

MediCine

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THE HEART OF CARDIOVASCULAR DISEASE RESEARCH

Shaping the future of
cardiovascular health

LESSONS ON LEADERSHIP

What the majestic gut
microbiome can teach us
about leadership

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THE NUS MEDICAL SCHOOL AT 117

Going beyond medicine's
traditional frontier

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MediCine

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NUS Yong Loo Lin
School of Medicine

Dean's Message

Dear Reader,

Are you a long-distance runner? Do you regularly participate in high-intensity exercises that emphasise endurance, subjecting the cardiovascular system to a high level of stress? Then the study in sudden cardiac failure in athletes that our clinician-scientists are conducting will be of particular interest to you. They are seeking answers to two key questions, which lie at the heart (no pun intended) of the study: Why do seemingly fit runners suddenly collapse and die? What underlying conditions do these athletes harbour that defy easy detection?

Cardio-metabolic disease may be hidden and unexpected, even among athletes and those who are health conscious, although estimates of disease prevalence among this group vary widely. Cardio-metabolic disease refers to medical conditions where the heart works defectively because of abnormal energy and nutrient utilisation. Professor Roger Foo, Director of the Yong Loo Lin School of Medicine's Cardiovascular Translational Research Programme, suspects that a lot more can be done to assess and uncover the cardio-metabolic health status of runners. Additionally, how many people who participate in endurance races and sports that put prolonged stress on the cardiovascular system are at risk of disease? Does high-performance running impact cardio-metabolic health? What can be done to detect these conditions before they present with catastrophic results?

Roger and his co-investigator, Dr Mayank Malakoti are collaborating with the IRONMAN Group, organisers of the Standard Chartered Singapore Marathon

2022 on a long-term study to find the answers to these questions. They have recruited more than 1,000 participants for the study, which will involve questionnaires and history-taking. "Through questionnaires initially, we will gather data on current medical histories, family histories and exercise, dietary and behavioural information. In the longer term, we aim to carry out multi-layers of clinical analysis to measure cardio-metabolic parameters and identify effective biomarkers for assessing cardio-metabolic health," he says.

In a separate research initiative, NUS Medicine staff are partnering colleagues from the Singapore General Hospital to understand the mysterious workings of a gene that regulates bile acid composition in patients with Type 2 diabetes. There is urgency to the task—the prevalence of diabetes increased from 8.8% in 2017 to 9.5% in 2020 and the number of Singaporeans suffering from diabetes is estimated to hit one million by 2050. The team is exploring different methods to target this gene and hopes to develop new treatment options to treat and prevent Type 2 diabetes.

Our research work has also found its way to the small screen: I invite you to view four newly released CNA documentaries featuring research in immunology, nanomedicine, cancer and cardiovascular diseases. In these episodes, our researchers share their journeys, aspirations and motivations for finding a cure for dengue, turning milk into medicine for gut diseases, advocating personalised therapies for cancer patients and how they shape the future of cardiovascular health (See pages 32 to 37).



“

All in, it is a good, brisk start to 2023. We can look forward to more good news, which I will share with you in subsequent editions of our news magazine.”

And to conclude on this happy note, we congratulate NUS Medicine alumna Dr Ching Ann Hui (Class of 2022) on being awarded a Rhodes Scholarship. She joins 100 scholars from around the world to pursue fully-sponsored postgraduate studies at the University of Oxford in October 2023. The Rhodes Scholarship, which was established in 1903, is the world's preeminent and oldest graduate fellowship. Every year, one outstanding applicant in Singapore will be selected for the scholarship. Recipients of the scholarship are young people with proven academic excellence who also show exceptional character, leadership, the energy to use their talents to the full and a commitment to solving humanity's challenges.

All in, it is a good, brisk start to 2023. We can look forward to more good news, which I will share with you in subsequent editions of our news magazine.

Happy reading.

Yap Seng



A MEGICAL NUS Medicine Educators' Day 2022

BY LIM PEIYING, SENIOR EXECUTIVE, DEAN'S OFFICE, NUS MEDICINE

Educators from NUS Medicine came together in person for the first time since 2019 for NUS Medicine Educators' Day to celebrate the School's milestones in medical education.

NUS Medicine's Dean, Professor Chong Yap Seng, lauded the adaptability and resilience of educators in light of the COVID-19 pandemic, disruptions caused by Russia's invasion of Ukraine and geopolitical tensions in Asia. "Medical education has to go beyond the teaching of Medicine in order to better equip our students for the future," the Dean said. "With innovation being the currency of the future, doctors and scientists must continue to think beyond and pursue what seems impossible and attempt new things," he added.

Keynote speaker Associate Professor Clement Tan, Director for the Division of Graduate Medical Studies (DGMS) first outlined the evolution of postgraduate medical education in Singapore. Before 1986, postgraduate medical students could only attain their masters by taking and passing exams offered by overseas colleges. Fast forward to today, NUS Medicine DGMS now offers a standalone Residency programme also known as the Accreditation of Postgraduate Medical Education, Singapore (APMES). He then described the various methods for assessing professional competence,

from blueprinting to selecting appropriate test formats and sampling adequately. He opined that the increasing use of technology-enhanced learning would soon become a norm.

Assistant Professor Kathleen Agres from the Yong Siew Toh Conservatory of Music, the second keynote speaker, chronicled the use of music in healthcare and talked about how music-based complementary medicine can support health outcomes. Dr Agres showed a clip on the healing power of songs in helping dementia patients recall certain memories and how music can be used as an aid in the rehabilitation of Parkinson's patients. She also highlighted the opportunity to leverage technology such as integrating music into real-time systems to treat different disorders.



The highlight of NUS Medicine's Educators' Day was the finals of the Medical Education Grand Innovation Challenge (MEGIC). The third edition of the annual event saw more NUS Medicine students participating. Eight finalist teams presented their ideas and work to a panel of judges—Associate Professor Lee Kooi Cheng, Director of

the Centre for English Language Communication; Associate Professor Soo Yuen Jien, Director of the Centre for Development of Teaching and Learning and Associate Professor Seow Teck Keong, Deputy Director of the Centre for Development of Teaching and Learning.



Scan to learn more about the MEGIC 2022 projects here:

First Prize

Team **EnPointe** emerged **first prize** winners, having impressed the judges with their innovative idea of using Artificial Intelligence (AI) and machine learning to analyse trainees' performances in ultrasound-guided procedures. The agar-based phantom model developed by the team aims to provide an inexpensive, durable and safe method for medical students to practise and at the same time, receive real-time feedback from the AI model.

Team members: Dr Deborah Khoo Xian Li, Ms Flora Xu Wen Xin, Dr Amanda Choo Min Hui, Dr Ong Shao Jin and Dr Pamela Ting Li Ming.



Second Prize

Team **IlluminiSafe** bagged the **second prize** for their development of IlluminiSafe, a non-toxic fluorescent indicator to simulate biological contamination. The team developed a water-soluble non-toxic indicator solution that is highly customisable and cost-effective to produce, compared to existing products.

Team members: Dr Ong Shao Jin, Mr Chia Koon Liang, Ms Lim Wen Yi Claire, Ms Liu Chunxi, Mr Matthew Scott Lau Wen Jiang, Dr Ang Wei Leng Bertrand, Dr Calvin Jianyi Koh, Dr Deborah Khoo, Dr Raj Kumar Menon, Dr Su Peijing, Dr Teo Li Lin Lycia, Adj A/Prof Ho Bow, A/Prof Quek Swee Tian, and Prof Paul Anantharajah Tambyah.



Third Prize

Team **Guardians of the Galaxy** won the **third prize** for their innovation of a unique team-based escape room experience to teach medicolegal concepts to students. The unique gamified curriculum, integrating the use of an escape room and flipped classroom concept, aims to provide students an immersive hands-on experience on the application of medical concepts taught in class.

Team members: Mr Chng Hao Sheng Alvin, Ms Chua Xin Ying, Anastasia, Mr Kaveen Kumar S/O Suriakumaran, Ms Ng Min Hui, Mr Wang Yu Hang, Ms Yang Yuxiu, Mr Yee Ting Hui, Dr Chua Joo Wei, Dr Tan Li Feng, and Dr Soo Shuenn Chiang.



Best Video

Team **VE-RA** clinched the title for 'Best Video' with their idea of using Virtual Reality (VR) to provide a realistic environment for students to practice their anesthesia skills before moving on to real patients.

Team members: Dr Leong Kwong-Ming, Dr Quek Jinlin Terence, Dr Simon Tan Yong Sheng, and Dr Vera Lim Qin Yi.





Masonic Charitable Fund – Ronald Ng Establish Bursary

*NUS Yong Loo Lin School of Medicine (NUS Medicine) recently received a \$150,000 endowed gift to establish the **Masonic Charitable Fund – Ronald Ng Lodge Mt Faber Bursary**. A gift agreement was signed on 26 October 2022 by Dr Brian Shegar, Chairman of Masonic Charitable Fund (MCF), Dr Ronald Ng, senior mason and donor for the Masonic Charitable Fund – Ronald Ng Lodge Mt Faber Bursary and Prof Chong Yap Seng, Dean of NUS Medicine.*

The gift will enable the School to award up to two bursaries, of up to \$6,000 each, annually, to help financially needy Singaporean students.

“The Masonic Charitable Fund and Dr Ronald Ng’s intention to help disadvantaged students with this gift is truly honourable and will be important for NUS Medicine, as we prepare our

undergraduates to be the competent, compassionate and future-ready doctors that Singapore needs,” said Prof Chong.

NUS Medicine deeply appreciates the MCF and Dr Ronald Ng’s generous support to provide bursaries, which will help deserving needy students to pursue their dreams and serve Singapore as caring and capable doctors.

“

The Masonic Charitable Fund which has established several endowments with NUS College of Design and Engineering, is pleased to undertake its first endowment with the NUS Medicine, to provide bursaries to financially disadvantaged medical undergraduates.”

Dr Brian Shegar, Chairman of MCF



(Right to Left) Dr Brian Shegar, Chairman of MCF, Mr Lee Keng Li, Assistant Director of the Development team, Dean’s office, NUS Medicine, Mr Randall Lee, member of Lodge Mt Faber, Ms Valerie Lee, Head of Department (Development), Dean’s Office, NUS Medicine, Dr Raja Kamal, Senior Director, NUS Medicine International Council, Mr Michael Gray, Trustee of the MCF, Mr Timothy Grant, Master of Lodge at Mt Faber, Dr Ronald Ng, donor for the MCF – Ronald Ng Lodge Mt Faber Bursary and Prof Chong Yap Seng, Dean of NUS Medicine at the signing ceremony.

Global Recognition for Research on Healthy Ageing in the Community

Promoting healthy ageing in the community through intergenerational programmes, developing a competent healthcare workforce and enhancing nursing education. These are some facets of Assistant Professor Vivien Wu Xi's research in the Nursing sector that have gained international recognition, making her one of five winners for a prestigious global award.

The National University of Singapore Alice Lee Centre for Nursing Studies (NUS Nursing) researcher received the 2022 Emerging Nurse Researcher/Scholar Award in July this year, at the Sigma Theta Tau International Honour Society of Nursing's 33rd International Nursing Research Congress.

"It is not about my name, my name is small, but hearing the announcement made me really proud that Singapore is represented on this international

platform," says Asst Prof Wu. She is Singapore's first recipient of this award.

The award was created in 2015 to recognise early-career nurse researchers and scholars whose work has influenced the profession and the people it serves.

Asst Prof Wu, a Nursing sector veteran with more than two decades of working experiences, was one of five awardees who each represented a geographic region—Asia, Europe, Latin and South

America/Caribbean, North America and Oceania.

Speaking about her research on community-based e-health programmes for older adults living with chronic diseases, Asst Prof Wu said Singapore is a place where Nursing initiatives can take root and grow. This boils down to efforts by the government in promoting digital literacy for the older population, along with a supportive social-cultural environment. She cited research findings that show many still require training and support to use the various e-health platforms despite a rapid increase in the number of older people going online.

These telehealth applications have supported healthcare workers during the COVID-19 pandemic, noted Asst Prof Wu, while also facilitating the care of older adults and ensuring they comply with the treatment. She added that older



Photo: 2022 Emerging Nurse Researcher/Scholar Honorees.

adults are also concerned about barriers such as a lack of access to technology—something which can be overcome with volunteers' support in the community. To further develop the field of Nursing research, there has to be a stronger focus on mentorship and peer support programmes, said Asst Prof Wu.

Reflecting on her own career, she shared that she had benefited from the advice, resources and ideas of more experienced senior academics and researchers over the years. Now she proactively steps up and gives back to the Nursing community by mentoring junior researchers. Asst Prof Wu currently leads a research team consisting of research assistants and graduate students. She explained that studies had shown that mentoring and peer support improve research productivity and the overall well-being by providing a supportive learning environment.

"I know I need to serve sincerely, with heart, and to nurture and develop our young talents. In this journey, I have also developed my mentorship and leadership skills in nurturing the next generation of nurse leaders in research and education."

She noted, however, that the infrastructure for Nursing research in many countries is still developing. "Postdoctoral Nursing researchers generally work in different fields or contexts, combining their work in research, education and other fields."

They also face challenges developing and sustaining careers in the field, due to lack of career opportunities, she added.



It is not about my name, my name is small, but hearing the announcement made me really proud that Singapore is represented on this international platform."

Asst Prof Vivien Wu Xi, Singapore's first recipient of Emerging Nurse Researcher/Scholar Award

Asst Prof Wu is currently focusing her research on programmes that promote healthy longevity for the older adults in Singapore. She aims to help this vulnerable group better self-manage their chronic conditions by tapping on the power of technology.

"World ageing has become one of the most significant social issues in the 21st century. A large proportion of older adults are living with multiple chronic diseases, and managing their health in the community is a major public health concern."

