



HEALTHCARE



HEALTHCARE COMMITTEE POINT-OF-VIEW PAPER

ENABLING HEALTHCARE INNOVATION

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INTRODUCTION

The increasing focus on healthcare innovation arises from the need to address evolving health challenges while ensuring universal healthcare access. According to the World Health Organization (WHO), healthcare innovation involves new or improved solutions such as policies, products, technologies, services, and delivery methods that enhance health and well-being¹. The pharmaceutical, biotechnology, and medical technology sectors play a crucial role in driving healthcare innovation by researching, developing, and commercializing drugs, biologics, vaccines, and medical devices to meet developing medical needs. Preceding the COVID-19 pandemic, the industry's innovation efforts spanned various areas, including medical treatments, diagnostics, patient care, administration, and healthcare delivery models. These advancements have reduced access disparities and provided tailored solutions for diverse medical needs.

The healthcare industry continues to traditionally invest heavily in research and development^{2,3}. Encouragingly, Singapore recognizes that both public and private investments are essential for the research and development of innovative healthcare products. Private sector research expenditure on biomedical and related sciences alone increased by 17.2 percent from SGD 706.7 million (US\$525.6 million) in 2019 to SGD 828.1 million (\$615.9 million) in 2020⁴. Ranked 10th in the 2022 World Index of Healthcare Innovation⁵, Singapore's approach to innovation in healthcare goes beyond robust research and development initiatives, complementing its efforts with strong public-private partnerships. Singapore's excellent execution of COVID-19 crisis management is further testament to the success of a vibrant culture of innovation that encourages collaboration between a wide range of partners from government, academia, industry, and healthcare providers.

¹The World Health Organization. n.d. "Health innovation for impact". <https://www.who.int/teams/digital-health-and-innovation/health-innovation-for-impact#:~:text=WHO%20defines%20health%20innovation%20as,to%20accelerate%20positive%20health%20impact>.

²Gonzalez P, Macho-Stadler I, Perez-Castrillo D. (2016). Private versus social incentives for pharmaceutical innovation. *J Health Econ*, 50. 286 – 297.

³EvaluatePharma. (2019). "World Preview 2019, Outlook to 2024". https://info.evaluate.com/rs/607-YGS-364/images/EvaluatePharma_World_Preview_2019.pdf

⁴(2020). *National Survey of Research, Innovation and Enterprise in Singapore 2020*. National Research Foundation, Agency for Science, Technology and Research. <https://www.a-star.edu.sg/docs/librariesprovider1/default-document-library/rie/2020-rie-survey-publication06283045a6d849d99a375a13ef1890e5.pdf>

⁵Gregg Girvan, Grant Rigney, and Avik Roy. (March 4, 2023). "Singapore: #10 in the 2022 World Index of Healthcare Innovation". The Foundation for Research on Equal Opportunity. <https://freopp.org/singapore-10-in-the-2022-world-index-of-healthcare-innovation-3942e86e986c#:~:text=2022%20World%20Index%20of%20Healthcare%20Innovation-Interactive%20Heat%20Map&text=Its%20strong%20GDP%20growth%2C%20moreover,times%20to%20see%20a%20doctor>.

INDUSTRY INNOVATIONS TO BRIDGE GAPS IN CARE AND ENHANCE HEALTHCARE DELIVERY



Singapore's rapidly aging population demands more innovative technology and care delivery to fulfill the rising demand of care, particularly in the space of chronic diseases management. **embecta**, a global player in diabetes care, decided to establish direct-to-consumer channels – official stores on e-commerce platforms – in Singapore to address challenges with adherence faced by healthcare professionals (HCPs) due to time constraints. To enhance health literacy on proper insulin injection techniques and bolster patient education on medication for people with diabetes, embecta's e-commerce stores maintain validated digital content that covers detailed product specifications, usage guidelines and demonstrations. The content is phrased in easy to digest and follow language and helps to address frequently asked questions that in turn saves time that HCPs spend per patient accordingly. The stores also provide convenient delivery of insulin devices that reduce patients' travel time to pharmacies and further help to improve treatment adherence. This has facilitated a stronger mechanism for continuous care and support as well as help patients maintain therapy adherence and achieve their glycemetic goals.



