year Masterplan

- Tackle SGH's most complex clinical and operational challenges
- Attract, grow, and retain talent from research to innovation
- Build a financially resilient model for delivering high-quality care
- Our vision: Defining tomorrow's medicine



Innovation at SGH: 4 Building Blocks

Defining the Problem Starting with the right problem to address current pain points and future challenges.



Activate Our Technical Ecosystem Engineers, coders, data scientists, impact evaluators embedded in clinical teams.



CDDO A.L.I.C.E



Empowering the People Closest to the Problem

An environment that allows frontline and administrative professionals to co-design and test solutions.



Build Pathways to Adoption and Scale

Facilitating internal adoption, scaling, and commercial partnerships.





1. Defining the Problem



- Problems must be **rooted in frontline experience**, focusing on real gaps in patient care, operations, or experience.
- We prioritise problems that are **recurrent, impactful, and solvable** within our ecosystem.
- Tools like design thinking, journey mapping, and staff-led sensing help uncover what matters most.



2. Empowering Those Closest to the Problem



Clinician Innovator Awardees (CIA)

Dr Luke Tay Dr Jasmine Ong Vascular Surgery Pharmacy Inpatient

Dr Yong Jin nt Urology



Singapore Translational Research Investigator Award (STaR)

Prof Marcus Ong Emergency Med

Clinician Scientist Awardee (CSA) – SI

Prof Chan Ling Ling Diagnostic Radiology

- SGH support homegrown innovators through structured career pathways across research and innvoation, e.g. achieving Clinician Innovator Awards (CIA), Clinician Scientist Awards (CSA), and mentorship-linked grants.
- RIO and partners like FHS identify and support frontline staff with ideas, offering early-stage guidance, funding access, and prototyping help.
- Over time, this ecosystem has produced award-winning innovations, launched start-ups, and built an embedded innovation culture.



3. Activate a Technical Ecosystem

- Innovation needs interdisciplinary collaboration, not handovers between silos.
- We co-locate technical talent, including engineers, data scientists, designers, human factor specialists within clinical ecosystem.
- "Bilingual thinkers" who understand both healthcare and tech are key to success.

SingHealth DukeNUS ACADEMIC MEDICAL CENTRE Alice Lee Innovation Centre of Excellence SGH CAMPUS Launch of Alice Lee Innovation Centre of Excellence @ SGH Campus Advancing Frontiers 1 P SGH CAN

A.L.I.C.E @ SGH launched in September 2023.





Alice Lee 🔰 Innovation Centre of Excellence

SGH CAMPUS

ldea

- Support grant writing and early-stage proposal development
- Help translate clinical insights into functional prototypes
- Provide prototyping resources for pre-grant validation



- Connect innovators with commercial and public-sector partners
- Match projects with the right technical expert
- Scout and validate external solutions for local adaptation





- Enable test-bedding within SGH and across SingHealth
- Support adoption pathways and commercialisation readiness
- Strengthen enterprise partnerships for long-term scaling

3. Activate a Technical Ecosystem

128 projects

34% of the completed projects received followon funding support \$31.7M External[#] funding raised for innovation

72 Partnerships Agreements Signed 93,252 113,653 Man-hours saved Patients benefitted* 71 Innovation Event/Workshop >2,500 attendees

Process Innovations

Medical Devices & Al Innovations

uSINE®



KKH implements the world's first artificial intelligence-powered (AI) ultrasound guided automated spinal landmark identification system uSINE® - to help women achieve successful spinal anaesthesia at the first attempt during childbirth.



MedClarity is a powerful 5-in1 Al platform that transforms coronary CT scan analysis cutting workflows by 10x, tripling revenue, and delivering expert-level accuracy.



SmartRPD



Higher quality removable partial dentures and reduced treatment time with new advanced smart digital denture fabrication workflow by NDCS.



US2.AI

Us2.v1 software is an automated clinical workflow solution that analyses 2D and Doppler echo studies from any vendor in under 2 minutes, producing detailed, editable reports with explainable results from each heart chamber,



Software Suite

Nursing

Empower patient and

administration task.

man-hours saved.