She stressed the need for academics to work in close collaboration with community partners to create and sustain healthy ageing programmes and enhance the physical, mental, cognitive and psychosocial well-being of the older adults in society.

Citing the support from her peers and colleagues, Asst Prof Wu said

she was honoured to receive the Emerging Nurse Researcher/Scholar Award and believed her work would have real impact for society.

She thanked NUS Nursing head Professor Emily Ang and other senior colleagues, along with her research team members, for their insights, experiences and hard work in contributing to research efforts. She also expressed her gratitude to the older adults and staff in the community, who supported and believed in her team's work and mantra.

"I am glad to be able to make an impact on the global platform through my research," said Asst Prof Wu.

"I am confident that my research work will continue to promote the physical, cognitive, mental and psychosocial well-being of older adults and professional development for nurses."



Assistant Professor Vivien Wu Xi (third from left) receiving the 2022 Emerging Nurse Researcher/Scholar Award.

Can the Majestic Gut Microbiome Reveal Lessons on Leadership?

BY ASSOCIATE PROFESSOR KEVIN SW TAN, HEAD, DEPARTMENT OF MICROBIOLOGY AND IMMUNOLOGY, AND VICE-DEAN FOR GRADUATE STUDIES, NUS YONG LOO LIN SCHOOL OF MEDICINE

Among the various themes of the English poet William Blake's 'Auguries of Innocence', recognising the fragile beauty and balance found within nature resonates with the microbiologist in me.

The first sentence of his poem, 'To see the world in a grain of sand' reminds us that there is depth and beauty in mundane objects, if one would only stop to ponder on its many dimensions. I am pleased to write the inaugural article in this series with the theme 'The world in a grain of sand'. In the coming issues, my colleagues from the Department of Microbiology and Immunology will bring you into a wondrous world of microbes and immunity. They will share their insights as experts in their domains of research and education, and perhaps help us appreciate this microscopic world, its complexities, and the secrets it can reveal if only one stops to wonder, and ruminate.

The magnificent microflora of the gut

Once thought to be distinct from our own tissues and organs, the trillions of bacteria that reside in our gut have, in recent decades, been acknowledged to constitute a core component of our physiology and are not mere tummy travellers. These are collectively called microbiota and comprise over a thousand species of bacteria that, in a healthy individual, play vital

roles in digestion, metabolism, gut health and immunity.

The gut is also connected to our central nervous system through the vagus nerve, and the microbiota regulates the production of molecules that affect mood and behaviours (that's why balanced diets can promote happy feelings). New sequencing technologies have unravelled some interesting characteristics of this collection of bacteria. A key observation is that a healthy gut would be made up of many different bacteria

gene sequences, indicating that many microbes reside there. This genetic diversity allows the bacteria to perform a bewildering array of physiological functions, with each function often being fulfilled by more than one group of bacteria. When this balance is disturbed, either through stress, cancer or some other undesirable stimuli, this diversity is lost, and often, certain disease-promoting groups of bacteria flourish. These pathogens can cause gut diseases directly, or through the loss of collective metabolic functions afforded by the microbiota. Blake would have appreciated that microbial balance and diversity are important requisites for gut health!



Enter the ecosystem engineer

Bacteria are not the only microbial inhabitants of the human gut. There exists a much smaller faction of a physically larger, yet often overlooked group, called the single cell eukaryotes, or SCEs. These comprise yeasts (think *Saccharomyces cerevisiae*) and protists, such as amoebas and flagellates. Our laboratory has in recent years investigated the role of *Blastocystis*, a common SCE of the gut. Fortuitously, we keep a collection of various genetic types (called subtypes, or STs) in our laboratory which allows for the study of microbiome changes using laboratory models of colonisation. *Blastocystis* ST7, which is common in Singapore and the region, was associated with a loss of bacterial diversity in hospital patients suffering from diarrhoea. In laboratory models, *Blastocystis* ST7 killed off good bacteria, promoted pathogen growth, caused loss of diversity, which in turn led to an increase in inflammatory cells under the gut lining and decrease of short-chain fatty acids (healthy metabolites produced by bacteria). Worryingly, when laboratory models were induced to undergo gut inflammation, adding ST7 exacerbated the disease.

In the West, a different, yet microscopically indistinguishable, ST is prevalent. ST4 is the most common ST in Europe and North America. Oddly, from microbiome surveys in Europeans, ST4 carriers had higher microbiome diversity, and by extension, better gut health, compared to non-carriers. We reproduced these findings in laboratory models and showed that introducing ST4 into laboratory models resulted in greater microbiome diversity and increased production of beneficial metabolites. Startlingly, in colitis (gut inflammation) models of disease, adding ST4 accelerated recovery, dampened inflammation, promoted beneficial bacteria growth and kept the numbers of disease-promoting

bacteria at bay. ST4, in essence, behaves like a probiotic, enhancing gut health.

Upon rumination, one can glean several insights from these studies. *Blastocystis* ST4 and ST7 look identical, are genetically similar, yet have striking, and opposing effects on the gut. In a recent major study, a side-by-side comparison of these two STs in laboratory models of colonisation confirms that ST4 behaves like a health supplement while ST7 is clearly toxic to the microbiota ecosystem.

Can the Blastocystis-Microbiota relationship reveal leadership lessons?

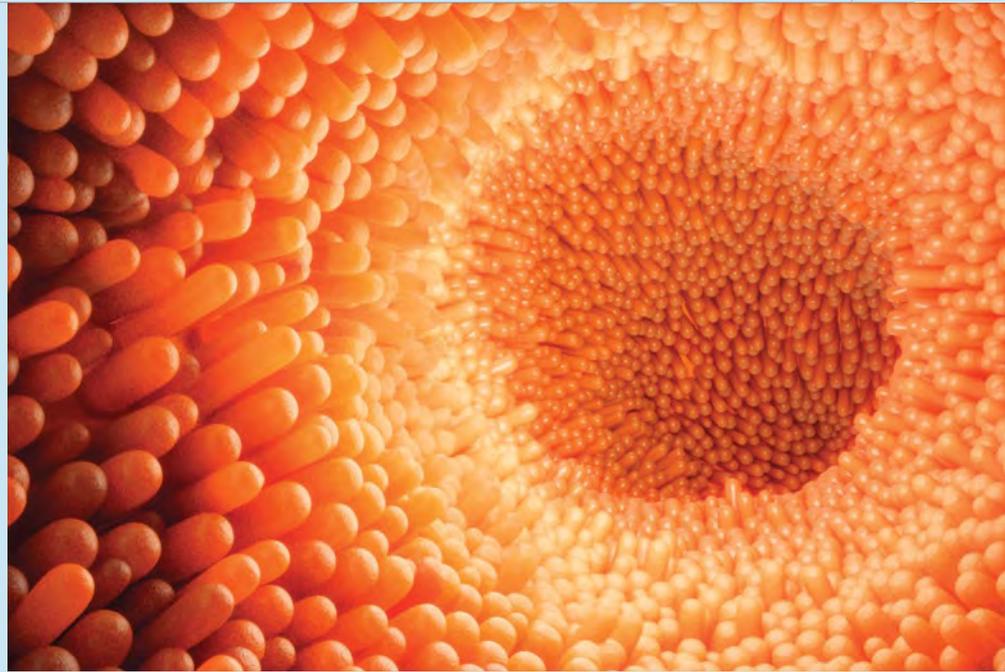
When I reflect on my seven years serving in the Dean's Office, first as Assistant Dean, and subsequently as Vice-Dean, and the last two years as Head of Department, I wonder if I relish stress and suffering! Or does the opportunity to improve the lives of others in my community outweigh the punishing cost (and sacrifice) of administrative service? In preparing for this article, I decided to share my reflections of what constitutes effective leadership, but at the intersection of research and service, with a focus on the humble and beneficial protist, *Blastocystis* ST4.

1. Like ST4's influence on the gut microbiome, effective leaders promote diversity in their workplace, hire team players and create a resilient environment, that can weather challenging periods. Diversity allows for complementary skill sets to coexist, promotes collegiality, and increases well-being within the community.
2. ST4 is considered an understudied, neglected parasite (which is an inaccurate label) by the general scientific and clinical community. Yet it is clear that it engineers the microbiome in a positive manner. Effective leaders shun the limelight but use their skills to empower and enable teams. Such teams inevitably produce good outcomes (good metabolites) and positively impact the School (host).
3. Effective leaders are agile and react quickly to solve problems, whenever these arise, no matter if difficult decisions need to be made. In laboratory models that were triggered to undergo gut inflammation, the administration of ST4 resolved the disease quicker, through multiple mechanisms. Conversely, priming the gut with ST4, created a resilient microbial ecosystem that could mitigate the effects of toxic colitis triggers (see 1).



So, let's flip the switch and use *Blastocystis* ST7's impact on the microbiome as an analogy for ineffective leadership.

4. Poor leaders suppress good staff and promote those who are under-performing. This dampens morale and creates a toxic environment in which those with the wrong priorities thrive. Similarly, ST7 kills good bacteria, promotes the growth of pathogens and results in dysbiosis (loss of microbiome balance).
5. *Blastocystis* ST7 produces molecules that damage the integrity of host tissues, and sometimes, kills the laboratory model in which it was introduced. In the same vein, poor leaders can cause direct damage to the teams through acts of commission and omission, or simply through demeaning and discouraging words. In extreme cases, they leave the organisation in shambles when they move to their next posting (or get promoted!).
6. In colitis models, inoculating ST7 exacerbates the disease, likely through mechanisms described above. This results in severe inflammation and pathology. Whether through inexperience or inability, toxic leadership often turns a bad situation into a calamity. This can occur through many means, such as playing the



blame game, through inaction, or incompetence (think how the leaders of some countries have managed, or mis-managed their handling of the COVID crisis).

These stories have implications for senior management. Both ST4 and ST7 are microscopically indistinguishable yet exert beneficial or toxic effects on the host. Likewise, it is profoundly difficult to decide if someone will be a good leader based on superficial measures (CVs, interviews, even reference letters), yet they can have such a major impact on the culture and outcomes of the teams they lead. Hence, the wrong decision results in appointments that produce major, negative impact on the morale, culture and outcomes upon the teams that they lead. Taking a page from this article, an effective

way may be to survey the former subordinates of the candidate (checking the health of the microbiome). It may be a difficult pill to swallow, but honest brutal feedback on a potential candidate may save your institution from future damage, collateral or otherwise.

After more than 25 years in this wonderful institution I call my second home, I have the benefit of hindsight. Juxtaposing the unlikely worlds of *Blastocystis* research and administrative service has helped craft a certain philosophy to leading teams—empower and enable others, promote the deserving, create a positive and supportive work culture, and manage crises and achievements away from the limelight. It's amazing how much a 'grain of sand' can teach us!

¹ <https://www.health.harvard.edu/blog/gut-feelings-how-food-affects-your-mood-2018120715548>.

² Tito RY, Chaffron S, Caenepeel C, Lima-Mendez G, Wang J, Vieira-Silva S, Falony G, Hildebrand F, Darzi Y, Rymenans L, Verspecht C, Bork P, Vermeire S, Joossens M, Raes J (2019) Population-level analysis of *Blastocystis* subtype prevalence and variation in the human gut microbiota. *Gut* 68:1180-89.

³ Deng L, Wojciech L, Png CW, Kioh DYQ, Gu YX, Aung TT, Malleret B, Chan ECY, Peng G, Zhang YL, Gascoigne NRJ, Tan KSW (2023) Colonization with two different *Blastocystis* subtypes in DSS-induced colitis mice is associated with strikingly different microbiome and pathological features. *Theranostics* doi:10.7150/thno.81583.

⁴ Deng L, Lee JWW, Tan KSW (2022) Infection with the pathogenic *Blastocystis* ST7 is associated with decreased bacterial diversity and altered gut microbiome profiles in diarrheal patients. *Parasites Vectors* 15:312.

⁵ Deng L, Wojciech L, Png CW, Koh EYL, Aung TT, Kioh DYQ, Chan ECY, Malleret B, Zhang YL, Peng G, Gascoigne NRJ, Tan KSW (2022) Experimental colonization with *Blastocystis* ST4 is associated with protective immune responses and modulation of gut microbiome in a DSS-induced colitis model. *Cell. Mol. Life Science*. 79: 245.

⁶ Deng L, Tan KSW (2022) Interactions between *Blastocystis* subtype ST4 and gut microbiota in vitro. *Parasites Vectors* 15:80.

⁷ Deng L, Wojciech L, Gascoigne NRJ, Peng G, Tan KSW (2021) New insights into the interactions between *Blastocystis*, the gut microbiota, and host immunity. *PLoS Pathog* 17(2): e1009253.



*The NUS Medical
School at
117*

Going Beyond Medicine's Traditional Frontiers

BY CHONG YAP SENG, LIEN YING CHOW PROFESSOR IN MEDICINE, DEAN,
NUS YONG LOO LIN SCHOOL OF MEDICINE

The NUS Yong Loo Lin School of Medicine marked her 117th year of service to Singapore on 3 July this year. Since its establishment, the School has witnessed and experienced multiple challenges. The School's response to each and every major historical event culminated in the long and distinguished legacy that we are now charged with.

Genesis: A medical school by Singaporeans for Singaporeans

The School is a special institution, made possible by one of Singapore's first community-led philanthropic initiatives. Launched as the Straits Settlements and Federated Malay States Government Medical School in 1905, the School was the first institute of higher learning set up in Singapore. It came into being because of the vision of a group of local

community and business leaders, who saw the need for a medical school to train local, native doctors to care for the community.

Led by businessman Mr Tan Jiak Kim, the group petitioned the British colonial government, which promised its support for staff salaries and maintenance if the sum of \$71,000 could be raised by them. The group exceeded the target and raised \$87,000 comfortably.