Abbott introduced its High-Sensitive Troponin-I blood test that can be added to conventional testing methods to predict cardiovascular disease (CVD) risk more accurately, even among healthy individuals. Individuals identified with moderate or high risk can consequently be managed more actively to reduce this risk. In more recent studies, more prolific screening, including proactively amongst asymptomatic population cohorts, reduces the risk of CVD events by nearly 10 percent and shows gains in healthy life expectancy of up to 27 years. Abbott's approach shows the value of diagnostics for CVD management and the role it can play in significant reduction of disease burden and more effective management of associated costs.



Glaukos leverages minimally invasive platform technologies to build an unrivaled portfolio of next-generation surgical and pharmaceutical therapies addressing unmet needs in glaucoma, corneal health, and retinal disease to prevent

blindness. To bridge the treatment gap between non-invasive topical eye drops and invasive glaucoma surgery, the company created the micro-invasive glaucoma surgical (MIGS) category with iStent® and its next generations, the smallest known implants approved by the U.S. FDA that is now a global standard of care, backed by the strength of their clinical and economic evidence. Through safely reducing medication burden and eye pressure, iStent *inject* is the only tool that has demonstrated improvements in patients' vision-related quality of life and eye comfort when combined with cataract surgery. With iLink®, they also achieved the first and only FDA-approved pharmaceutical-hybrid corneal cross-linking treatment to slow or halt the progress for keratoconus, a corneal disease afflicting the adolescent population and is a leading cause of corneal transplants in many countries. iLink® also targets the weakening corneal tissues, which temporary solutions such as eyeglasses and contact lenses do not resolve, resulting in cost savings and better quality of life for patients.

Medtronic

Medtronic is committed to transforming healthcare by delivering technologies that change people's lives. For example, Medtronic has a remote monitoring service that creates healthcare accessibility for cardiac device patients. It is an

information system that integrates cardiac device data into clinical practice that improves patient compliance to follow up⁶, reduces time in clinic⁷ thus increasing patients' satisfaction and quality of care.

Medtronic also has an innovative advanced hybrid closed-loop (AHCL) insulin pump system with self-adjusting basal delivery with autocorrection dosing. The system automatically uploads and shares data with healthcare professionals, allowing remote patient monitoring and presenting opportunities for tele-health consultation for diabetes management. Insulin pump therapy is associated with significantly greater reduction in hospitalizations, inpatient days, and emergency department visits, compared with multiple daily injections⁸. A Singapore cost-effectiveness analysis showed the use of AHCL led to a reduction in costs arising from T1D complications and would likely be cost-effective from a Singapore healthcare system perspective⁹.

⁶TRUST Investigators. Efficacy and safety of automatic remote monitoring for implantable cardioverter-defibrillator follow-up: the Lumos-T Safely Reduces Routine Office Device Follow-up (TRUST) trial. *Circulation*. July 27, 2010;122(4):325-332.

⁷Crossley GH, Boyle A, Vitense H, Chang Y, Mead RH, and the CONNECT Investigators. The CONNECT (Clinical Evaluation of Remote Notification to Reduce Time to Clinical Decision) trial; the value of wireless remote monitoring with automatic clinician alerts. *J AM Coll Cardiol*. March 8, 2011;57(10):1181-1189.

⁸Medtronic Data on file from Pump vs MDI: Cross-sectional Analysis of Healthcare Costs and Utilization During CY2019.

