

**SPEECH BY PERMANENT SECRETARY FOR MINISTRY OF COMMUNICATIONS  
AND INFORMATION MS YONG YING-I AT THE 4TH SINGAPORE HEALTHCARE  
AI DATATHON AND EXPO (3 DEC 2021)**

Good morning, distinguished participants and friends

1. Thank you for inviting me to speak today in an event bringing together top clinicians, data scientists and innovators to address pressing problems in healthcare. I congratulate National University Health System (NUHS), National University of Singapore (NUS) and the Massachusetts Institute of Technology (MIT) Critical Data for organising this important event.

2. I have had the pleasure of working with your community in my various jobs in my public service career – at the Ministry of Health, working with many of you to develop our national electronic clinical medical records and healthcare IT, on developing academic medicine and advancing our work in biomedical sciences research and innovation, and now co-chairing the Govt’s funding and development effort on Smart Nation and the Digital Economy.

AI has huge potential for widespread deployment in healthcare

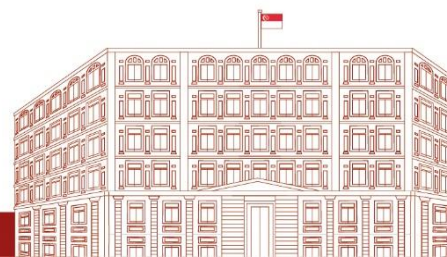
3. With this perspective, I’d like to share a few reflections with you today. First, AI is a platform technology whose time has come. Artificial intelligence and machine learning will be widely deployed. AI for image recognition is being deployed in many application areas, including facial recognition, surveillance, customer and sentiment analysis. AI for logic deduction is also being developed, most famously demonstrated by a computer winning an AlphaGo contest against one of the best players in the world. It can therefore be applied to clinical diagnostics. In Singapore, AI is being applied in pockets in healthcare, including in the current fight against Covid-19:

- a. NCID used AI developed by TTSH & A\*STAR to read chest-x-rays and to calculate the likelihood that a patient may develop severe pneumonia. This has enabled more timely intervention from clinicians to better triage patients.
- b. AI has been used to quickly evaluate the most effective combinations and dosage of medicines to combat the Covid-19 virus. Identifying a drug that can be used to treat Covid-19 is a grueling task, if done manually. It would require both time and precision to sieve through the massive range of possible drug combinations for effective solutions. NUS’ IDentif.AI<sup>1</sup> has accelerated this process significantly, yielding answers within just days.
- c. Smart bots are also being deployed for various uses. NUHS is using AI-enabled robots to help temperature taking and scanning for safe entry. Community care facilities for close monitoring of patients to enable timely clinical and psychosocial interventions. This has been valuable to reduce the strain on our healthcare professionals caring for many Covid-19 patients in our community care facilities.

4. I am therefore happy to see so many people participating in this Datathon, and all the more so when our healthcare community is already so heavily stretched by the demands on you from Covid-19. It shows your dedication to the cause of better patient care. I am confident that the Datathon will spark new ideas for the potential uses for AI across the spectrum of healthcare, which will benefit the patients you serve.

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<sup>1</sup> Identifying Infection Disease Combination Therapy with AI



### Application requires system-level support from multiple stakeholders

5. This brings me to my second point, which zooms up from the individual innovative spark I just spoke of to a system-level viewpoint. My second reflection is that the application of AI innovations to improve healthcare requires a multidisciplinary team to bring it to fruition, and it requires multi-stakeholder effort. It takes a village. Let me explain, using SELENA+ as an illustration. SELENA+ is the National AI project from the healthcare sector. Jointly developed by the Singapore National Eye Centre, the Singapore Eye Research Institute and the NUS School of Computing, it is an AI algorithm that analyses eye scans to detect diabetic retinopathy. SELENA+ has achieved accuracy levels of over 90%, on par with the performance of professional graders but doing it in a much shorter time.

6. SELENA+ is not a bolt out of the blue, but is the latest chapter of innovations in remote diagnostic imaging. Singapore's efforts in teleradiology started at least a decade and half ago, including our x-rays being read in India, and US x-rays being read by us to take advantage of time-zone differences. We gradually learnt to be assured of clinical standards and patient safety, critical factors for successful healthcare innovations. I recall SNEC then introduced the remote diagnosis of diabetic retinopathy, for our patients in our polyclinics. The ability of our eye specialists in our national specialty centre to reach a much broader swathe of patients in the primary care system was a huge step forward, enabling us to detect and treat patients much earlier than before. Early detection was immensely valuable to tackling diabetes. Making this happen required collaboration between our specialty centres and our primary care network in many things, including workflow processes, patient management and data transfers. It required clinicians, nurses, administrators, technical specialists, and IT professionals to come together. It took hard work to resolve obstacles and build collaborations. Because we made this work manually so to speak, introducing SELENA+ now was made smoother. It takes a village, with sustained determination and commitment over time, to make innovations happen.