When the Straits and Federated Malay States Government Medical School opened its doors on 3 July 1905 for what was to be the historical beginning of medical education in Singapore, 16 young persons presented themselves for the full five-year course that would lead, on successful completion, to their qualification as medical practitioners and in the words of one of the recommendations of the Kynnersley Commission of 1902 on the system of English Education in Singapore, “supply the demand for Assistant Surgeons and General Practitioners among the native population and the poorer inhabitants”.¹

The young medical school’s first seven pioneering graduates were S.R. Krishnan, Ino Gnanapragasam, Chen Su Lan, M.W. Chill, E.W. de Cruz, J.S. Lee and W.S. Carnage.² As remembered 60 years later by the late Dr Chen Su Lan, one of the seven successful candidates who passed the final examination in Medicine, Surgery and Midwifery in the shortest prescribed time in 1910, “The Medical School was born without a flourish of trumpets.”³

In 1913, the School changed its name to King Edward VII Medical School, in recognition of an endowment by the King Edward VII Memorial Foundation and was later renamed to King Edward VII College of Medicine in 1921. The School then merged in 1949 with Raffles College, an institution for higher education in the arts and sciences, to form the University of Malaya—which morphed into the University of Singapore after separation from Malaysia in 1965. The University was renamed the National University of Singapore after it merged with

Nanyang University in 1980. A name that has persisted into the new Millennium.

Over the course of 117 years, the NUS medical school—still fondly referred to by the moniker, NUS Medicine, by alumni—has

educated and trained more than 12,000 men and women to become some of the best doctors, medical teachers and scientists in the world. And since 2005, we have also produced some of the most highly regarded nurses in the profession.



Top: Medical school at Sepoy Lines, Outram.

Bottom: College of Medicine Building.



Over the course of 117 years, the NUS medical school—still fondly referred to by the moniker, NUS Medicine, by alumni—has educated and trained more than 12,000 men and women to become some of the best doctors, medical teachers and scientists in the world. And since 2005, we have also produced some of the most highly regarded nurses in the profession.”

The work that NUS Medicine does has shaped the health and healthcare of Singapore. Its graduates have gone on to be leaders and decision-makers in many areas, improving the lives and welfare of millions. What the School does, matters. And it matters in ways big and small, in good times and especially in bad ones.

Nearly three years since a coronavirus ambushed an unsuspecting world, we are still not fully out of the COVID-19 woods. Like the rest of the world, the NUS Yong Loo Lin School of Medicine has had to adjust to the significant changes brought about by the pandemic. We have adapted, moved on, and thrived, revelling in the freedom to try new approaches, and leverage on technology, egged on by the restrictions on physical proximity. After some hitches in 2020, we resumed clinical training without compromising either the safety or the learning experience of our students.

Our academics have outdone themselves in research efforts while also contributing to national and international efforts on COVID-19. Taking advantage of new flexible work arrangements, our people have had the opportunity to rediscover and develop themselves with various online learning initiatives. Overall, the School has done well and improved our international standing despite the turbulence and headwinds of 2021, placed at 21st place globally in the Quacquarelli Symonds 2021/2022 ranking of medical schools around the world, while the Times Higher Education ranking listed NUS Medicine at 17th for 2022. This drive to live up to the values of the School, to serve

with unstinting grace against the odds, traces its DNA to those who laid the foundations for the School. Some died doing just that, even before they could graduate.

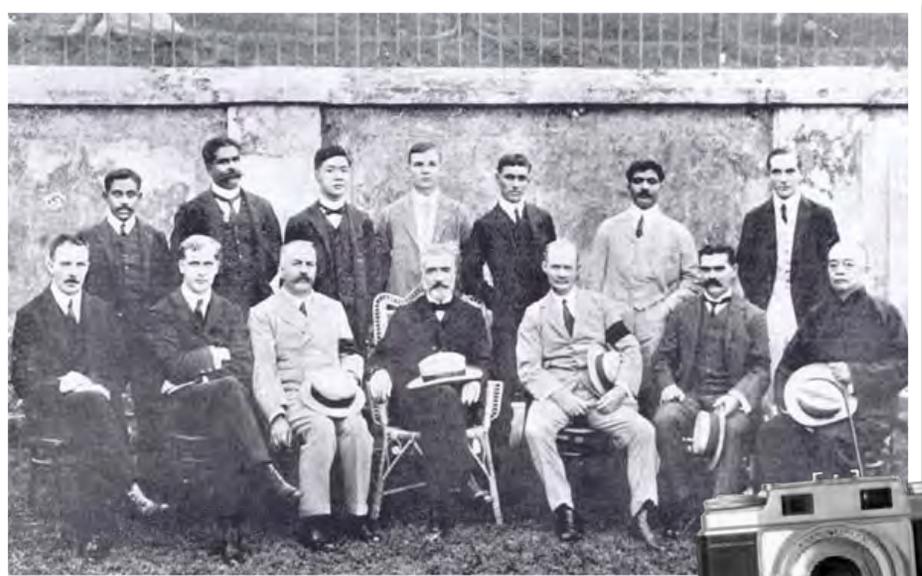
Remembering the pioneers

On the grounds of the Singapore General Hospital stands a modest memorial to a group of medical and dental students who lost their lives to enemy fire in February 1942 during World War II. The events that led to their deaths is recounted in an absorbing article by a classmate, Dr Abdul Wahab.⁴ In any retelling of the history of the NUS medical school, the names of the 11 students who died should be remembered:

1. Yoong Tat Sin
2. Mabel Luther
3. N.P. Sarathee
4. E. Baptist
5. H.E. Oorjithan
6. Ling Ding Ee
7. Hera Singh Bul
8. Chan Kok Loon
9. Chen Kok Kuang
10. Teoh Tiaw Teong
11. Abdul Hamid Bin Mohd Yusoff

While the ultimate sacrifice of these students in service to their fellow men has thankfully not been repeated since that fateful day in 1942, the spirit of service that energised them lives on in NUS Medicine alumni, as well as staff and students of the School today.

First cohort of students in 1910 pioneer group standing behind teachers.



“The work that NUS Medicine does has shaped the health and healthcare of Singapore. Its graduates have gone on to be leaders and decision-makers in many areas, improving the lives and welfare of millions. What the School does, matters. And it matters in ways big and small, in good times and especially in bad ones.”

No pandemic here

It is seen for example in the creative approaches that were adopted to circumvent the interruptions to daily life brought about by the pandemic: student-hopefuls applying for a place were assessed differently. Where previously 1,000 candidates would put pen to paper at the University for their Situational Judgement Test, applicants in 2021 did this from the comfort of their homes—an online assessment, recorded for integrity, was held instead. The Focused Skills Assessment component of our admissions exercise, however, remained on-site. These tests, comprising role play, task-based components, group work, and interview stations, are vital to ensure students not only have an aptitude for medical studies but also hold values aligned with those of the School.

Our teaching staff too did not let teaching and learning come to a halt. Despite constraints such as a limited group size of five for bedside teaching—including patient, students, tutors, and other healthcare workers—and embargos on high-risk areas, students still benefited from the School's creative pedagogy. For example, the School's digital transformation journey progressed with even more cyber tools rolled out for our tech-savvy students.

The Department of Obstetrics and Gynaecology (O&G) and the Department of Anatomy—both of which celebrate centennials this year—have embedded virtual reality into their curriculum, adding to the suite of technologies and online learning platforms that had been introduced earlier. At the O&G Department, a simulated labour ward expands students' clinical



exposure beyond what they would otherwise receive in a six-week posting. Students are taken through a range of cases in the second and third stages of labour, via professionally animated videos on all blueprint topics and annotated surgical videos with commentaries. Each step is guided and every rationale explained, for common obstetric and gynaecological surgeries. Interactive presentations aid students as they take on the role of house officers, brainstorming patient management plans under various scenarios. Likewise, students learn about anatomy and physiology through 3D virtual learning technologies that even allow them to try their hands at virtual dissections, while instruction using cadaveric specimens provides critical understanding of the three-dimensional relationship of different anatomical structures and their variations.

Examinations however, continued to be observed along national guidelines. They were held on campus, away from healthcare institutions. For theory assessments, additional measures included a maximum of 50 persons to an exam room, visual identity verification software, and staggered reporting times. For clinical examinations, supplementary measures comprised pre-event

testing, staggered reporting, and cohorting. The use of real patients was re-instituted at certain stations.

In a feature article in the Singapore Medical Association, new house officers Dr Isaac Ng, Dr Valencia Zhang, Dr Tseng Fan Shuen, and Dr Desiree Tay described their final MBBS examinations as “a surreal experience”. Struggling to deal with the uncertainties thrown up by the pandemic, they were yet well prepared, noting, “In NUS Medicine, we are privileged to have access to comprehensive e-learning resources (as well as) virtual scenario-based clinical teaching.” They also shared that though batch-mates had significant worries, “We were extremely appreciative of the School's efforts to provide regular updates through multiple online platforms ... In addition, our clinical tutors held regular virtual townhalls to provide an avenue for students to voice their concerns.” The cohort has since passed a milestone. While the Commencement Ceremony for the Classes of 2020 and 2021 was first held virtually in July, Commencement for the Class of 2022 reverted to the traditional ceremony held on campus in July this year.



Students using
Hololens.

Translating biomedical findings to clinical practice

While the NUS medical school's founding mission was to educate and train doctors for the community, the pivotal role of biomedical research has always formed the other *raison d'être* for our work. Research at NUS Medicine focuses on finding solutions to diseases that afflict the Singaporean population, and aims to ultimately enhance people's overall health and well-being.

With this in mind, the School reorganised its research structure into Translational Research Programmes (TRPs) in 2019 to promote interdisciplinary collaboration and cross-pollination of ideas. Strategically selected to meet the current and future healthcare needs of our population, our 10 TRPs focus on health matters relevant to Singapore, other Asian communities in the region, and beyond. Each of our TRPs is directed by a lead scientist and a clinical lead who manage the core funding for the programme to attract expertise and develop research facilities. With an interdisciplinary focus, our TRPs enhance collaboration and synergy to maximise limited resources. Research is also given the space to evolve to meet changing needs. Let me share a few key examples of our work.

Cardiovascular disease is widely recognised as the top disease burden locally and internationally. Research has revealed that Singaporeans who suffer from the onset of the disease are about 10 years younger than Western patients. The Cardiovascular TRP thus aims to identify biomarkers and regulators of cardiovascular disease, validate mechanistic



insights into disease models, and conduct studies leveraging cardiac cohorts.

Given the prevalence of **cancer** in the Singaporean population and worldwide, the search for viable and effective means to detect the disease as early as possible is critical. In a related study, Professor Yeoh Khay Guan from the Department of Medicine is leading the world's first large-scale clinical research project for the discovery and validation of novel combinations blood-borne circulating microRNA (miRNA) and DNA methylation biomarkers that will lead to the development of a multi-cancer early detection test for up to nine high incidence and high mortality cancers, including lung, breast, colorectal, liver, stomach (gastric), esophageal, ovarian, pancreatic, and prostate cancers.

NUS Medicine researchers are also working on identifying the multifaceted aspects of **ageing** to provide a more comprehensive understanding

of the biology of ageing, and to add healthy years of life by delaying ageing, prolonging disease-free life, and increasing quality by allowing people to be more active and engaged. Take **Alzheimer's**, which is a neurodegenerative disease manifesting as progressive memory loss. Ageing increases an individual's susceptibility for this disease. It is usually seen among people above the age of 65. However, in certain cases, the disease can affect people in their 30s or 40s.

The main reason for this disease is the aggregation of malignant proteins like beta-amyloid in the brain. This detrimentally affects neurons and destroys memory. The hippocampus, a brain region crucial for the conversion of short-term memory into long-term memory, is one of the first affected regions during the early stages of the disease. When Alzheimer's disease strikes, a person experiences a loss of neurons and the consolidation of memories is significantly impaired. Focusing on the hippocampus, our researchers



Cardiology lab.

SynBio Lab.



discovered an aberrant function of micro-RNAs that impedes the conversion of short-term memory to long-term memory. Work is ongoing.

Another translational research effort sees an interdisciplinary group of researchers from the School's basic science and clinical departments looking to characterise and develop interventions to maximise **human potential** for health and productivity. The influence of the groundbreaking work of *Growing Up in Singapore Towards healthy Outcomes (GUSTO)* researchers is well known and focuses on giving Singaporeans the best start to life. Another one of these is in the management of heat stress in tropical climates like Singapore's.

Heat stress increases the risk of heat injury and accidents, interferes with work productivity, and can compromise decision-making. Long-term exposure to heat stress can also induce diseases such as chronic kidney disease of non-traditional causes even in healthy working adults. Our investigators are working with government representatives on updating guidelines on managing heat stress.

Given the limited evidence on occupational heat exposure, and the impact of age, physical fitness, and gender on well-being, health, and work productivity, improved knowledge is essential for the development of effective prevention programmes at and beyond the workplace. The investigator's Project HeatSafe takes a multidisciplinary approach to understanding the complex threat that heat exposure poses on well-being and work productivity in the tropics. They also aim to identify sustainable, preventive policies and actions that can reduce the impact of heat stress on indoor and outdoor workers in chronically heat-exposed Singapore, Vietnam, and Cambodia so as to safeguard and heatproof workers in a warming world. The project will also examine the impact of heat on pregnancy and fertility, and on learning ability in children in tropical environments.

Going beyond the confines of traditional medical education

Even as our research efforts seek solutions to current healthcare challenges, the NUS medical school is also reviewing and re-examining the way we teach and prepare

our students for future careers as healthcare professionals. Getting ready for the 21st century entails acquiring a broader set of skills beyond technical competency.

The NUS medical undergraduate curriculum is a five-year course with two years of preclinical teaching and three years of clinical training. We provide many opportunities for self-exploration with a four-week elective period at the end of the third year and a 12-week elective period at the end of the fourth year. During these electives, undertaken locally or overseas, students can choose to explore personal interests in various aspects of healthcare, science, society, and humanity.