⁹DAPHNE GARDNER, MRINMAYEE LAKKAD, ZHIYU QIU, YUTA INOUE, SURESH RAMA CHANDRAN, KAEL WHERRY; 1009-P: Cost-Effectiveness of MiniMed 780G Therapy Compared with Multiple Daily Injections (MDI) with Intermittently Scanned Continuous Glucose Monitoring (isCGM) in People with Type 1 Diabetes (T1D)—A Singapore Perspective. *Diabetes* 20 June 2023; 72 (Supplement_1): 1009-P. <https://ada.scientificposters.com/apprizr.cfm?tsHR9lrxSCsv8NKXKZxnnVXLExklrZaWL%2FQqQHMV2FloggOxy%2BkyDWrCi0wb7jLB6SYku2A16uk%3D>



Cutting-edge cancer treatment, that increasingly involves targeted therapies and biomarker testing, is critical to ensure patients have access to the most appropriate cancer therapy. **Guardant Health's** next-generation

sequencing (NGS) capabilities coupled with its proprietary bioinformatics algorithms enable identification of actionable cancer biomarkers, empowering oncologists to make informed treatment decisions. Compared to patients receiving standard chemotherapy, patients who receive biomarker testing and targeted therapy have a significant increase in median overall survival and lower average treatment costs.

Recently, Guardant Health's blood-based comprehensive genomic profiling (CGP) test became the first liquid biopsy test to be approved by HSA for all solid tumors. Since being introduced, our laboratory developed test (LDT) has become widely accepted for blood-based CGP with more than 400 peer-reviewed publications, trusted by more than 12,000 oncologists and over 400,000 tests ordered world-wide to date. The company has since harnessed this liquid biopsy technology for applications across every stage of the disease, including for cancer surveillance, real-time monitoring of treatment efficacy, and early cancer detection. Most recently, the company launched a blood-based screening test for Colorectal Cancer (CRC), that can help overcome access barriers and increase cancer screening compliance rates by easily integrating CRC screening into routine medical care.



At **BD**, innovation strategy focuses on advancing healthcare through addressing three irreversible trends. First, smart connected care, such as using artificial intelligence, informatics, and robotics to transform healthcare processes, tools, and treatments. Second, enabling new

care settings to enhance the patient experience and expand care. Finally, improving diagnosis and treatment of chronic diseases to improve patient outcomes.

Aside from new product development, BD continually optimizes manufacturing capabilities to improve their ability to serve, especially in the context of pandemic-related restrictions and global supply chain challenges. Singapore has been a strong partner to achieve this. The company's new BD BACTEC™ Blood Culture Media Manufacturing Facility in Tuas allows BD to better serve the demand for diagnostic products, shorten lead time, and provide faster delivery to customers in Singapore and in Asia.

The convergence of these trends presents a significant challenge, but also a prime opportunity for innovation. Today, for an elderly patient living at home with urinary incontinence and perhaps other medical conditions, quality of life is impaired by having to wear and frequent changes of incontinence underwear. Families or caregivers also need to make significant sacrifices emotionally, physically, and financially. BD's PureWick™ Urine Collection System was designed to help patients and caregivers relieve the burden of managing incontinence at home: reducing trips to the bathroom - a known cause of nighttime falls, improving sleeping at night, and helping to reduce the risk of catheter-associated urinary tract infection.



At **Moderna**, the company is innovating at speed to change the world of medicine with our mRNA vaccines and therapeutics. This was brought to life when the company played a critical role in supporting the rapid response to the global COVID-19 pandemic. Since Moderna's founding in 2010, the company have made tremendous progress in mRNA science, research and development to advance mRNA vaccines and treatments in order to help patients. Leading the way with COVID-19, Moderna delivered one of the most effective vaccines to fight against the disease around the world.

Currently, Moderna has 47 clinical development programs. Alongside with the company's research and development (R&D) in infectious diseases vaccines for respiratory, latent and emerging diseases, Moderna is also committed to solving some of the toughest health problems. Harnessing the power of the company's innovative mRNA platform and artificial intelligence in their R&D processes, Moderna is unlocking the potential of mRNA to develop mRNA medicines across four therapeutics areas, which include immune-oncology, rare disease, cardiovascular disease and autoimmune disease. Specifically in immune-oncology, the company is developing individualized neoantigen therapies, with the goal to train a patient's immune cells to recognize the cancer fingerprint proteins and launch an immune response against the cancer cells.

