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Will AI Change Healthcare Delivery and Health Professions Education?

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Celebrating New Beginnings

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Ending the Year with Recognition and Appreciation



SHBC 2024

How AI is Changing Healthcare Delivery and Health Professions Education, and will it Replace Clinicians? - Part 1

At the 2024 Singapore Health and Biomedical Congress (SHBC), thought leaders from the National Healthcare Group (NHG) Clinical Education explored and discussed how technology, and artificial intelligence (AI) in particular, has enabled astonishing transformations in healthcare delivery. These advances also raise intriguing questions about the role of healthcare professionals in a healthcare landscape where AI promises to enhance diagnostic accuracy, optimise treatment planning and improve patient outcomes.

In this three-part series, we hear from Assistant Professor Chow Minyang, Associate Professor Aaron Ang, and Associate Professor Michelle Jong, as they delved into what mindsets, knowledge and skills our healthcare professionals will require in order to navigate and adapt to this AI wave. And also explored the implications of AI integration on healthcare delivery and education, where they suggest ways in which educators, learners and systems can leverage on technological advancements to meet the demands of the future.

In the first of this three-part series, Dr Chow (Consultant, General Medicine, Tan Tock Seng Hospital) shared how AI is changing healthcare delivery and health professions education, where he thinks AI will take healthcare to, and the challenges it brings.



Will AI Change Healthcare Delivery and Health Professions Education?

"AI is already influencing numerous aspects of healthcare, ranging from clinical workflows to personalised education for healthcare professionals," said *Dr Chow* to the SHBC attendees via video teleconferencing. He cited some examples such as the analysis of medical images, generation of patient risk assessments, real-time monitoring of vital signs, to name a few.

However, *Dr Chow* argued that these technological innovations are not designed to replace healthcare professionals (HCPs), but rather to augment their roles, which would ultimately lead to more time being freed for HCPs to focus on more nuanced aspects of patient care.

He believes that healthcare should not fear AI, but ride on it to reap the potential benefits that it brings.

Dr Chow shared two main reasons for the adoption of AI:

Firstly, the opportunity costs of not adopting AI will limit the potential for growth, innovation, and improvement across various domains. And HCPs will miss out on utilising AI's potential to solve complex problems due to its ability to process large datasets quickly and efficiently.

And secondly, the risks of being "left behind" as AI becomes an integral part of healthcare, and the potential for job displacements.

As an educator, *Dr Chow* sees the positives that AI brings to the table such as automating tedious tasks (such as grading, scheduling, managing resources, etc.), streamlining and generating content, and personalising (and possibly on-demand) learning for the learners, which would free up time for educators to focus on "higher-level" instruction, and student-educator interaction time.

Certain concepts (especially in medicine) are much more effectively communicated when shown, rather than explained verbally, suggests *Dr Chow*, and cited the example of teaching the effects of insulin on blood sugar levels. Through the use of large language models and coding, the effect of changes in basal and bolus insulin levels in a patient can now be represented visually, providing students with a simulated platform in which they can adjust insulin doses and immediately see its effects, he said.

"This approach allows students to directly engage with the concept, providing them with an intuitive understanding of the relationship between insulin dosing and glucose control," said *Dr Chow*.

"Such experiences help learners develop a deeper understanding of the physiological processes involved beyond what would be possible through lectures or textbook readings alone."

Dr Chow highlighted that aside from utilising AI to generate education-related content, educators can also tap on data-driven insights provided by AI analytics to monitor student performance in real-time, enabling timely interventions for struggling learners.

Despite bringing about many exciting changes, *Dr Chow* acknowledged that AI is not without its challenges.

"Job displacement remains a significant concern as AI may render some roles redundant," he shared. "However, it is also vital to recognise that AI (also) creates new roles and opportunities."

Bias and discrimination in AI systems pose another risk, said *Dr Chow*, and elaborates that if AI systems are trained on biased datasets, the responses reflect

that biasness. Hence, he stressed the importance of ethical AI training, and to put in place robust protocols for data governance.

"Addressing these challenges necessitates responsible AI development with a commitment to transparency and ethical practices," noted *Dr Chow*.