7. SELENA+ has been deployed in most polyclinics already and will reach all polyclinics by the end of 2021. It is projected to screen 120,000 patients annually, covering all diabetic eye screenings in our polyclinics across the nation. SELENA+ has also been licensed to local start-up EyRis, which has business in more than 20 countries and regions including EU, China and SEAsia.

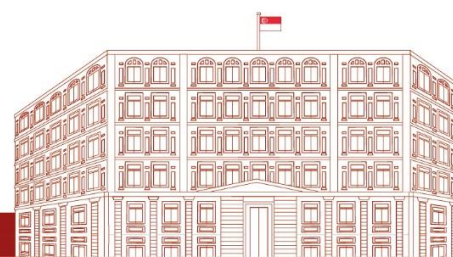
8. The journey continues. We have an on-going AI in Healthcare Grand Challenge for Singapore, which aims to tackle major chronic diseases afflicting Singaporeans such as diabetes mellitus, hypertension and hyperlipidemia. I look forward to multidisciplinary teams of researchers, clinicians, computer scientists and data analysts developing more innovative solutions for this.

### The importance of ethical AI and trust, and Singapore's thought leadership

9. My third point to leave you with, is that our adoption of AI must be premised upon its safe and ethical use. We must manage a delicate balance between encouraging innovation while maintaining a high level of public trust in the technologies deployed. This is especially so in healthcare where misapplication can cause great harm to patients and destroy trust.

10. Addressing concerns about the risk of harm from using AI requires us to think deeply about questions that span policy, legal, technological and ethical domains. For example:

- a. AI can be susceptible to errors and bias. How do we assess what level of accuracy is considered acceptable, and how might this vary across use cases?
- b. How do we ensure that AI solutions are sufficiently robust to guard against irresponsible deployment of AI algorithms or improper management of training data? And to protect against cybersecurity risks, including data manipulation?



- c. How do we determine accountability, if an AI system goes awry? In real life complications, who would be responsible?

These challenges apply to AI everywhere, but they have a particular resonance in healthcare because it affects patients' health and their lives. So in your discussions and in developing innovations, do build in governance, ethical and resilience considerations into the design of the AI innovation.

11. Singapore has taken concrete measures to help establish principles and practical guidelines to ensure that AI is deployed in a responsible and ethical manner. This is critical for public and professional trust in AI. In Jan 2020, Singapore released the 2<sup>nd</sup> edition of the Model AI Governance Framework. This translates ethical principles into practical measures that organisations can adopt. In Oct this year, MOH issued to healthcare providers its AI in Healthcare Guidelines or AIHGle, with recommendations to support patient safety and improve trust in AI and sharing best practices with AI system developers and implementation teams. For AI medical device manufacturers, I understand that this complements HSA's regulations for AI Medical Devices.

12. Various companies in the healthcare sector have implemented the Model AI Governance provisions. To cite one example, UCARE.AI which is a local healthcare start-up, has developed an AI-powered cost predictor to derive accurate estimates of hospital bills for patients. It has been transparent in its usage of AI, clients with concerns about bill predictions were encouraged to highlight them; and UCARE.AI also encrypted sensitive data and minimised usage of this data to preserve patient confidentiality. I understand deployment of the AI solution has gone well, with hospitals providing more accurate bill estimates, and patients having greater peace of mind over the likely size of these bills.

13. Singapore is also actively involved in international discussions on ethical AI. For example, IMDA and PDPC are developing an AI Governance testing framework, consistent with internationally recognized principles from EU, UNESCO, OECD and others. Best practices in AI feature in our Digital Economy Agreements. These various efforts support Singapore's vision to become a global hub for the development, test-bedding, deployment and scaling of AI solutions.

14. Let me conclude by wishing you a rich and fruitful Datathon. The conversations in panels and workshops these few days bring to the fore some of the latest solutions for today's healthcare issues. I hope that they will inspire you to develop innovations that will benefit our healthcare system and the patients that you serve.

15. My congratulations to NUHS, NUS and MIT Critical Data for making this event happen. All the very best to you and the participants. Thank you.