This comes as NUS declares the need to rethink higher education to produce graduates who are lifelong learners, who constantly add value to their work. We need to go beyond the traditional confines of medical education, which has tended to focus on preparing students for 'sick care' rather than healthcare, on understanding disease and treating it. Our focus needs to pivot to promoting population health and well-being, think beyond patients who are sick to those who are relatively well, and how we can help to make them remain healthy. To this end, we aim to produce a new breed of doctors who understand human potential in Medicine.



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Human potential refers to early life factors that can be aligned, so that a child is born with the very best start that he or she can possibly have. Among other things, this may involve ensuring a mother-to-be is not only physically and emotionally healthy, but is also getting the right nutrition when she conceives. Promoting health begins with giving people the best start to life.

Current medical education prepares doctors to function in a specialised setting, such as a hospital, rather than in a community setting such as a general practitioner clinic. In the community setting, it is crucial to understand that the social determinants of health are probably more critical than other factors. We need to understand patients' family backgrounds, the kind of environment they live and work in. Many doctors also lack knowledge about health economics. For example, take the case of doctors in the US recommending a whole battery of tests for patients who are covered by insurance, even if some of the tests are unnecessary.

If a similar practice were to take place here, it would drive up healthcare costs. We cannot afford to go the same way, being defensive and prescribing tests without understanding the cost-to-benefit ratio. Doctors need to improve their knowledge of the health system and how it works, so they can properly hand over their patients to the next stage of their treatment.

We have therefore taken several steps to address these gaps in the education of medical students. These include recruiting experts in

family medicine to improve training in this area, conducting research into longevity and human potential, and offering courses in health economics and health systems. The School has also introduced five pillars of knowledge that are common across not just the school of medicine, but also the schools of dentistry, public health and pharmacy in NUS. These pillars are: social and behavioural determinants of health, professional practice and communications, teamwork, as well as data and digital literacy.

Foundational Learning Pathway Programmes

As we work to fulfil the five pillars, the School introduced the learning of new knowledge, skills and attributes in the form of elective Pathway programmes. These impart topics and disciplines that were previously neglected or not thought to be important for practice. Running through the various phases of the undergraduate medical course, they offer core instruction in a choice of five fields that are not traditionally associated with medical professions. They are:

Health Informatics – This was first introduced to Phase I students in 2019 (AY2018/2019 cohort) and has since been extended to all Phase I and II students. The *Inquiry and Thinking* pathway was launched to Phase II students in July 2020 (Q2 FY2020). The programme has been extended to all Phase I students (by registration of interest) as a summer programme.

The *Health and Humanity* pathway aims to nurture students to be socially conscious, globally aware and committed to serve. Students embark on a journey to develop

a deeper appreciation for humanity in healthcare as they build knowledge, skills and attitudes to serve vulnerable persons in the local and global community. To date, pilot workshops were held for Phase I to III students, through various forums such as summer school, electives and experiential journey where a total of 127 students participated.

The *Behavioural and Implementation Sciences* pathway is being developed. Faculty and staff were identified and trained in 2019, and a pilot workshop were implemented among 24 Phase I students in 2020. However, due to COVID-19, some of these efforts have been delayed, as the School's Behavioural and Implementation Science leads are based in Melbourne, Australia. With the easing of COVID-19 restrictions, we are increasing the pace for the pathway.

The *Medical Education* pathway exposes medical students to concepts and principles in Health Profession Education, equip them with foundational skills in Health Profession Education—with a focus on educational innovation, leadership and management, and scholarship for teaching and learning. To date, approximately 50 students from Phase IV and V have participated in this elective based pathway.

Another pathway, *Medical Innovation and Entrepreneurship* is a longitudinal one that spans Phase I to V. The programme gradually exposes medical students to concepts and principles in innovation and entrepreneurship. Three out of five of the pathway programmes mentioned—Health Informatics, Health and Humanity, Inquiry



Health and Humanity (H&H)

127

students participated in pilot workshops

Behavioural and Implementation Sciences (BIS)

24

Phase I students participated in pilot workshops in 2020

Medical Education (CenMED)

50

students from Phase IV and V have participated in this elective based pathway

and Thinking were also offered to students from NUS College (USP and Yale-NUS).

Learning with students from different faculties challenges medical students to explore different views and perspectives that can broaden their learning experience. Other than leveraging on pathways for cross-disciplinary learning activities, NUS Medicine is collaborating with the NUS School of Computing and the NUS School of Design and Environment to develop an Integrative Health Minor for NUS undergraduate students from other faculties or schools. This is planned for launch in AY2023/24. Interdisciplinary learning aims to prepare undergraduates from non-healthcare disciplines for the health/healthcare industry or industries with health/healthcare business units by equipping them with the necessary interdisciplinary understanding, sensing and thinking.

Finally, students also have the opportunity to do an MBBS with a difference. They may choose to take a gap year between Year 4 and 5 and spend a year working on a postgraduate degree e.g. a Master of Science in Bioinformatics or by Research, or a Master in Public Health. This means that students could graduate with both a Bachelor's Degree in Medicine & Surgery as well as a postgraduate degree.

Conclusion

As we step out of the pandemic-induced darkness into the light once more, one of the most critical lessons the past two and a half years have brought home to us is that progress is meaningful when it embraces and involves many, and the

benefits and mutual security that scientific and societal advances bring are enjoyed by everyone. As the NUS Yong Loo Lin School of Medicine looks forward to her 120th anniversary in 2025, it is also better prepared to face the challenges that will come her way. The School's response to each and every major historical event has

added to the legacy that we have inherited and which our generation must build upon. I am confident that like the early generations of medical graduates, the men and women of the NUS medical school today will continue the work of caring for the health and well-being of Singaporeans and do so, faithfully and magnificently.

From top:
White Coat
Ceremony 2022.

Students with
Prof Chong at
MedNurse RAG
Performance
2022.



I am confident that like the early generations of medical graduates, the men and women of the NUS medical school today will continue the work of caring for the health and well-being of Singaporeans and do so, faithfully and magnificently.”

This article first appeared in Century of Transformation, published by the Alumni Medical Association (Singapore). This article is republished with permission.

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Photo:
Inaugural batch of students in the Master of Science in Biomedical Informatics (MSc in BMI) degree programme.

Adapting to the Technological Revolution in Healthcare: The Newly Inaugurated Division of Biomedical Informatics

Methods of machine learning and Electronic Health Records (EHR) are increasingly used in healthcare, making the technological revolution a reality today. Big data and advanced analytics are no longer mere buzzwords. Therein lies the need to adapt to the way healthcare is transacted in the near future.

With that, the Division of Biomedical Informatics (DBMI) is newly inaugurated under the NUS Yong Loo Lin School of Medicine. It will support and build an international network of biomedical informaticians and thought leadership in education and research, to provide personalised medicine and higher care quality.

Headed by Associate Professor Ngiam Kee Yuan, DBMI aims to train specialised and skilled Clinician Informaticians (CIs) to be well-versed in healthcare technologies, using big data and innovative ways of presentation to provide clinical insights, disease, treatment and response patterns.

They offer the Master of Science in Biomedical Informatics (MSc in BMI) degree programme,

available in full time or part time study options. It has two specialisations: Analytics or Hospital Management. They welcomed their first batch of students on 30 July 2022.



Scan to read more here:

Healthy Lifestyle Habits Lower Risk of Type 2 Diabetes among Women with a History of Gestational Diabetes

Women with a history of diabetes during pregnancy can still reduce their chances of developing Type 2 diabetes substantially by sticking to a healthy lifestyle.

Gestational Diabetes Mellitus (GDM), or diabetes during pregnancy, is a common pregnancy complication. Women who developed GDM are nearly 10 times more at risk of developing type 2 diabetes compared to the general population.

In particular, Asian women have the highest risk of developing GDM across all racial and ethnic

groups. It's no surprise that in Singapore, up to one in five pregnant women are at risk of GDM. This calls for more public health and research efforts in identifying and developing effective interventions to prevent or delay the progression of type 2 diabetes.

The five modifiable risk factors of type 2 diabetes, such as weight control, diet, amount of physical activity, alcohol consumption

and smoking, have thus far been examined individually. However, the combined associations of these risk factors on the long-term risk of developing type 2 diabetes are less well understood, particularly among women who developed GDM.

Investigating this, Professor Zhang Cuilin, Director of Global Centre for Asian Women's Health (*GloW*), and a Professor from the Department of Obstetrics and Gynecology at the NUS Yong Loo Lin School of Medicine, led a team of NUS researchers, in collaboration with the National Institutes of Health and Harvard T.H. Chan School of Public Health. They examined the associations of adhering to optimal levels of five major modifiable risk factors, with the risk of developing type 2 diabetes among women with a history of GDM.

Lifestyle factors trumps genetic susceptibility

Yet another aspect of investigation was the risk factor associations among a subset who were further predisposed by a greater genetic susceptibility and were overweight (BMI>25.0 kg/m²).



Women who developed GDM are nearly

10 TIMES

more at risk of developing type 2 diabetes compared to the general population



Diabetes developing among this group of women may have been considered at greater risk.

Published in the British Medical Journal (BMJ), the study showed promising findings on the beneficial roles of optimal modifiable factors in lowering type 2 diabetes risk among these high-risk women.

Major findings from the study convey a hopeful and powerful message to these women. Eating healthily, exercising regularly, not smoking, and maintaining an optimal body weight can lower the risk of type 2 diabetes by up to 90% and even alleviate the high genetic risk of type 2 diabetes. Those who are overweight may also benefit from adopting these healthful lifestyle practices after their GDM-complicated pregnancy.

Study findings hold relevance for Asian populations

The study population consisted of 4,275 women with a history of GDM from the Nurses' Health Study II, a longitudinal predominantly white female cohort in the United States that has been followed up with since 1989. These participants were included as part of the Diabetes & Women's Health Study initiated and led by Prof Zhang for investigating modifiable and genetic risk factors for type 2 diabetes and comorbidities following pregnancies complicated by GDM.

In the study, 924 women developed type 2 diabetes over 28 years of follow-up. After adjusting for other major diabetes risk factors, the researchers found that having optimal levels of the five modifiable risk factors, namely a normal BMI (18.5-24.9), high-quality diet, regular exercise, abstinence from smoking, and moderate alcohol

Having optimal levels of the five modifiable risk factors, namely a normal BMI (18.5-24.9), high-quality diet, regular exercise, abstinence from smoking, and moderate alcohol consumption, was associated with a relative reduction of more than 90% in the risk of type 2 diabetes, compared to those who did not have any.

consumption, was associated with a relative reduction of more than 90% in the risk of type 2 diabetes, compared to those who did not have any. Each additional optimal modifiable factor was associated with an incrementally lower risk of the condition.

Asked about the relevance of this study to the Singaporean population, Prof Zhang answered, "Although data of the present study came from predominantly Caucasian women in the United States, accumulating evidence has suggested benefits of adopting a healthy lifestyle in the prevention of cardio-metabolic diseases including type 2 diabetes."

"We believe the biology and mechanisms underpinning the roles of healthy lifestyle on the prevention of type 2 diabetes should be similar across populations. Thus, they should work among Singaporeans, although the magnitude of effectiveness and their interactions with genetic susceptibility to type 2 diabetes could be different," said Prof Zhang.

Indubitably, this means future studies on women who developed diabetes in pregnancy, within the Singaporean population, are needed—for the development and precise application of medicine and prevention initiatives.

Given the multi-ethnic composition of the Singapore society and possibly different underlying genetic profiles, future studies examining

health outcomes among Singaporeans should account for its populational heterogeneity.

At the same time, ethnicity specific intervention approaches should be explored. With that being said, Prof Zhang and her team are eager to conduct such studies within the Singaporean population in the near future.

The first author of the study, Dr Jiayi Yang, a research fellow in the Global Centre for Asian Women's Health and Department of Obstetrics and Gynecology at NUS Medicine, commented, "Although causal relationships cannot be established given the observational nature of the study, ample evidence consistently support the effectiveness of healthy lifestyles in preventing obesity or type 2 diabetes, and on improving cardiometabolic health among diverse populations."

In view of the alarmingly high prevalence of GDM in Asia broadly and in Singapore particularly, and the ongoing diabetes epidemic in Asia, future studies among high-risk Asian women are warranted to further expand findings from the study. But as of now, the findings are encouraging for women at risk of developing type 2 diabetes.



Scan to read more here:



How Naps Can Be Beneficial for You

BY PROFESSOR MICHAEL CHEE, DIRECTOR, AND DR RUTH LEONG,
RESEARCH FELLOW, CENTRE FOR SLEEP AND COGNITION

A resurgence of interest in naps has accompanied growth in awareness about the importance of sleep in modern lifestyles. Naps are gaining attention as a potential avenue to compensate for inadequate nocturnal sleep and also as a tool to enhance learning and productivity.

Naps refer to periods of sleep occurring outside a main nocturnal sleep period. Such periods of sleep are taken voluntarily and should be distinguished from bouts of irresistible sleep in the day that are adverse in nature. Discretionary, mid-afternoon napping used to be common in Mediterranean, Middle Eastern and East Asian societies, but with the rapid spread of industrialisation, the practice has declined. Northern European societies who largely drive sleep

research do not look favourably on napping in adulthood, and most research studies have used naps as a vehicle to study sleep processes. Such nap studies examine how a short period of sleep, compared to an equivalent period of wakefulness, can benefit cognition.

We recently conducted a meta-analysis of nap studies performed to date to clarify how the age of the napper, nap duration, nap timing as well as the preceding night's sleep affect the cognitive benefits of napping.