The expectation for the "rapid" adoption of AI is also a challenge in itself. HCPs will need to be ready to adapt to AI through education, transformation, and reskilling; all of which requires time and mindset shifts. The HCPs will also need to pick up a separate set of non-technical skills such as critical thinking, creativity, and emotional intelligence, in order to complement the AI skills acquired, said *Dr Chow*.

"(On top of that) We also need to ensure that AI systems are transparent, ethical, and accountable."



Dr Chow speaking to the attendees, in the flash.

“Artificial intelligence is here to stay, but we all recognise that the human touch cannot be replaced.”

- Dr Chow Minyang

At this moment, Dr Chow paused his SHBC talk, and revealed that 'he' is in fact a Deepfake generated speaker, where he then handed the talk over to the real Dr Chow who was seated amongst the audience.

Although all the things that the Deepfake version of Dr Chow (represented by italicised mentions of his name throughout this article) shared were accurate and crafted by the real Dr Chow, there was a "disconnect", remarked Dr Chow.

A weird mishmash of Singaporean-American accent could be heard, and a near-perfect speech (with rhythmic, and at times 'robotic' pauses) were noticed

when the Deepfake Dr Chow moved across sentences.

"There's something about speaking live (in person) compared to watching the AI (speak on behalf)," said Dr Chow, whilst making reference to the Deepfake video he created to illustrate the point that there are some things only humans can do, and AI is unable to.

"Artificial intelligence is here to stay, but we all recognise that the human touch cannot be replaced," he stressed.

"Contrary to the belief that AI will take over the world, I think the other way... that AI can make healthcare, health, and

healthcare professionals education more human again.

"AI isn't just about transforming. It is about freeing the human to do things which are higher level. Things that are worth our time, worth that human connection.

"The world feels that AI will bring us into the future. But I propose that AI will bring us back into the future. Back about 2,500 years ago... (where) Hippocrates said that wherever medicine is practiced, there is a love for humanity. I believe that AI, with all its promises of efficiency, will free us to return to the heart of healthcare, the patient, and to the heart of education, the learner," concluded Dr Chow.

Read more about Dr Chow, A/Prof Ang, and Dr Teo's HuMe-AiNE framework in the Nov 2024 – Feb 2025 issue of Lifewise!



Ethics of AI in Medicine Explored at Inaugural Education Rounds

By Dr Winnie Teo

A key concern surrounding the use of Artificial Intelligence (AI) in healthcare and medical education is about the ethical use of AI. Clinical educators from NHG gathered for the inaugural Education Rounds (EduRounds) session on 21 Aug 2024 where invited speaker, Dr Jasmine Ong (Principal Clinical Pharmacist, Singapore General Hospital) shared her article "Medical Ethics of Large Language Models in Medicine", which was published in June in the New England Journal of Medicine (Artificial Intelligence).



Panelists (from left): A/Prof Aaron Ang, Dr Jasmine Ong, and Dr Chow Minyang

Dr Ong's discussion about her paper was prefaced by Assistant Professor Chow Minyang [Consultant, General Medicine, Tan Tock Seng Hospital (TTSH)], who introduced the audience to some of the ways in which Large Language Models (LLMs) could transform medicine and education: in generation of content, in summarisation, translation, classification, and in development of chatbots. While this meant that LLMs could potentially save educators much time, Dr Chow urged educators to use the time saved to invest in what mattered to them most, for example, teaching complex issues to their learners.

Dr Ong shared that LLMs demonstrate emergent properties; that is, they develop new functionalities and features when they are trained with larger and larger datasets. Moreover, the ability to integrate different types of input, such as text and images mean that there are increasingly diverse ways that LLMs can be used. The transformative power of AI in healthcare has raised a lot of concerns about the ethical risks of these AI models. In fact, shortly after the release of ChatGPT, key technology leaders like Elon Musk, had called for a pause on AI development in order to fully study and understand the risks associated with AI use.

who has access to the data used to train AI algorithms, and how data is being shared and used. Another area of ethical risk lies in transparency and accountability – how are users able to understand the decision-making process in AI systems, and who should be held accountable for these.