ADVANCING THE DIGITAL HEALTHCARE SYSTEM

With digital health as a key driver, the Ministry of Health has collaborated with service providers to introduce regulatory sandboxes, aiding the deployment of digital health solutions. Leveraging its innovation capabilities, Singapore could concentrate on advancing the digital healthcare ecosystem by tapping into AI and automation to enhance patient-centric healthcare innovation, clinical efficiency, and reduce healthcare waste.



Abbott offers a portfolio of life-changing electrophysiology (EP) technologies to equip doctors with the right tools to diagnose abnormal heart rhythm problems, map the inside of hearts and deliver the right therapies. A combination of

catheters and sensors helps physicians treat patients and restore them to regular electrical functions. These advanced diagnostic and ablation technologies are available in all major Singapore hospitals' cardiology labs. Accessibility to such technologies, including remote connectivity, is essential to unlocking greater healthcare innovations for better patient care.

Singapore is the first country in Southeast Asia to launch the new 3D mapping system, Ensite™ X EP Mapping System. A novel tool, Ensite™ Connect Remote Support, allows highly advanced mapping support to physicians remotely anywhere and instantly. This combination of tools connects the physicians to a new level of support, elevates their electrophysiology lab efficiency, allows flexibility to schedule cases on demand, and provides expert system insights. This optimized remote care experience translates to significant advantages such as better quality of care for patients and procedural efficiency. In addition to applying the technologies, the partnership and collaboration between healthcare professionals in Singapore and Abbott further elevate Singapore's position as a hub for cutting-edge medical advancements.



MSD has been partnering with various government agencies and like-minded partners to deliver health messages through innovative approaches. They created a gamification approach to improve digital health literacy amongst seniors through the RSVP Smart Wellness Program. By tailoring bite-sized

information to seniors, the program is a digital tool that facilitates their ability to find, understand and use publicly available resources and services to navigate their own way through healthcare systems, as well as guide health decision-making. The program bolsters disease awareness for these subpopulations and contributes to early intervention and upstream prevention efforts that will lower overall healthcare costs downstream.

BALANCING HEALTHCARE INNOVATION AND COSTS

The healthcare sector is teeming with innovation, and we are seeing a growing need for accelerated implementation. However, challenges remain toward achieving a harmonious balance within the "iron triangle"¹⁰ of healthcare¹¹ for Singapore that impact the adoption of new healthcare innovations across the ecosystem. The conundrum of reconciling healthcare innovation with escalating national healthcare expenses centers on the simultaneous advancement of medical technologies, treatments, and services¹².

With Singapore's aging population exacerbating constraints, along with a dwindling labor pool and tightening fiscal capacities, healthcare policymakers and administrators are wrestling with the task of striking a balance between heightened costs and maintaining equitable standards of care quality and accessibility. The high cost of innovation has long been a barrier to the pursuit and adoption of healthcare innovation and unfortunately, the barriers are building up¹³. Multiple stakeholders, including patients, governments, payers, healthcare providers and the biopharmaceutical industry, have a role to play in the funding of healthcare innovation. However, who pays for healthcare innovation is a complex issue that can strain healthcare budgets and exacerbate ethical dilemmas around social issues about equity and access.

In addition, the current landscape of fragmented healthcare systems with varying healthcare reimbursement models may not be well-suited to adequately drive or incentivize the development and adoption of healthcare innovations¹⁴. Paying for healthcare innovations necessitate thoughtful multi-stakeholder collaboration toward developing sustainable funding models that take into consideration the specific innovation, the context in which it is being developed and the ethical implications of funding mechanisms.

Given that we know healthcare innovations are essential for improving the quality and efficiency of care delivery, but are expensive to develop and implement, it is therefore equally important for both innovators and end-users to demonstrate the cost and/or operational effectiveness of healthcare innovations to justify their adoption. Through the demonstration of real-world data, economic evaluations or quantitative methods, policymakers and healthcare organizations can make informed decisions on adoption of value-based innovations.

¹⁰Kissick W.L. (1994). *Medicine's Dilemmas: Infinite Needs Versus Finite Resources*. Yale University Press; London, UK.