Naps of at least 30 min benefit cognition across a range of cognitive tasks

Our analysis covered results from 60 experimental studies performed on healthy people that compared cognitive performance between a group that took a nap and a group that stayed awake for the same duration. Across different types of tests, the benefits of naps were significant, and effects were the strongest for vigilance and memory. 'Declarative memory',

referring to the type of memory whose contents can be verbalised (i.e. facts or images), is the most studied class of memory in nap studies. Vigilance has also been frequently studied because its degradation following sleep restriction is robust. Vigilance enables us to minimise momentary drop outs, which we often encounter when attending meetings in the afternoon.

Naps ranging from 30 to 120 minutes, and between 12 noon to 4 pm all showed benefits. Most people may find 30 minutes to be the most practical duration to schedule a nap. Most persons experience a mid-afternoon dip in alertness accompanied by increased sleepiness at around 2pm. This dip can occur even when one has gotten adequate sleep the night before and is primarily a result of circadian regulation of sleepiness rather than a 'post-prandial' dip.

The ability to nap varies across adults. Some find it difficult to nap even when fatigued. Although one work has suggested that non-habitual nappers fare worse than habitual ones if they are made to nap, other studies suggest that naps are beneficial regardless of whether one has a regular nap habit.

Naps are beneficial for teens and young to middle aged adults

Sleep patterns change with age. A young child needs more sleep than an old adult and napping is very common as a result. With maturation, sleep tends to consolidate into one main nocturnal sleep period such that from adolescence into at least mid-life, it is possible to stay awake all day without a nap if one has adequate night-time sleep. However, napping in the afternoon shows

Results from 60 experimental studies showed that the benefits of naps were significant, and effects were the strongest for vigilance and memory.

Napping in the afternoon shows consistent benefits on cognitive performance in teens as well as young to middle aged adults.

consistent benefits on cognitive performance in teens as well as young to middle aged adults.

But older adults may not benefit from long naps

There were too few experimental studies performed in older adults to draw conclusions about cognitive benefits.

However, multiple studies do indicate that in older adults (~60 and beyond), long naps of >1h have adverse associations. Persons who habitually take such long naps are at greater risk of greater cognitive decline and cardiovascular disease. In such persons, underlying neurodegeneration that affects cognitive abilities is accompanied by degraded control of circadian function. The latter results in poorer sleep at night and increased daytime sleepiness. Many existing epidemiological studies do not separate discretionary naps from such involuntary bouts of daytime sleep. Future work is needed to help distinguish the outcomes that result from these two different types of 'naps' in old adults.

Should we schedule naps into our day?

The fact that naps have endured in different societies for centuries begs continued inquiry into how they may be adapted to 21st Century life. A compelling reason for supporting napping is that an

increasing number of persons are not obtaining adequate nocturnal sleep. While it is easy to dispense sleep hygiene recommendations that specify ideals for duration, timing and regularity, adherence is a totally different proposition and it is that which matters most.

A recent study we conducted with the Health Promotion Board offering incentives for persons to meet sleep goals taught us that many young adult Singaporeans do value sleep but feel that even with incentives, their entrenched habits are difficult to transform without additional support.

While it is ideal to obtain sufficient nocturnal sleep, another branch of our lab's work has shown that for cognitive performance, split sleep schedules comprising shorter-than-ideal nocturnal sleep combined with a 90-minute mid-afternoon nap opportunity, will boost alertness and memory encoding compared to having even a night of adequate sleep. It is presently unclear if this comes with the trade-off of increasing risk of diabetes mellitus.

A number of prominent politicians have gone public about their penchant for naps. With increased understanding about how napping works, and a growing societal will to improve sleep health, it may be time to consider scaling up an old habit.



Long naps of >1h have adverse associations in older adults such as: **cognitive decline, cardiovascular disease, poorer sleep at night, daytime sleepiness**

Resolving Conflict over Vaccinated Blood

BY PROFESSOR JULIAN SAVULESCU, DIRECTOR, CENTRE FOR BIOMEDICAL ETHICS, NUS MEDICINE, AND PROFESSOR DOMINIC WILKINSON, DIRECTOR OF MEDICAL ETHICS AT THE OXFORD UEHIRO CENTRE FOR PRACTICAL ETHICS

There have been media reports about some parents who are refusing blood transfusions for their children if the blood comes from a person vaccinated against COVID.

In a recent case, New Zealand parents refused consent for major surgery for their six-month old baby, (referred to in the reports as “Baby W”). Baby W had a complex congenital heart abnormality and the surgery would require blood transfusion. The parents were apparently concerned about their baby being

exposed to “spike protein” from vaccinated blood. However, the New Zealand High Court awarded temporary guardianship to treating doctors and surgery has since taken place¹. Similar refusals have occurred in the US² and Canada³. How should we respond to such cases? Were the courts right to intervene?

Can parents refuse surgery or transfusion?

The first point to note is that although parents are usually closely involved in decisions about medical treatment for their children, there are limits. Most societies don’t think that parents should be allowed to make decisions that would risk serious harm to their children. Courts in the past have overruled parents who refuse life-saving treatment such as chemotherapy⁴, operations or blood transfusion⁵. But actually, W’s parents weren’t refusing blood or surgery. They just didn’t want blood from a particular source.



Are the parents' concerns justified?

W's parents' concerns have been attributed to "misinformation"³. There are no known risks⁶ from receiving blood from vaccinated donors. Countries have very stringent safety controls on their blood supply to protect recipients from infection. They involve extensive questioning of donors about risk factors, then numerous tests for infection. The parents' concern about the 'spike protein' in the vaccine have no scientific basis. There is no evidence⁷ that the protein generated by the vaccine is harmful. It is also extremely unlikely to be present in the blood of someone who has been vaccinated more than two weeks earlier.⁸

However, even if doctors do not share W's parents' views, it doesn't automatically follow that parents should be overruled. It wouldn't be harmful to baby W to have blood from an unvaccinated donor.

Religious accommodation and justice

It is an important principle of medical ethics that doctors should pay attention to the views and values of patients. They should do that even if the doctor thinks that the patient is mistaken or that their views are irrational. That includes, for example, religious values. So an atheist doctor should try to respect and accommodate a religious patient's requests for treatment that meets the requirements of their spiritual teaching.

But it also includes other non-religious values—for example patients who are vegan or concerned about the climate, or wishing to boycott products from a particular

country. Or patients may have particular medical concerns. For example, a patient may have a concern about the risk of acquiring a newly detected virus like monkeypox. Again, doctors should potentially try to accommodate those requests, even if they do not share the concerns.

However, there is one good reason to deny such requests, even if reasonable: distributive justice.

Distributive justice is the principle of allocating limited resources fairly. Health resources constitute a limited pie and everyone is only entitled to his or her fair share. This might involve equal shares, or giving priority to the worst off, or maximising the health gains from these resources, and so on.

Distributive justice is relevant in at least three ways.

Firstly, patients do not have the right to demand interventions which are not possible. This has been given as a reason for denying antivaxxers' requests. For example, at the present time the vaccination status of blood donors is not recorded routinely. There is no way to identify blood that would be acceptable to W's parents³. However, this wouldn't be an absolute barrier. Blood could be labelled and distributed in a way that respects patient values and preferences.⁹

A second reason is more important: this would potentially be costly and resource-intensive to implement. Meeting the logistical challenges of identifying blood that would be acceptable to W's parents (or other recipients) would divert

limited resources away from the care of other patients.

There is a third concern that is a significant one for blood services: the security of the blood supply. Allowing parents or patients to pick and choose who they are happy to receive blood from would set a dangerous precedent.

In the past, African Americans were identified as "high risk" and such labelling can stigmatise and exacerbate discrimination against minority groups. It would be extremely problematic to permit some individuals to choose donors from a particular religious, political or ethnic background. It may undermine the altruism and solidarity upon which the blood donation system is based.⁹

Compromise? Directed donation

One option that might allow W's parents' views to be respected without requiring major changes to the usual process of blood donation—would be through something called "directed donation".

This is the term used for someone donating blood directly to a specific individual. In this case, W's family members or friends could have donated blood for the surgery (assuming that they had not had the COVID vaccine and were of the right blood group).



It is an important principle of medical ethics that doctors should pay attention to the views and values of patients. They should do that even if the doctor thinks that the patient is mistaken or that their views are irrational."

However, there are several reasons that may explain why that was not pursued in this case.

First, directed donation is associated with slightly higher medical risks for the recipient (for example of infection, of developing antibodies, and of a rare problem called “graft versus host disease”)¹⁰. These risks are relatively small, so it is not clear that would rule out directed donation.

Second, and more importantly, it is not clear that it would be practical in a case like baby W’s. Directed donation requires extra time to collect and screen the donated blood. For major heart bypass surgery, the surgery typically requires multiple units of blood products of different types¹¹. It is not clear that it would be feasible to collect enough of the right kind of blood for the operation in time for it to take place. This would also likely require significant additional time and resources to undertake the collection and screening.

Finally, doctors may have been unwilling to take extra measures to arrange directed donation because this may appear to be offering implicit support for a problematic view. It is not simply that doctors do not share the parents’ views—they likely regard the view as harmful. Misinformation about



vaccines in general and the COVID vaccine in particular has caused and continues to cause preventable serious illness and death. Individual doctors, or health systems may choose not to accommodate vaccine sceptics, in case this provides any tacit support for such views. As a parallel example, doctors may refuse to support parents who wish to arrange directed donation from people only of a particular racial or ethnic group because doing so would make the doctors complicit in racism.

Conclusion

Cases like that of baby W are uncommon. However, they raise important questions about how much health systems are willing to accommodate

patients and parents who reject mainstream views about certain medical treatments. If we allow parents to decline vaccination for their children, it may seem paradoxical that they are not allowed to refuse a blood transfusion from vaccinated donors. However, the consequence of refusing blood transfusion for a seriously ill child is completely different from refusing vaccination in a healthy child. One compromise in some cases may be to allow directed donation so that parents arrange for a family member/friend to give blood to the child. However, as we have pointed out, that will not always be possible. It may also carry some ethical cost.

This article was first published on CNA.

¹ <https://www.theguardian.com/world/2022/dec/09/new-zealand-baby-w-case-boy-has-surgery-after-court-gives-doctors-guardianship>.

² <https://www.webmd.com/vaccines/covid-19-vaccine/news/20210817/covid-skeptics-request-blood-transfusions-from-unvaccinated-donors>.

³ <https://www.ctvnews.ca/health/coronavirus/covid-19-misinformation-prompts-some-patients-to-refuse-blood-transfusions-from-vaccinated-donors-1.6110333>.

⁴ <https://www.bbc.com/news/world-us-canada-49642662>.

⁵ <https://www.independent.co.uk/news/uk/home-news/jehovahs-witness-blood-transfusion-doctor-judge-ruling-girl-leeds-nhs-trust-religion-a8977066.html>.

⁶ <https://www.healthline.com/health/blood-transfusion-covid-vaccine>.

⁷ <https://fullfact.org/online/conservative-woman-vaccine-scientist-spike-protein/>.

⁸ <https://www.nzblood.co.nz/knowledge-hub/covid-19/covid-19-vaccines/>.

⁹ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8653055/>.

¹⁰ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8442217/>.

¹¹ <https://www.clinicalguidelines.scot.nhs.uk/nhsggc-guidelines/nhsggc-guidelines/cardiac/paediatric-cardiac-thoracic-surgery-and-cardiology-ordering-schedule-for-blood-blood-products/>.

From Classroom Teaching into the Community: Learning through the Longitudinal Patient Experience Home Visit Programme

BY DR GOH LAY HOON AND DR ANN TOH, NUS FAMILY MEDICINE, ASSOCIATE PROFESSOR LYDIA LAU, NUS ALICE LEE CENTRE FOR NURSING STUDIES, ASSOCIATE PROFESSOR WONG MUN LOKE, NUS DENTAL, DR LEROY KOH, NUS PHARMACY



Since the Longitudinal Patient Experience (LPE) programme, a year-long home visit programme that allows healthcare students to apply what they have learnt in the classroom in the community, started about 10 years ago, it has since evolved.

A Story in LPE

F¹ paused in the conversation on the Zoom call. The students fell silent because they were not sure how to respond to what F had shared. F is a 28-year-old designer whose chronic condition has confined him to a wheelchair. His mobility issues require him to wake up

four hours before the time he plans to leave the house. Unlike others who can skip out of bed and be out of the house within a short time, F needs the help of both his father and brother for his bathing and toileting preparation each day. Finally, F broke the silence with his gentle smile and made a small

joke. This daily drill that is part of F's life was shared in a matter-of-fact manner with the students and this caught them by surprise. With relief, to the observing tutor, one student unmuted his microphone and resumed the conversation. The mood lightened and other students started to join in.

LPE and its role in NUS healthcare curricula

This story was one of many Zoom sessions experienced by first-year healthcare students from NUS Medicine, Alice Lee Centre for Nursing Studies and NUS Pharmacy and their



LPE students with their LPE participant at a community fair in August 2022.

tutors in the LPE programme in 2022. LPE started about 10 years ago with medical and nursing students. It has since grown to include NUS Pharmacy in 2021 and Dental students in the coming year. The LPE is a year-long home visit programme that allows these healthcare students to apply what they have learnt in the classroom in the community. In the classroom, students are taught how social determinants of health and health-related behaviours can influence people's lifestyles and their healthcare choices. Following the classroom teaching, the students will visit a patient in their homes with their tutors through the LPE programme. LPE offers a unique opportunity for interprofessional students and tutors to interact and work together. Central to the LPE programme is the focus on patient-centredness which is understanding what matters to patients in life, health and illness. Exciting activities in 2023 will include a community walk with patients in their neighbourhoods. This walk allows students to trace their patients' footsteps in their daily activities such as shopping for groceries or visiting the *sinseh's* clinic. The walk will enrich the students' learning of the impact of the social determinants of health in a patient's daily routine.