Scaled to all SingHealth

institution in FY24. 29,380

reduce nurses



Electronic

Charge Capturing

Eliminate manual workload.

Scaled to all institutions since Nov'23. Manpower saving of ~35 FTE.





4. Build Pathways to Adoption and Scale: An Adaptable Future Workforce

Change Management

Transitioning individuals, teams and organisation from a current state to a desired future state

Job Re-design

Restructuring job roles to improve efficiency, motivation, and alignment with health system needs



Competencies Development

Building the skills and mindset needed to generate, implement, and sustain creative ideas and solutions

Innovation Culture

Creating an environment that encourages creativity, experimentation, and continuous improvement



4. Build Pathways to Adoption and Scale: Strategic Industry Partnerships

Scalable, real-world solutions unlocked through industry partnerships

Industry insights support SGH innovation



From Ideas to Impact: Our Innovation Stories









Robotic Process Automation

RPA lets us hand off repetitive digital tasks to bots, so people can focus on what matters.

- Freed up 84,000+ man-hours, generating ~S\$3 million in productivity gains.
- Driven by frontline-identified pain
 points and developed by in-house RPA
 Citizen Developers.
- Supported by a scalable infrastructure and training ecosystem.



Citizen Developer and Senior Radiographer Lee Kuan-Ming showcasing his RPA use case at the SGH RPA Showcase 2024.



KLARO™ Surgical Light

A flexible, in-body LED light designed to illuminate deep surgical cavities.

- Conceived by a surgeon and embedded clinical engineers, inspired by a child's light-up toy.
- Co-developed by SGH's Medical Technology Office, National Cancer Centre Singapore, and Vivo Surgical, following the Biodesign process.
- Achieved FDA, CE, and HSA approvals; now **distributed by Vivo Surgical** in over 20 countries.











A/Prof Tan Ngian Chye (left) and Dr Kevin Koh with the Klaro









With KLARO® & Head Lamp



With KLARO® Alone

ENLYT® Flexible Endoscope

ENLYT is a compact, affordable flexible endoscope that connects to a mobile device for diagnostic imaging.

- Initiated by a surgeon to improve access to endoscopy for head and neck cancer diagnosis.
- Designed as a briefcase-sized, smartphone-connected solution for use in lower-resource settings.
- On track for HSA/FDA certification.









An AI tool that captures and summarises doctor-patient conversations in real-time, freeing clinicians to focus fully on the patient.

- NoteBuddy was developed by SingHealth's Division of Digital Strategy using Microsoft Azure OpenAI, tailored for Singapore's multilingual clinical context.
- Piloted at SGH with support from FHS project managers, clinical champions, and training efforts.
- Early studies show 9% more doctor-patient eye contact and 70% of patients reported feeling comfortable with AI in consults.



An example of Note Buddy capturing and transcribing different languages spoken during consultation.



iACT: Individualised Antibiotic Combination Test

A lab-developed test that identifies precise, personalised antibiotic combinations for patients with multidrug-resistant infections.

- Started as research at SGH Pharmacy (2006-2020) and translated to a clinical service for complex infections with no standard treatment.
- Provides results within 48 hours using over 180 antibiotic combinations to cover >99% of clinical CRGNB strains
- Commercialisation in progress: Engaging national agencies, industry, and manufacturing partners.



Prospective in vitro combination testing

24hr Preliminary results based on visible bacteria growth



<48hr Effective combinations determined



An Unwavering Commitment

Best Outcome, Best Experience as the flagship hospital in an integrated healthcare ecosystem * * * * * Data-driven Appropriate and WORLD'S BEST learning health system value-based care HOSPITALS 2019 - 2025 Newsweek Resilient High tech, POWERED BY and adaptive **High touch** statista 🔽 infrastructure SINGAPORE GENERAL **HOSPITAL (SGH)** Seamless, Employer person-centered care of choice

Net zero carbon campus



Thank you!



Singapore General Hospital

SingHealth