The EduRounds session ended with a panel discussion moderated by Associate Professor Aaron Ang (Senior Consultant, Department of Psychiatry, TTSH), who fielded questions from the audience ranging from implementation timelines for AI systems, to struggling with ChatGPT hallucinations – false information due to the AI model generating responses based on patterns learned from not having access to real-time data, or the ability to verify facts.



Some 50 clinicians attended the inaugural Education Rounds

**EduRounds sessions are organised by NHG Clinical Education to feature interesting and timely published articles, shared by the author, and moderated by a clinician educator.*

Do look out for news about coming EduRounds on our Faculty Hub at: <https://for.sg/nhgfacultyhub> (Teams App)

Not a part of the NHG Faculty Hub?

Register here: <https://for.sg/nhgfacultyhubteamschannel>

Or Email: fmrt@nhg.com.sg





Inaugural NHG Residency Recognition Dinner: Celebrating New Beginnings

Seventy-two junior and ninety-three senior residents from National Healthcare Group (NHG) marked the next phase of their medical careers at the inaugural NHG Residency Recognition Dinner, held at the Goodwood Park Hotel on 30 Aug 2024.

The dinner, attended by more than 160 residents, faculty members and NHG senior leadership, saw the promotion of the junior residents to senior residents, senior residents graduating as specialists from residency training, and celebrated the achievements of the outstanding resident awardees.

Distinguished guests included Group Chief Executive Officer (GCEO) Professor Joe Sim; Deputy GCEO (Strategy, Planning & Resourcing) Professor Jason Cheah; Deputy GCEO (Clinical & Academic Development) Professor Chin Jing Jih; NHG Polyclinics CEO Dr Karen Ng; Group Chairman Medical Board (CMB) (Clinical) Professor Lim Tock Han; and the CMBs from Khoo Teck Puat Hospital & Yishun Community Hospital, Tan Tock Seng Hospital, and Woodlands Health.

"I want to thank all of you for choosing NHG to be the place to train. For those of you who are joining us (as specialists), we look forward to having you as part of our senior team... (and) for those who are not, I would also like to congratulate you, and wish you well, because we are very confident that we have trained you well, and geared you for success," said Prof Sim, in his opening address.



**I want to thank all of you
for choosing NHG to be the
place to train."**

- Prof Joe Sim



Prof Joe Sim congratulated and shared healthcare insights with the graduands and new senior residents as they move to the next chapter of their medical journey

He pointed out that the graduands and newly promoted senior residents are entering an exciting phase in their medical careers and healthcare.

Prof Sim elaborated that with the many significant changes in healthcare such as the shifting of care from hospitals to the community, the move towards team-based and transdisciplinary practice, the focus on population health, along with NHG's expansion plans and increased focus on research, the current batch of residents and graduates will be at the height of their careers when it comes into force.

"Many of you will be taking on leadership roles, leading many of these changes, leading the charge, taking us to new heights... That is when all these (plans) will come together," he added.

"So, it's (a) very exciting time for all of you. And that's why I want to urge you to soldier on, to keep learning, to keep improving and sharpening yourself.

"I wish you all the best and continue to work hard. There will be many challenges along the way, but take comfort in that, you are not alone."



**NHG Residency, Designated Institutional Official,
Dr Llewellyn Lee giving his closing address**

Prof Chin urged both graduands and attendees to be empathetic, bridge the inter-generational gap between clinicians, and adapt to healthcare's ever-changing landscape.

"We need to continue to try to understand and empathise. I think for our patients, empathy is the thing that bridges the cold hard data that we have with the art of healing... and for our colleagues, it is important for us seniors to learn to adapt and understand our juniors. (As) for the juniors, to understand where your seniors are coming from," he said.



We need to continue to try to understand and empathise. I think for our patients, empathy is the thing that bridges the cold hard data that we have with the art of healing..."

- Prof Chin Jing Jih

"If we do not address this issue, instead of inter-generational solidarity, we will get inter-generational competition, and misunderstandings that are going to weaken our system."

On the topic of adaptation, Prof Chin stressed that "AI (artificial intelligence) will not replace everyone. It will only replace those who refuse to adopt AI".