Tutors in LPE

In LPE, the tutors are the students' role models in appreciating the professional yet humane interactions with their patients. The tutors supervise the students during the home visits and facilitate the initial introduction between the patients, their families and the students. One tutor who is a general practitioner in the heartlands of Singapore joked that LPE is a programme that allows him to teach the students in the GP's "home territory" instead of teaching a tutorial in the classroom. He enjoys mentoring students

and sharing what he does every day as a general practitioner which includes making home visits, treating and comforting his patients many of whom are older people and lonely. The doctor felt that through the LPE programme, budding healthcare students are given a rare opportunity to appreciate that patients are people too, that their views about illness and treatments are often coloured by their upbringing and limited by their environments. After acknowledging those circumstances, students should recognise and help patients who are unable to adhere with instructions given by their healthcare providers due to such factors.

Students in LPE

As not all home visits are conducted with the tutors, LPE encourages the students to take charge and be responsible for conducting most of the home visits on their own. This independence allows students to build rapport with the patients and their families. It also provides the opportunity for nurturing interprofessional teamwork where students learn how to work effectively together to facilitate a meaningful visit for patients, caregivers and their peers. To aid in that process, students are given a small stipend from NUS Medicine to buy gifts for their patients. Students are careful when purchasing these gifts, choosing to buy fruits or healthy snacks for the patients who are usually older people with chronic conditions such as diabetes, hypertension and hyperlipidemia. During the pandemic period, a group of students creatively used the stipend to cheer up a young patient who was feeling isolated at home by sending him a surprise gift—bubble tea delivery!

Besides the home visits, some students went the extra mile to accompany their patients for

their medical appointments in the polyclinics or hospitals on the odd occasions when the patients' families were unable to. One group of students who accompanied their patient to the polyclinic shared that they wanted to speak with the patient's doctor after learning that the patient had difficulty making her questions and concerns clear to the doctor.

Patients' role in LPE

Patients and their families and caregivers are invited to join the LPE if they are open to interacting with students and share with students how they live and cope with their chronic conditions or disabilities in their daily lives. Many patients have chronic and sometimes debilitating illnesses that make them mostly homebound. Some live alone while others are mostly alone at home when their children go to work. Although a majority of patients are able to move about independently, they are lonely after retiring from their jobs. Many students in the LPE programme have partaken meals with their patients, making good use of the stipend given to them. One patient remarked that the meal at the coffeeshop with the students felt like having all his grandchildren at one place for a get-together. Other groups have watched movies with their patients or enjoyed coffee together at the neighbourhood coffeeshop. Another group of students was inspired by a LPE participant who is an avid volunteer at Lions Befrienders. They had first-hand experience on how this participant supports her peers in various ways and this has provided her with an unmatched fulfilment. The LPE experience helped the students see how an older person spends her time fruitfully and challenges herself both mentally and physically.

Returning to the story

After the Zoom call with F, the students met their tutor a week later to debrief on the session. The students shared how they were struck and moved by F's courage and positive outlook in life despite his physical condition. F is merely a few years older than them and could easily be one of their friends in school. Yet their lives and future trajectories are and will be very different. Below are excerpts from the reflections written by two students who met F:



It amazed me ... how independent, creative, strong-willed he is. Despite his condition, and the many difficulties he faced in life, he still bravely looks forward to living a fulfilling life each day... Hearing about his likes and dislikes, his accomplishments, and hobbies, reminded me that our patients are just like us, and that they should not be defined by their illness or condition, but instead valued for their thoughts, opinions and decisions.”

Nursing student



I feel that society tends to assume that individuals... face limitations in their daily lives and we are taught... to feel sympathy towards them... However, he is a physical testament that such a view is erroneous and comes from a position of privilege... He is truly someone that has accepted his condition wholeheartedly and strives to be a source of positivity which I think is extremely admirable.”

Medical student



Sir William Osler, an eminent physician in the 19th century said:



The good physician treats the disease; the great physician treats the patient who has the disease. Listen to your patient; he is telling you the diagnosis.”

This quotation aptly describes the importance of listening to the patients as persons when delivering care to them. Although LPE does not involve the diagnosis and clinical management of patients, the programme provides a year-long experiential learning journey for students to learn to listen to their patients attentively and walk in their shoes. The early exposure to interacting with patients in the real-world context provided by LPE heralds the beginning of imbibing a person-centred attitudes towards patient care in our students as they journey to become competent and compassionate healthcare professionals of the future.

Photo:
LPE students and their LPE participant enjoying a day out in the community.



¹ To protect the identity of the patients whom the students interacted with, their real names have been replaced with letters.

Integrating Medicine and Social Science

NUS Medicine alumna, Dr Ching Ann Hui, receives the prestigious Rhodes Scholarship this year.

Established in 1903, the Rhodes Scholarship, one the world's preeminent and oldest graduate fellowship, aims to nurture creative young leaders with proven academic excellence who also show exceptional character, leadership and commitment to serve others. One outstanding applicant in Singapore is awarded the scholarship every year, and Dr Ching was selected from among 10 finalists to join 100 scholars from around the world to pursue fully-sponsored postgraduate studies at the University of Oxford in October 2023.

"I am interested in building compassionate healthcare systems centred on the lived experiences of patients and healthcare workers," says Dr Ching.

Dr Ching co-founded 'Third Spacing', a podcast in 2019 with her classmates in medical school to build conversations and raise social

consciousness with the aim of improving the medical practice and healthcare access. The podcast has published over 50 episodes currently.

In addition to being a clinician and podcaster, she is also a photographer. Her keen eye and heartfelt images which included a personal shot of her own family, won her the top prize in the junior category of a local photography competition.

Through an interdisciplinary Undergraduate Research Opportunity with the NUS Faculty of Arts and Social Sciences Department of Malay Studies, Dr Ching used autoethnography in Medicine

to systematically analyse the uses of race in medicine against the historical background of racial formation during British Colonialism. This culminated in a 50-paged research paper, which she wrote across the clinical years in medical school, and won the Outstanding Understanding Research Prize. The paper has since been presented at local medical education platforms, and also at international social science conferences.

Dr Ching plans to pursue a Master of Philosophy in Medical Anthropology in Oxford come October 2023, hoping to integrate social sciences into clinical practice and research, with writing.



“

I am interested in building compassionate healthcare systems centred on the lived experiences of patients and healthcare workers.”

Dr Ching Ann Hui, NUS Medicine alumna, Class of 2022



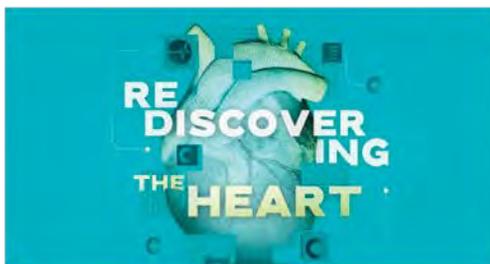
A series about our



TRANSLATIONAL RESEARCH PROGRAMMES

To meet the evolving needs of the healthcare landscape, NUS Medicine set up ten Translational Research Programmes (TRPs) to fully integrate basic and clinician scientists working in complementary and related research areas, facilitate stronger synergies for collaboration, and accelerate translational research for better outcomes. The ten multi-disciplinary, health- and platform-based TRPs include five health focused programmes - Cancer, Cardiovascular Disease, Healthy Longevity, Human Potential and Infectious Diseases, and five platform programmes - Digital Medicine, Precision Medicine, Nanomedicine, Immunology and Synthetic Biology.

NUS, in partnership with CNA has developed a series of content to tell the story of the School's research work. In this series, find out how four of the TRPs at NUS Medicine are addressing priority health concerns of Singapore and beyond.



Watch Full
Episodes here:

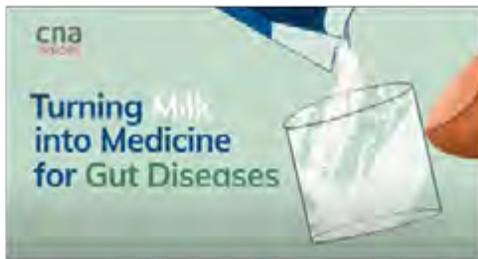


The Cardiovascular Disease TRP:

Rediscovering the heart

This two-episode documentary shines light on the Cardiovascular Disease TRP, which is at the forefront of tackling the spread of heart disease.

Watch Prof Roger Foo, A/Prof Mark Chan, Dr Mayank Dalakoti, Dr Lynette Teo, Asst Prof Koh Cho Yeow, Dr Tan Sock Hwee, and Dr Zhu Yi Ke tell the stories of how their various research studies help combat the epidemic of heart disease—from disease prevention to revolutionising treatment.



The Nanomedicine TRP: Milk as medicine for gut diseases

The pains of inflammatory bowel disease include abdominal pain, diarrhoea, and bloody stools, and even treatment often comes with side effects.

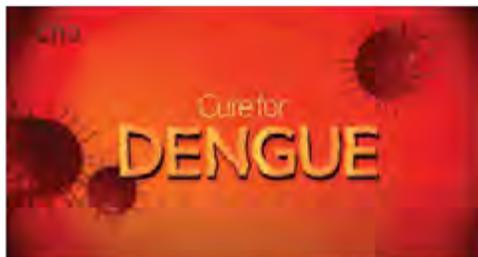
Working on a breakthrough in treatment, Asst Prof Wang Jiong-Wei and his colleagues from the Nanomedicine TRP believe, however, that a type of milk nanoparticle they have extracted may be the answer to these problems.



Watch Video



Read More



The Immunology TRP: Taking the sting out of dengue

Imagine a day when dengue patients can have their diagnosis and injection of antibodies—then simply wait for the virus to be killed within six hours.

For A/Prof Paul MacAry and his team at the Immunology TRP, their decade-long research has reaped a hopeful breakthrough of the isolation of a human antibody, and clinical trials could follow in the next 18 to 24 months.



Watch Video



Read More



The Cancer TRP: Using artificial intelligence to help cancer patients

A digital medicine platform named “Quadratic Phenotypic Optimisation Platform (QPOP)” had helped a 24-year-old fend off Stage 4 natural killer (NK) cell lymphoma, a very rare variant of lymphoma, for 16 months.

Homing in on this, A/Prof Edward Chow and Asst Prof Anand Jeyasekharan from the NUS Centre for Cancer Research TRP shared how this platform works—from generating over half a million drug combinations from a set of 12, to selecting the most effective one for the patient.



Watch Video



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The Heart of Cardiovascular Disease Research



BY DR MAYANK DALAKOTI, DR MATT ACKERS-JOHNSON,
DR RIJAN GURUNG AND PROF ROGER FOO FROM THE NUS
MEDICINE CARDIOVASCULAR DISEASE TRANSLATIONAL
RESEARCH PROGRAMME (CVD TRP)





Three years of unanticipated turbulence. Lives adapted, jobs changed. In some countries, large numbers of lives lost and healthcare systems strained. Today, many economies and governments are still faltering and suffering. Few corners of the world are untouched, but we breathe a collective sigh of relief, and hope that normal is finally back with us.

Even so, what is normal? There are some things that have not changed. For the heartbreak of every life lost to COVID-19 in the last three years, at least seven more have been claimed by cardiovascular disease. This is a trend that remains stubbornly rising over past decades across the world, and particularly acutely here in Singapore.

Here, one in three deaths, around 21 each day, are due to cardiovascular disease (CVD). CVD can cut short an adult life in its prime, and also cause debilitating chronic ill health in the silver years of an increasingly ageing population. Between 2026-2029, Singapore will become a “super-aged society”, where one in five persons will be aged 65 or above¹. By 2030, there will be only 2.1 working persons per every retired individual². CVD is the worrying barrier to population health, accounting for ~30% of chronic conditions causing overall disability³.

Against this backdrop, our article summarises CVD research at the cutting edge, from genes, molecules, RNA, DNA to cohorts and clinical trials, and takes a leap into the future.

The mighty molecule RNA

Until two years ago, no one would have imagined that half the world would come to be injected with this mighty molecule, and that RNA would become centrestage for hot biotech pursuit. Beyond being used as vaccines, RNA is now also the new therapeutic biologic that is unlocking “undruggable” targets that were previously unreachable or intractable by conventional medicines such as small molecules. For example, loaded with intricate molecular engineering design, the RNAi molecule **Patisiran**⁴, targeting the gene **TTR**, is the game changer that offers new hope for patients with amyloidosis⁵, a relatively rare but severely debilitating disease that results from abnormal protein deposition in organs, including the heart.

With wider patient reach, **Inclisiran** uses the same RNAi approach, but with a different engineering design, targeting the gene **PCSK9**, and reducing LDL-cholesterol by ~50%⁶, offering for the first time a cholesterol-lowering medicine that needs only two subcutaneous injections a year, compared to the daily doses of small molecule statins. Major effort is ongoing to identify many more gene targets of disease.

Melting plaque, helping the heart to heal

A means to identify gene targets is by studying cellular gene expression signatures called transcriptomes. Meaningful gene targets are the ones that orchestrate major behavioural changes in the cell, underpinning why and how an organ fails and progresses into the diseased

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state. Today, **transcriptomes** can be analysed by single cell technology (scRNA-seq), and combined with advanced mass spectrometry (CyTOF and CITE-seq), and/or imaging techniques such as laser-capture microdissection (LCM) to offer cell-specific and spatial resolution (spatial transcriptomics). Cell type specific gene targets are being uncovered with ever more sophistication.

In the atherosclerotic plaque, we hope that studies will yield discoveries of (a) which cells

in the plaque to target, and (b) which gene(s) to target, in order to achieve the holy grail of plaque regression. In the heart muscle (myocardium), heart failure results from the loss of contracting cells, occurring with increasing age and aggravated by a heart attack. For the latter, the aim is to find gene targets that offer regenerative therapy and myocardial self-healing. Getting to the root cause and achieving disease regression or reversal have only become possible today because of the discovery of key disease-causing genes.