¹¹The iron triangle of healthcare is a conceptual framework introduced by Professor William Kissick in 1994 that illustrates the inherent trade-offs and challenges within healthcare systems. This triangle consists of three key components: cost, quality, and access. The principle behind the iron triangle suggests that improvements in any one of these components will inevitably impact the other two.

¹²Ministry of Health Singapore. (November 2, 2020). "Managing Healthcare Cost Increases". Parliamentary Question and Answer. <https://www.moh.gov.sg/news-highlights/details/managing-healthcare-cost-increases>

¹³Berwick D.M. (2003). Disseminating innovations in health care. *Journal of the American Medical Association*, 289(15), 1969–1975. doi: 10.1001/jama.289.15.1969.

¹⁴Kelly, C.J, Young, A.J. (2017, June). Promoting innovation in healthcare. *Future Healthcare Journal*, 4(2), 121 – 125. <https://doi: 10.7861/futurehosp.4-2-121>.

Singapore's implementation of various measures to control costs and curb healthcare inflation may potentially increase access by making healthcare more affordable as well as encourage judicious utilization of healthcare products and services.^{15,16} However, AmCham encourages the government to continue to prioritize investments into healthcare innovation, as well as reconsider regulatory strategies that may be a double-edged sword for enabling healthcare innovation. Healthcare regulations play a critical role in safeguarding patient safety, maintaining quality standards, and ensuring the ethical and efficient delivery of healthcare services but established regulatory processes that are too costly may inadvertently become a barrier to fostering progress for the healthcare industry.

Novel healthcare innovations may not fit neatly into traditional evaluation frameworks designed for established treatments. The benefits of healthcare innovations may not be immediately apparent and require time to scale up and achieve their full potential impact. Some innovations may have long-term benefits that are difficult to quantify in the short term. The success with introducing interim regulatory sandboxes to advance telemedicine¹⁷ indicates a possible avenue that Singapore can leverage to reassess regulatory strategies for innovation in healthcare to facilitate adoption. Such regulatory sandboxes could allow for the creation of more dynamic evaluation processes with separate regulatory pathways to ensure that novel approaches to healthcare are thoroughly assessed and refined in the local context.

Singapore is transitioning to a patient-centered healthcare system, with a focus on preventive care and addressing patient needs¹⁸. Establishing partnerships that support and facilitate healthcare innovation across the continuum of care is crucial for ensuring the resilience of the healthcare system in the future as well as striking a balance between the need for innovation to improve patient care and the cost of that innovation.

¹⁵Lim, V. (2023, June 14). MOH introduces hospital fee benchmarks for private sector to manage rising costs. *Channel News Asia*. <https://www.channelnewsasia.com/singapore/moh-hospital-fee-benchmarks-doctor-surgeon-healthcare-cost-3560836>

¹⁶Ministry of Health Singapore. (2023, February 23). Cancer Drug List. *Parliamentary Question and Answer*. [https://www.moh.gov.sg/news-highlights/details/cancer-drug-list#:~:text=The%20Cancer%20Drug%20List%20\(CDL\)%20was%20introduced%20to%20accord%20the,burden%20on%20patients%20and%20families](https://www.moh.gov.sg/news-highlights/details/cancer-drug-list#:~:text=The%20Cancer%20Drug%20List%20(CDL)%20was%20introduced%20to%20accord%20the,burden%20on%20patients%20and%20families).

¹⁷Ministry of Health Singapore. (2021, February). Licensing Experimentation and Adaptation Programme (LEAP) – A MOH Regulatory Sandbox. [https://www.moh.gov.sg/home/our-healthcare-system/licensing-experimentation-and-adaptation-programme-\(leap\)--a-moh-regulatory-sandbox](https://www.moh.gov.sg/home/our-healthcare-system/licensing-experimentation-and-adaptation-programme-(leap)--a-moh-regulatory-sandbox)