"I hope that all of you will be adaptive, resilient, and will continue to meet these changes," he said.

In his closing address, Dr Llewellyn Lee, Designated Institutional Official, NHG Residency, highlighted the importance of being humble, regardless of how senior or experienced a clinician becomes.

"There will always be things that you do not know," he said.

"So you must definitely continue learning."



Prof Chin presented the awards to the newly promoted senior residents



Woodlands Health Learning Festival:

Learning to Unlearn and Re-Learn

By Ms Elisa Arumugam, Ms Kan Jia Hui, and Mr Elson Lim



It was a vibrant sight at Woodlands Health (WH) on 5 Sep, as it held its inaugural Learning Festival which brought together WH staff, educators, and invited guests from NHG institutions to explore the future of healthcare, and celebrate the power of knowledge and connection. The Learning Festival, which will be a yearly event at WH, aims to celebrate learning, the connection between individuals, and the sharing of skills and knowledge.

In the opening address, Professor Nicholas Chew (Chairman Medical Board, WH) and Ms Pua Lay Hoon (Chief Nurse, WH) highlighted WH's journey of learning and growth since its startup to the opening of the hospital, and acknowledged the invaluable contributions of educators who play a crucial role in training and educating the next generation of healthcare professionals.

Both Prof Chew and Ms Pua shared that this year's theme of "Learn.UnLearn.Relearn" resonates deeply with WH's journey from its pre-operations phase to the opening of its hospital campus. The emphasis on adaptation, innovation and commitment to lifelong learning in today's rapidly evolving healthcare landscape, is very much a part of WH's DNA.

Prof Chew took the opportunity to reaffirm WH's commitment to strengthen its processes and enhancing its hospital services through this cycle of learning, unlearning, and relearning.

The festival kicked off with a special edition of Hospital Seminar on the topic of "Cultivating Saplings to Grow into Great Trees: Developing Clinical Education in Our New Hospital", with WH clinicians sharing their

experiences in creating a supportive clinical learning environment.

Two Development Awards, namely the WH Sponsorship for Formal Education, and MOH In-service scholarship/sponsorship, were also presented at the festival to celebrate and recognise the awardees' commitment in continuous learning and professional development.



Keynote speaker Dr Vaikunthan Rajaratnam





Prof Chew guiding the participants through some basic photography principles

With the advent of Artificial Intelligence (AI) in healthcare, keynote speaker Dr Vaikunthan Rajaratnam (Senior Consultant, Orthopaedic Surgery, Khoo Teck Puat Hospital) urged the audience to embrace the change that technology and AI will bring, by unlearning work processes

(often old and obsolete practices), and relearning new skills and practices. He provided insights on harnessing the power of AI to effectively adapt to the rapid advancements in healthcare; and even provided hands-on demonstration on generative AI tools such as GeminiAI and ChatGPT, which captivated the audience.

Participants were also treated to a series of masterclasses covering a wide variety of topics including identifying career development needs, leveraging digital tools in teaching and learning, building and sustaining a community of practice, and harnessing the power of simulation in healthcare education.

Beyond formal presentations, the festival offered a variety of activities, including a Mix & Mingle session over lunch, and a "Blind Date with a Book" booth, that provided participants with the unique opportunity to discover new reads. Participants were given the chance to bring home a piece of book – kindly donated by WH Senior Management.

Participants also had the opportunity to hear inspiring stories from scholarship recipient, Ms Michelle Segal-James (Advanced Practice Nurse, General Medicine, WH), who

recounted how the support from colleagues and loved ones motivated her when she embarked on her Master of Nursing and Advanced Practice Nurse journey; and Ms. Joanne Kong (Principal Radiographer and Clinical Educator Lead for Diagnostic Radiography, WH), who shared the profound impact that her students and mentors have had on her, and how it inspired her to become and continue to strive as an educator.

The day ended with a Photo Walk session led by avid photographer, Prof Chew. Participants learned photography tips, and got new profile pictures taken using the new skills they learnt. The session, aptly captured the essence of the festival, and most importantly, the act of learning, i.e. to shift or take on a new perspective when learning something new or challenging.