1 IN 3

deaths
(~ 21 each
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disease



DNA CRISPR – “Once and for all” therapy

While repeat doses are still needed for RNAi medicines because of the cellular turnover of their RNA targets, the Nobel prize-winning technology of DNA gene editing (CRISPR) directs treatment to the blueprint DNA itself, making it a “once and for all” therapy (only one dose needed lifelong). Here again, the targeted gene edit of PCSK9 produces ~50% lowering of LDL-cholesterol⁷, and the groundbreaking CRISPR clinical trial has started recruiting in New Zealand⁸, with more patients being assessed for suitability in London.

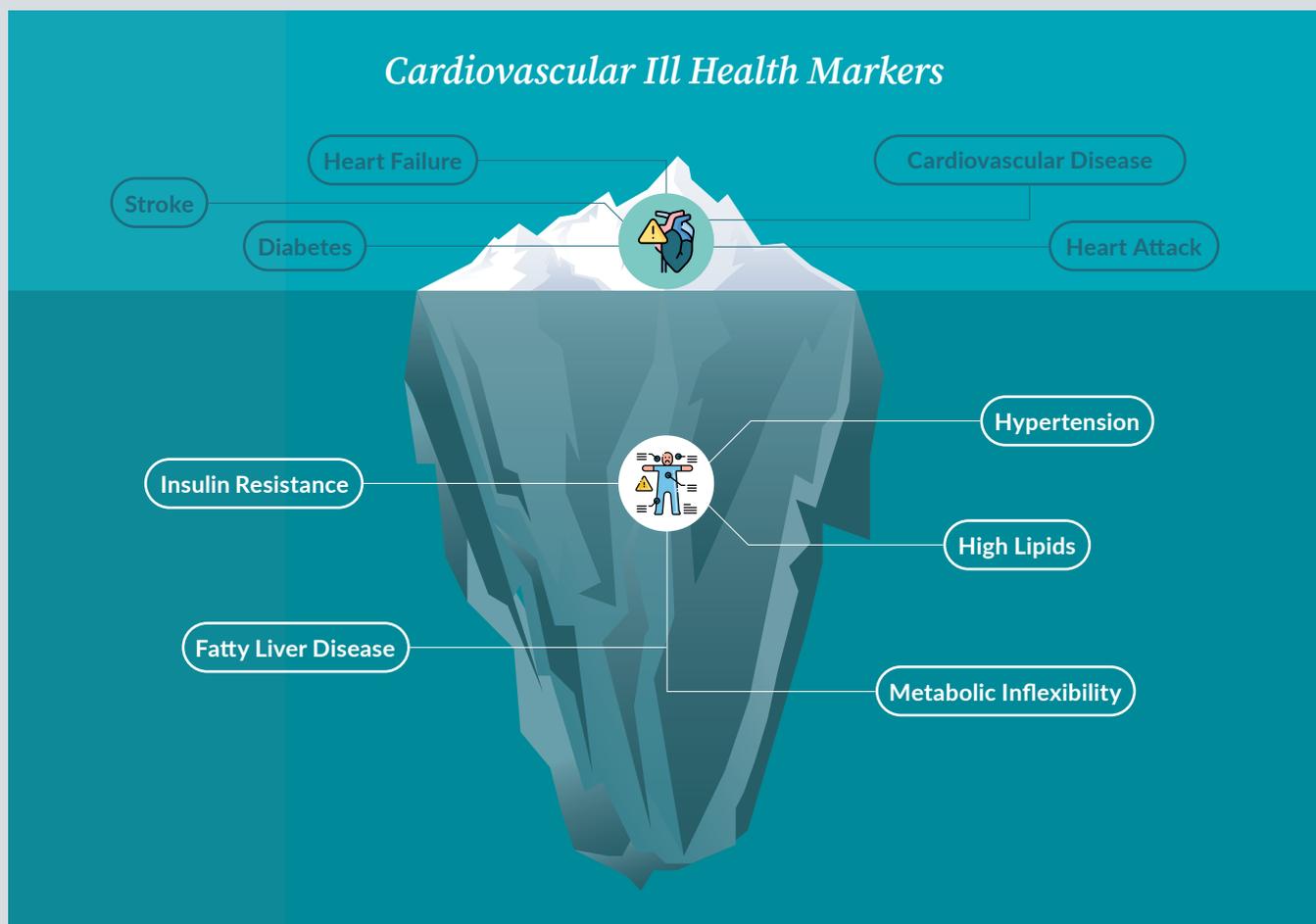
The safety for both RNA and DNA approaches will be watched closely in the coming months and years. Indubitably, the massive

impact and potential of these new medicines/technologies/therapies mean that as long as key disease-causing genes are identified, new treatment frontiers for CVD and many other diseases will be breached in the coming years.

Going below the iceberg: prevention is better than cure

We often believe ourselves to be “healthy” whilst not diagnosed with disease, but the reality is a wide continuum. Young and seemingly fit and exercise-conscious adults may appear apparently healthy, yet harbour measurable cardiovascular abnormalities, progressing unknowingly and precariously towards the tip of the iceberg.

The safety for both RNA and DNA approaches will be watched closely in the coming months and years. Indubitably, the massive impact and potential of these new medicines/technologies/therapies mean that as long as key disease-causing genes are identified, new treatment frontiers for CVD and many other diseases will be breached in the coming years.





But cardiovascular ill health is more easily reversible if detected early. Who among us has “hidden” or early CVD? Who is moving more quickly to the tip of the iceberg? Do we yet have all the best tests to assess this? What are more easily accessible markers that will help us to tell who is more prone, and who we should pay more attention to and manage more urgently? Emerging evidence suggests that lifestyle modifications such as vigorous intermittent lifestyle physical activities (VILPA)⁹ are helpful for CVD prevention. How does this apply in the Singaporean and Asian context? Our disease causal factors may differ here, so the same lifestyle changes may not work if simply transcribed over.

Sleep, circadian rhythm, psychological stress, diet choices, also have implications

on CVD health. Overall, what variables of lifestyle and social determinants should we tackle for Singapore, and how do we go about it? Beyond relying on episodic, subjective assessment of patients at each of their clinic visits, a digital medicine approach is to use sensitive and continuous measurements from the patient’s wearables (e.g. FitBit or Garmin). Dynamic lifestyle variables may indeed hold the key to new biomarkers for early CVD detection.

Answering the national call for Healthier SG¹⁰, the NUS Yong Loo Lin School of Medicine’s Cardiovascular Translational Research Programme is therefore channelling our major research effort into CVD early detection and prevention.

In November 2022, we collaborated with the IRONMAN group (organisers

of the Standard Chartered Singapore Marathon) to kick off a long-term first-of-its-kind partnership in Singapore to raise awareness and carry out research analysis of “hidden” CVD among outwardly healthy and health-conscious runners. We are doing this concurrently with our “PICMAN” and “REGULOMICS” cohort studies, recruiting and carrying out analyses on the same theme. See QR codes for details on these two studies.

Particularly poignant was when a young colleague from a partner institution experienced unexpected sudden chest pain one day in December last year. He was admitted through the A&E with what turned out to be a heart attack. He is making good recovery, but his is a story that is not unfamiliar to us in Singapore, emphasising the

pressing and urgent need for CVD research in this area.

The future is precision cardiology

Molecules and gene discovery are at one frontier, exposing new medicines that were hard to imagine possible even five or 10 years ago. No longer content with just slowing down disease progression, medicines of the future should all be targeting disease regression or disease reversal. Applying the same powerful companion molecular diagnostic tools means that we may soon also achieve the ultimate goal of precision cardiology, where

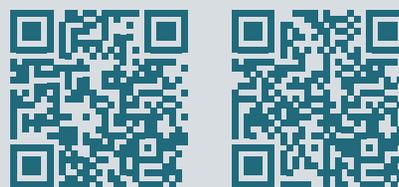
each person is assessed based on his/her detailed molecular, clinical and lifestyle parameters, following which preventive or treatment advice or medicines can be tailored and prescribed accordingly and precisely.

The wealth, diversity and mountain of data collected (including molecular, clinical and lifestyle parameters) are accumulating exponentially. Data science, data safety, data management, data interoperability, and the integrative analysis to make sense of what is relevant and how much relevance each data

point has: are all key frontiers that CVD research will have to tackle and master in the coming years.

If we get these right, our CVD research will truly bring us closer to a future where heart disease is a thing of the past.

Scan to read more about "PICMAN" and "REGULOMICS" studies:



- ¹ <https://population.un.org/wpp/>.
- ² <https://www.statista.com/topics/5821/ageing-population-of-singapore/>.
- ³ <http://www.healthdata.org/>.
- ⁴ <https://www.nejm.org/doi/full/10.1056/NEJMoa1716153>.
- ⁵ <https://www.webmd.com/cancer/lymphoma/amyloidosis-symptoms-causes-treatments>.
- ⁶ <https://www.nejm.org/doi/full/10.1056/NEJMoa1912387>.
- ⁷ <https://www.nature.com/articles/s41586-021-03534-y>.
- ⁸ <https://www.nature.com/articles/s41587-022-01445-5>.
- ⁹ <https://www.nature.com/articles/s41591-022-02100-x>.
- ¹⁰ <https://www.straitstimes.com/singapore/health/healthier-sg-six-things-you-need-to-know-about-singapores-healthcare-reform-plan>.



The Other Patient

Caregivers, Co-Patients or Unseen Victims of Trauma? Can we do better for our Patients' Caregivers?

BY DR NOREEN CHAN, HEAD AND SENIOR CONSULTANT,
DIVISION OF PALLIATIVE MEDICINE, NATIONAL UNIVERSITY
CANCER INSTITUTE, SINGAPORE

If, like me, you use Twitter for work-related discoveries and discussions, you may have come across Dr Glaucomflecken (@DGlaucomflecken) aka Dr William Flanary, whose satirical medical skits have been lighting up the Twitterverse. But it is his wife, Kristin Flanary aka @LGlaucomflecken who is the subject of this article.

Kristin had supported her husband through two bouts of testicular cancer while he was completing medical school, then residency. It seemed like they were through the worst of it, especially when he had finished his training and was embarking on his career as an Ophthalmology specialist. Then one night in May 2020, she woke up to discover that her husband was unconscious and not responding.

I knew that she had saved his life by performing CPR on him, but it wasn't until I watched them deliver the opening keynote of the ACEP (American College of Emergency Physicians) Congress this year, that I realised the enormity and horror of what had happened. The recording of the 911 call was harrowing beyond belief. Listening to the EMS dispatcher talking her through CPR, his grunts as she pounded away at his chest while their young children slept in the next room, the desperation in her voice

balanced by the reassuring dispatcher's voice "keep going honey ... they're coming soon ... 1-and-2-and-3-and-4-and..."

The EMS crew arrived after 10 minutes and managed to restart Will's heart, and he awoke in the ICU a few days later, amazingly neurologically and physically intact. When he was able to go home, there was a great sense of relief, but at the same time, nothing was ever the same again. As a couple, they needed to navigate their way back to some kind of normal life, and for a long, long time, Kristin found that she could not participate in conversations. It was as if she had no words.

She called it "the Quiet Place" and wrote about it in the *Journal of Cardiac Failure*.

It was a dark and empty chamber where no words were spoken or understood. If they were there, they flowed in and back out like a silent River Styx running through my brain. It was a place of grief and distress.

Those of us who have survived trauma need our healthcare providers to meet us in our Quiet Place. We need them to find their way into that dark chamber, light a candle, and fill it with the words that build a bridge for us to walk out.

She also pointed out that the term "caregiver" for someone like herself, was totally inadequate to describe what she had gone through and was still going through. Through her reading (of authors like Drs Katie Dainty and Kirstie Haywood), she found the labels of forgotten patients and co-patients/co-survivors. Whatever had happened to her husband, had happened to her, just in a different way. In fact, he had no memory of what happened, while she "fought death with hand-to-hand combat".

But as she expressed in "Words to Leave By: Bridges Out of the Quiet Place" the healthcare system did not recognise her needs.



She felt that those who attend hospital with a cardiac arrest patient are often “forgotten, neglected or even treated poorly”.

The JCF full length interview with Lady & Dr Glaucomflecken² reminded me forcefully that our patients’ caregivers are often more than that, and it isn’t wrong to consider them “co-patients”. It also brought home vividly the fact that caregivers or co-patients can be traumatised by the illness experience too, and how poorly the healthcare system recognises their needs.

Time and again, when I speak with families, I am reminded of how serious illness has changed their lives forever, even though they are not the patient. They can carry the scars for years afterwards, until something happens to revive painful memories. A 60-year old man with advanced cancer who was referred to our palliative care service for refractory insomnia turned out to have severe death anxiety. He wanted badly to be able to have a good night’s sleep, but at the same time, he was afraid that if he closed his eyes, he would not wake up again. It was only after we had gotten to know one another better, that he was able to share that he had been traumatised by his father’s death many years ago. Having watched him struggle and suffer with uncontrolled symptoms, led him to believe that his death would be similarly painful.

An undergraduate student contacted me last year, for advice on starting a volunteer group that would focus specifically

on caregivers of patients with terminal illness. He shared that when he was 13 years old, his mother died of cancer. He and his father had tried to care for her at home, but it was a struggle and eventually she ended up back in hospital where she died. When I asked if hospice home care had visited, he said yes, but their attention was all focused on her, and he felt that they could have supported him and his father better.

Dame Cicely Saunders is credited with saying “How we die remains in the memory of those who live on”. This is often taken as motivation to work on good symptom management and

promote comfortable peaceful dying. But it has to be more than that. We need to be aware of the caregivers, perspective and experience, in particular to be on the lookout for traumatic experiences, even “micro-trauma” or cumulative psychic injury from long drawn out illness journeys.

We need to do better. It is essential that the healthcare system does more than pay lip service to the patient and caregiver experience, and it is equally important that society and communities come together so that we can support one another. Because her/she/they, will someday be me/us.