¹⁸<https://www.healthiersg.gov.sg/about/what-is-healthier-sg/>

PUBLIC-PRIVATE PARTNERSHIPS IN SINGAPORE TO ADVANCE HEALTHCARE INNOVATION



Harnessing healthcare innovation to transform patient care, **Amgen** collaborated with the Singapore Cardiovascular Longitudinal Outcomes Database (SingCLOUD) to build a MACE (Major Adverse Cardiovascular Events) risk prediction model¹⁹ in Asian post-Myocardial Infarction patients. Recognizing the importance of accurate risk assessment in cardiovascular health, this partnership leverages the extensive dataset to develop a robust predictive model with a novel, dynamic machine learning approach. Utilizing data analytics and advanced algorithms, this collaboration enables healthcare professionals to identify individuals at higher risk of experiencing major adverse cardiovascular events and tailor interventions and treatments accordingly.



GILEAD



To better understand suitable patient care models that facilitate earlier treatment access for hard-to-treat cancers, **Gilead-Kite** collaborated with leading experts from Singapore healthcare institutions²⁰ to understand the cost effectiveness of CAR T-cell therapy compared to salvage chemotherapy in adults with relapsed or refractory large B-cell lymphoma. This study²¹, demonstrating positive incremental cost-effectiveness ratio (ICER) estimates per quality-adjusted life year (QALY) gained with reasonable national health budget impact, provided an evidence-based direction to accelerate the time to access innovative treatments for Singaporeans. By creating these patient-centric care models in collaboration with the local leading experts, Gilead and Kite Oncology hopes to improve access to healthcare, health equity, and drive continued innovation in oncology in Singapore.

¹⁹Fang He, John H Page, Jesisca Tandi, Abhijit Ghosh, Christian Liman, Joydeep Sarkar, Khung Keong Yeo 2023., 'Major Adverse Cardiovascular Event Risk Prediction in Asian Patients After Myocardial Infarction: A Novel, Dynamic, Machine-learning Approach', Journal of Asian Pacific Society of Cardiology

²⁰The healthcare institutions are Singapore General Hospital, Singapore; National Cancer Centre, Singapore; National University Cancer Institute, National University Health System, Singapore; Mount Elizabeth Medical Centre, Parkway Cancer Center, Singapore; Center for Clinical Haematology, Singapore

²¹Lim FLWI, Diong T-K, Ball G, et al. Cost-effectiveness and budget impact analyses of axicabtagene ciloleucel (axi-cel) compared to salvage chemotherapy in adult patients with relapsed or refractory large B-cell lymphoma from Singapore's healthcare system perspective. Poster 1076 presented at the 49th EBMT Annual Meeting, 23–26 April 2023.

Johnson & Johnson

With the support of EDB, **Johnson & Johnson (J&J)** collaborated with National University Hospital (NUH) to launch a 3D Printing Point-of-Care center, producing anatomical models for surgical simulation and patient education to advance personalized patient care capability in Singapore. The company also collaborated with A*STAR and stakeholders to bring the first of its kind Eye Health Digital Innovation Consortium in APAC and carries out research with SNEC and SERI to help halt progression of myopia.

J&J is also committed to address the dual gap in innovation and health equity through the establishment of the J&J Centers for Global Health Discovery. In 2022, J&J collaborated with Singapore's Duke-NUS Medical School to establish the third Satellite Center globally and first in APAC to catalyze investment and bolster R&D for flaviviruses. The collaboration builds on the company's decade-long legacy and ongoing collaboration with Duke-NUS in public health research, and our strong track record in flavivirus research and bench-to-bedside innovations that will facilitate antiviral drug discovery for the prevention and treatment of flavivirus-associated diseases that are affecting communities in Southeast Asia and beyond.

As part of Johnson & Johnson Innovation's strong commitment to nurture innovation, the company also recently announced its collaboration with EDB to bring the first of its kind Johnson & Johnson Innovation – JLABS' universal model to Singapore that will leverage JLABS's capabilities, services, and innovation resources aimed at boosting the region's innovation output.

The company's choice of Singapore as partner for the universal model is a recognition of Singapore's position as a leading center of innovation and entrepreneurship coupled with the need to rapidly evolve to meet the growing healthcare needs of aging populations, rises in chronic diseases and higher healthcare costs.