Note from the contributors:

The inaugural Learning Festival was a resounding success, and it provided the participants with valuable opportunities to learn, connect, and be inspired. With that, we hope to see everyone and more at next year's Learning Festival in WH!



Masterclasses on a range of topics were organised for the Learning Fest



Woodlands Health Welcomes Inaugural Batch of PGY1s

Current and future Post-graduate Year 1s (PGY1s) can now add Woodlands Health (WH) into their list of institutions within the National Healthcare Group (NHG) – in addition to Khoo Teck Puat Hospital and Tan Tock Seng Hospital – when they seek to complete their year-long training between basic medical education and full/conditional medical registration. This brings the training capacity of PGY1 within NHG to more than 180.

The inaugural batch of 18 PGY1s commenced their training at WH on 4 Sep 2024 to the warm reception by WH and NHG Residency leadership.

"We are very happy that you are here!" said an elated Professor Nicholas Chew, Chairman Medical Board, WH. "It's (PGY1 training at WH) a few years in the making."



As the first batch of PGY1s at WH, we must make it a memorable posting for all of you... so that you can tell everyone else that WH is a nice place to learn."

- Prof Nicholas Chew

Prof Chew shared that a hospital (especially a newly-opened one like WH) "is not complete" until it starts to contribute to the development of the future generation of doctors.

"As the first batch of PGY1s at WH, we must make it a memorable posting for all of you... so that you can tell everyone else that WH is a nice place to learn," he quipped to the laughter in the room.

Taking a more serious tone, Prof Chew assured the new PGY1s that during their four-month posting, they will not only be taught well, but also tested and treated well. "It's not just about work,



WH Chairman Medical Board, Prof Nicholas Chew, giving his welcome address

it's not just about the learning, but it's also the relationships that you form, and that sense of belonging," he said.

Prof Chew also stressed on the importance of asking when in doubt, and urged the PGY1s to flag out any issue within the hospital that they deem unsafe.

"You will notice that there are some minor differences in our system... our workflows. So whenever you are in doubt, please ask somebody," said Prof Chew.

"We (management) only know that something is not safe when you tell us it is not safe.... as we can't be physically present everywhere," he explained.

"There is nothing wrong with flagging things up... I would rather you flag it up as a concern, we investigate, and learn that it is safe (or not)."

Dr Lim Wen Phei, Associate Designated Institutional Official (WH), NHG Residency, who was also present said: "I assure you that together with our management, you will be treated as one of our own.

"(And) you will work hard, and play hard... and I look forward to seeing you guys in the wards."



The inaugural PGY1 cohort together with the PGY1 programme faculty and administrative staff

Ending the Year with Recognition and Appreciation

58 NHG Medical Educators and Departments ACE-d NUS Awards



Fifty-eight medical clinician educators (CE) and departments from the National Healthcare Group (NHG) were recognised for their excellence in training and mentoring students from the National University of Singapore Yong Loo Lin School of Medicine (NUSMedicine), during the NUSMedicine Appreciation of Clinical Educators award ceremony held on 15 Oct 2024.

This year, three departments from Tan Tock Seng Hospital (TTSH): Anaesthesiology, Intensive Care & Pain Medicine; General Medicine; and Orthopaedic Surgery, were awarded with the Clinical Training Excellence Award for achieving posting scores of at least 3.8 (out of 4), and teaching scores of at least 4.5 (out of 5) for two consecutive academic years. Seven departments from Khoo Teck

Puat Hospital, NHG Polyclinics, and TTSH were awarded with the Clinical Training Merit Award, for achieving posting scores of at least 3.8 (out of 4), and teaching scores of at least 4.5 (out of 5) in the last academic year.

“Thank you for your commitment, dedication and passion to teaching and mentoring our next generation of physicians,” said Associate Professor Faith Chia, Cluster Education Director (NHG), to the recipients in her opening address.



58 NHG medical clinician educators and departments were recognised for their excellence in training and mentoring NUSMedicine students

Dean of NUSMedicine Professor Chong Yap Seng also expressed his thanks to all CEs for teaching and imparting their knowledge and skills to the NUSMedicine students during their clinical postings.