This collaboration will unlock innovation potential and attract new enterprises in and from around the world to participate in Singapore's life science ecosystem. JLABS will work to turn science into tangible, commercially viable products, build on and catalyze the region's current culture of innovation and entrepreneurship to ultimately deliver novel therapies for the patient population.

RECOMMENDATIONS FOR SINGAPORE

There is no single solution that will solve the iron triangle of healthcare dilemmas and facilitate increased adoption of healthcare innovation. To ensure that Singapore continues to have access to the latest healthcare innovations and technologies, AmCham recommends a combination of approaches to address the complexity of factors that contribute to balancing innovation with fiscal responsibility and patient access.

1 **Establish formal platforms for transparent and regular dialogue between the different stakeholders involved in healthcare innovation to discuss challenges and opportunities.** Allowing all stakeholders to have a voice will be essential to overcoming the barriers to enabling healthcare innovation. Platforms may include existing multi-stakeholder advisory groups convened by the Singapore government that are expanded to bring in private sector expertise and resources to develop and implement action plans that address barriers and support healthcare innovation.

2 **Encourage organizations and companies to innovate in healthcare by rewarding innovations within a value-based framework.** Singapore has actively promoted healthcare innovation funding²² for early-stage research and healthcare technology development. To complement these efforts, the government may consider aligning incentives, such as grants, tax breaks or reimbursement bonuses, to reward healthcare providers and organizations that successfully introduce innovative solutions and technologies which demonstrably enhance patient outcomes, healthcare processes and delivery and/or reduce utilization costs. This can stimulate a more sustainable culture of innovation for continuous improvement and efficiency across the healthcare ecosystem, while fostering a competitive environment that drives the development of high-quality and cost-effective medical advancements.

²²National Health Innovation Centre has three funding streams which target different stages of the innovation development pipeline.
<https://www.nmrc.gov.sg/national-health-innovation-centre-singapore>

3

Develop and establish separate regulatory processes to evaluate healthcare innovations differently from established treatments. Significant efforts to stimulate innovation underpin the vital role of healthcare innovation in enhancing value and patient access. Singapore's top-tier medicine regulatory system²³ may consider introducing dedicated mechanisms, including regulatory sandboxes or controlled testing environments where innovative healthcare solutions can be safely trialed without usual regulatory constraints. This will serve to introduce more regulatory flexibility and adaptability, enabling rapid and iterative development of innovations that may reach patients faster. Streamlined approval processes, tailored to the unique risks and benefits of innovative products and technologies, may further address safety and efficacy concerns more effectively and increase speed to market. In parallel, separate procurement process for innovative healthcare technologies can be considered to encourage widespread clinical adoption²⁴.

4

Co-create healthcare innovations customized for the needs of Singapore through public-private partnerships. With regular and transparent dialogue, public and private stakeholders can more quickly identify and define the specific healthcare needs of Singapore, paving the way to building partnerships with the right stakeholders and fostering collaborative environments between these partners to co-develop new solutions. With access to different expertise and sharing of resources, public-private partnerships are able to pilot and test solutions in real-world settings to assess that these innovations adequately meet the needs of patients and providers with reduced risks and costs. This will strive to ensure safety of innovations while instilling confidence in government agencies and healthcare providers to scale up and adopt these co-created healthcare innovations more widely. By considering these recommended steps, Singapore can realise the full potential of healthcare innovations in driving progress and improving patient outcomes in the dynamic field of healthcare.

²³Teo, J. (2022, February 28). HSA is first health authority to reach WHO's top level for medicine regulatory system. *The Straits Times*. <https://www.straitstimes.com/singapore/health/hsa-is-first-health-authority-to-reach-whos-top-level-for-medicines-regulatory-system>

²⁴PwC Singapore. (2023). Improving the clinical adoption of health technologies. What do we need to do?. <https://www.pwc.com/sg/en/industries/assets/improving-the-clinical-adoption-of-health-technologies-summary.pdf>

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