"Your devotion and commitment to nurturing tomorrow's doctors is deeply appreciated and your efforts cannot be overemphasised. With your support, I'm confident that our students enter the workforce competent, compassionate, and well prepared to advance the health foundation as the school rolls out an enhanced curriculum that seeks to equip students with the necessary skills and aptitude to take on the evolving healthcare challenges," he said.

Urging all CEs to continue learning, Prof Chong cited a renowned quote by Nobel Prize winner Rabindranath Tagore: "A lamp can only light another lamp when it continues to burn its own flame".

He elaborated that "a teacher can never truly teach unless he is still learning", and hopes that the flame in all CEs continue to burn brightly, so that they can continue to "guide the way for others".

"Every one of us here today owes our success to the people who took time, effort and made personal sacrifices to guide us in our professional and personal journeys," added Prof Chong.

Prof Lau Tang Ching, Vice-Dean (NUSMedicine), closed the ceremony with a few words of appreciation.

"I think that the secret to success is to continue having meaning and purpose as we help to cultivate the next generation of students and healthcare professionals," he said.

"We look forward to working with all of you to ensure that all our graduates in Yong Loo Lin School of Medicine continue to contribute to the healthcare of Singapore, and (I hope) that all of us will continue to enjoy teaching them.

"And with that, we extend our heartfelt thanks to all of you for joining us in celebrating the dedication of our educators."



Your devotion and commitment to nurturing tomorrow's doctors is deeply appreciated and your efforts cannot be overemphasised."

- Prof Chong Yap Seng



This year's Dean's Honour Roll recipients include: Adj Associate Professor Chia Yew Woon (pictured, left) and Clinical Associate Professor Siow Jin Keat

[Click here to view the full awardees' list.](#)



Record Number of NHG Clinicians and Departments Received NTU LKCMedicine's Special Recognition Awards



Clinicians and departments from the National Healthcare Group (NHG) received twenty-nine out of the 70 Nanyang Technological University (NTU) Lee Kong Chian School of Medicine (LKCMedicine) Special Recognition Awards on 11 Nov 2024, for their outstanding efforts in teaching, mentoring, and supporting LKCMedicine students in academic year 2023/2024.

This year's award ceremony saw a three-fold increase in NHG consultants receiving awards, including Woodlands Health's first recipient, Dr Alicia Ang Xin Yu (Consultant, Infectious Diseases).

Dean of LKCMedicine, Professor Joseph Sung, expressed his appreciation to the "3,611 clinical educators who have contributed to a total of more than 89,000 student-days of clinical training for LKCMedicine students".

"These numbers reflect the remarkable efforts and contributions of our clinical partners, and we are truly appreciative of your commitment to advancing excellence in medical education," he said.

Prof Sung also took the opportunity to thank the clinician educators and faculty for their invaluable contributions and inputs to help LKCMedicine enhance and customise its new NTU MBBS curriculum to better address the needs and priorities of Singapore's evolving healthcare landscape.

"On behalf of our faculty, students and the entire medical school community, I extend my deepest appreciation to all of you and heartiest congratulations to the winners of the LKCMedicine Special Recognition Awards on this well-deserved recognition," he concluded.

In her address, Professor Jennifer Cleland, Vice-Dean of Education (LKCMedicine), highlighted the importance of clinical exposure and specialty rotations. She shared that there is a "huge amount of evidence that shows the experience that students have in clinical placements will influence their career making decision" upon graduation.



The fact that you (NHG) take our students, and you give them such excellent learning opportunities is absolutely key to developing (them to be) the doctors of tomorrow."

- Prof Jennifer Cleland

"Having a good clinical experience will influence what specialty the students choose, it will also influence where they choose to work when they graduate, or when they are applying for a place in residency," said Prof Cleland.

"The fact that you (NHG) take our students, and you give them such excellent learning opportunities is absolutely key to developing (them to be) the doctors of tomorrow.

"I urge you to (continue to) give them the best experience possible. Thank you again."



Prof Jennifer Cleland, Vice-Dean (Education), NTU LKCMedicine, expressing her thanks and appreciation

[Click here to view the full awardees' list.](#)