When You Hate Yourself for Revisiting Old Wounds

by Nikita Gill

You revisit old wounds for the same reason
birds will come back to the place
their nests have been destroyed
The mind walks into the same room
because it wants to know how to fix
those floorboards, paint the walls,
turn this into a more habitable place
if it tries something different from the last time.

This is survival.

This is learning to live through pain
once the skeletons have decided to walk out
of the closet and refuse to go back in again.
Call it the worst story you have ever owned,

a car crash within your bones
that you cannot stop staring at.
But the only way to understand pain
is to look at it and feel it
without turning away.

There is no shame in this.
Eventually, it will scab over and heal.



Scan to hear the 911 recording in “the Quiet Place” here:

¹ [https://www.onlinejcf.com/article/S1071-9164\(22\)00716-3/fulltext#;YzRJHTUilo.twitter](https://www.onlinejcf.com/article/S1071-9164(22)00716-3/fulltext#;YzRJHTUilo.twitter).

² https://www.youtube.com/watch?v=OGXn_Liwzg.

Skills Demand for the Care Economy



In its Skills Demand for the Future Economy Report 2022, SkillsFuture Singapore (SSG) found that demand for employees with caretaking skills, such as professional consultation and family engagement, surged over the last four years in the Care Economy.

THE BANYAN TREE

This column is dedicated to the pursuit of continuous learning and development and takes its name from the banyan tree. It has roots that grow deep, anchoring it firmly in the soil. The tree spreads its shade wide and far and provides space for reflection and discussion. We invite you to come and take a seat under its shade.



Skills demand growth

Building upon its 2021 inaugural report, which identified skills in three main areas—the digital, green and care economies, this second edition report dives deeper by adding a new dimension on skills demand growth alongside skills transferability. The report also illustrates how mid-career workers can upskill to stay relevant in their current job category, or reskill to take on opportunities in other fields.

The Care Economy

The Care Economy continues to grow in importance in 2022. As Singapore moves into the endemic phase of COVID-19,

organisations are dealing with new challenges, such as staff resignations and shortages and increased awareness of the importance of mental health at work. At the national level, Healthier SG¹ is an ambitious plan focusing on preventive care to help all Singaporeans achieve better quality of life by promoting health, wellness and fitness.

With the demographic shift, there is an increasing need for preventive and community care, adult education, and workplace learning and development, to cater to the needs of an ageing population and workforce. Preventive care,

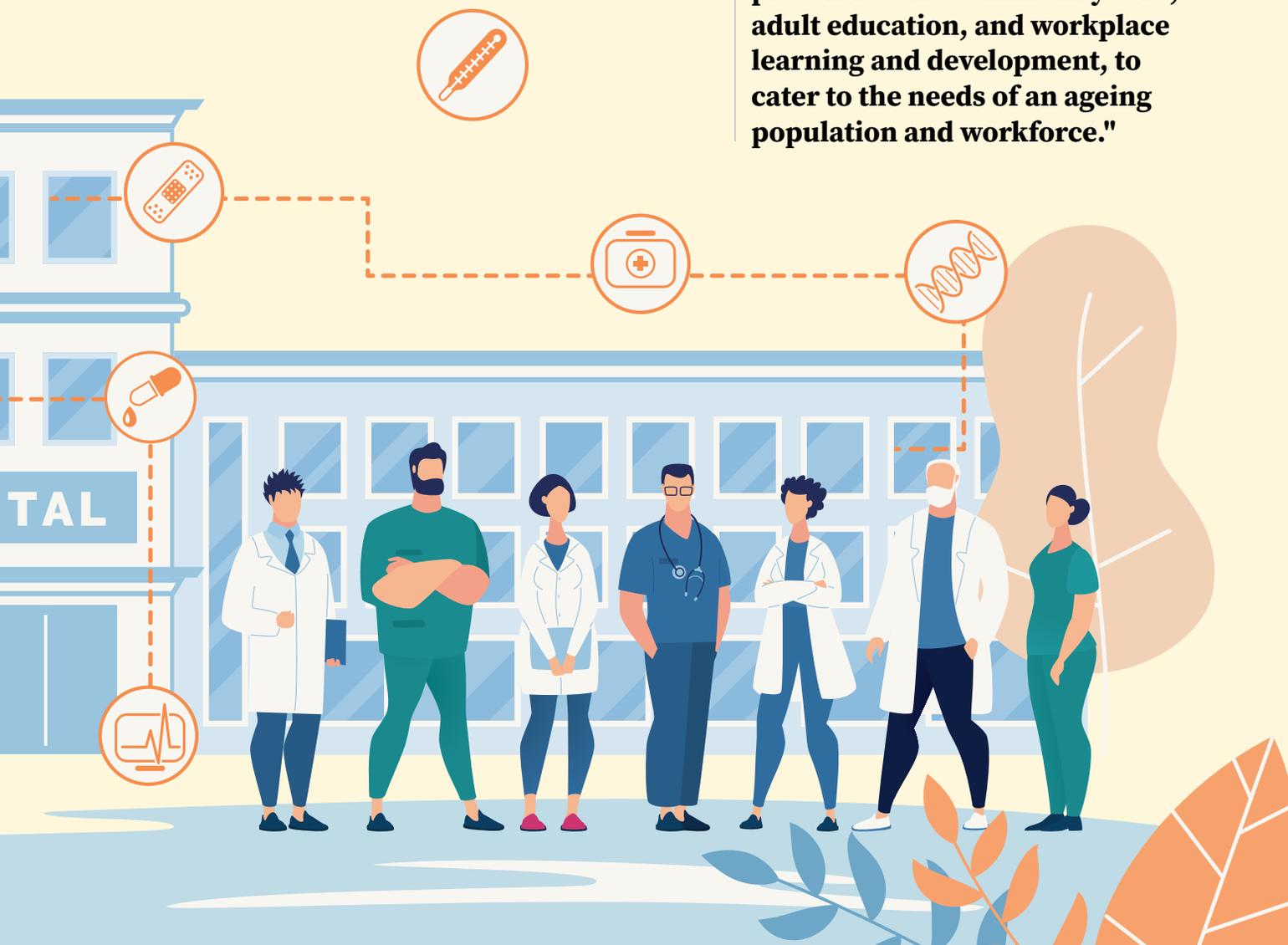
workplace learning, transformative human resource, learning and development practices, and the importance placed on mental well-being are noted to drive changes to jobs and skills.

Emerging domains in the Care Economy

The report classifies skills of increasing importance in the Care Economy into four emerging domains namely, Person-centred Care, Collaboration with Stakeholders, Teaching and Learning and Health and Wellness.



With the demographic shift, there is an increasing need for preventive and community care, adult education, and workplace learning and development, to cater to the needs of an ageing population and workforce."





Emerging Domains in the Care Economy



Person-centred Care

Skills in the Person-centred Care domain support effective delivery of personalised care to an individual. These skills support tasks in operational management, client data management, and service excellence in interaction.



Collaboration with Stakeholders

Skills in the Collaboration with Stakeholders domain strengthen care professionals' partnership abilities to deliver care services that benefit clients, as well as their families and caregivers. Strong collaboration across stakeholder groups remains a key enabler in delivering quality care. These stakeholder groups include professionals across multiple disciplines, community partners, and social service agencies.



Teaching and Learning

Skills in the Teaching and Learning domain seek to maximise individuals' performance and realise their potential. More organisations are now treating employee learning as a strategic priority to prepare their employees for changing business needs and promote their career growth. Learning specialists and business unit managers need skills to design and implement workplace learning modes and effectively engage employees through career conversations.



Health and Wellness

Skills in the Health and Wellness domain promote and develop the individual's overall health and well-being. Along with more healthcare, there will also be a greater societal need for skills that are related to preventive care, wellness and fitness promotion, mental resilience and self-care. These are needed both within companies and in the larger community.

Table 1: Highly transferable skills under the Person-centred Care domain

Skill	Demand Growth	Transferability	No. of Job Posts in 2021 Requiring this Skill	Example of Job Role
Change Management	51%	792	20,355	<ul style="list-style-type: none"> • Leading and organisation development manager • Learning solutionist • Manager in social work
Excellence in Service	69%	725	11,501	<ul style="list-style-type: none"> • Learning quality manager • Patient service executive • Youth worker
Human Resource Advisory	232%	665	8,459	<ul style="list-style-type: none"> • Head of HR business partner • Social worker • Director of nursing (clinical)

Table 2: High growth skills under the Collaboration with Stakeholders domain

Skill	Demand Growth	Transferability	No. of Job Posts in 2021 Requiring this Skill	Example of Job Role
Community Partnership	200%	171	1,355	<ul style="list-style-type: none"> • Programme executive • Senior care staff • Volunteer manager
Professional Consultation	105%	400	3,393	<ul style="list-style-type: none"> • Nurse clinician • Social worker • Manager, employee experience and relations
Family and Caregiver Engagement	100%	12	32	<ul style="list-style-type: none"> • Childcare centre manager • Patient service assistant supervisor • Senior nurse educator

Table 3: Highly transferable skills under the Teaching and Learning domain

Skill	Demand Growth	Transferability	No. of Job Posts in 2021 Requiring this Skill	Example of Job Role
Performance Management	66%	632	7,050	<ul style="list-style-type: none"> • Manager, performance and rewards • Nurse manager • Physiotherapist
Coaching and Mentoring	50%	609	5,530	<ul style="list-style-type: none"> • Learning and development specialist • Nurse educator • Youth worker
Talent Management	79%	542	7,814	<ul style="list-style-type: none"> • Manager, talent management • Psychologist • Senior social worker

Table 4: High growth and/or high transferability skills under the Health and Wellness domain

Skill	Demand Growth	Transferability	No. of Job Posts in 2021 Requiring this Skill	Example of Job Role
Resilience and Self-Care	156%	82	413	<ul style="list-style-type: none"> • Occupational therapist • Senior staff nurse • Social worker
Health, Hygiene and Nutrition for Children	159%	265	2,369	<ul style="list-style-type: none"> • Early intervention educator • Enrolled nurse • Volunteer manager
Health Promotion	30%	254	1,821	<ul style="list-style-type: none"> • Senior care staff • Speech therapist • HR business partner

¹ <https://www.skillsfuture.gov.sg/skillsreport>.

² <https://www.humanresourcesonline.net/skills-demand-for-the-future-economy-what-skills-should-you-develop-in-2023>.

³ <https://www.straitstimes.com/singapore/parenting-education/surge-in-demand-for-green-digital-care-skills-in-singapore-in-last-4-years-skillsfuture-report>.

Informed Consent for Healthcare Practitioners

What does the law say about informed consent? What do I need to do to stay within the boundaries of safe practice? What happens when the patient complains after a bad outcome and inadequate informed consent is given?

These were some of the questions addressed at the inaugural Informed Consent for Healthcare Practitioners workshop launched in September 2022. Developed by senior medical practitioners and faculty from the NUS Yong Loo Lin School of Medicine and the National University Hospital Patient Relations Department, this course sought to provide healthcare professionals with a practical guide to informed consent in Singapore.

Helmed by Programme Director, Associate Professor Chen Fun Gee, the inaugural course saw over 25 healthcare professionals participating in blended learning that combined asynchronous online learning and in-person application workshop. Through faculty presentations, facilitations, case studies, scenario plays and peer discussions, participants gain insights into informed consent in Singapore, including legal tests, basic requirements and potential pitfalls.

“Every practising healthcare professional is understandably concerned about informed consent. Inadequate informed consent is becoming a very common reason why patients seek legal redress, especially

when the outcome is less than desired,” said Assoc Prof Chen.

The course was well-received and exceeded many participants’ expectations. In particular, participants benefited from interactions with faculty members, who shared their experiences and knowledge in medical law and ethics. Bolstered by the excellent course feedback, the programme team hopes to organise more runs for learners!



Scan the QR code to learn more about the course:



Although we take informed consent routinely, it is useful to understand the components, the legal issues and go through real-life cases where there have been issues.”

Participant, Healthcare Administrator



The programme provides a viewpoint from a clinician’s point of view, which makes it more applicable to healthcare practitioners.”

Participant, Medical Doctor



Photo:

A/Prof Chen Fun Gee (second from right) sharing real-life informed consent cases at the application workshop.

NATIONAL WRITING COMPETITION

"Towards a sustainable Singapore: How youths can make a difference"

PRIZE PRESENTATION CEREMONY

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Writing the Future

Celeste Chua, Phase I student from NUS Yong Loo Lin School of Medicine (NUS Medicine), was named one of the three Merit winners of this year's National Writing Competition. Her heartfelt and articulate piece in response to the theme, "Towards a Sustainable Singapore: How Youth Can Make A Difference" strongly reflects the voices of young people and their critical role in shaping the future.

The competition, organised by the NYAA Council and Singapore Press Holdings Media Group, invited participants to share their ideas on how young people can contribute to a more sustainable lifestyle.



Photo:

Celeste Chua, Phase I NUS Medicine student receiving the merit award from Deputy Prime Minister Heng Swee Keat, Chairman of the National Youth Achievement Award (NYAA) Council's advisory board.

What We Don't Talk About: What Psychiatry and a Gap Year Taught Me about the Discourse Gap in Mental Health

BY TRICIA TAN HUI LING, PHASE IV NUS YONG LOO LIN
SCHOOL OF MEDICINE STUDENT

Nothing prepared me for the first patient I interviewed during my Psychiatric Medicine posting. Amelia was a bright eyed 16-year-old who bumbled into the consult room in an oversized band tee, wavy hair worn loose over her shoulders.

Immediately, I scribbled “euthymic, alert and well” in my notebook. In other words, normal.

“Hi, I’m Tricia, a medical student. Would you mind sharing what brings you to the clinic today?” I asked, smiling.

“Well, my mood hasn’t been that great...I’ve been seeing the doctor for a few years now.” As she tucked her arms behind her, I noticed the tell-tale stripes of scar tissue ploughed across her forearms—marks of deliberate self-harm.

“Could you share a bit more about why you started seeing the psychiatrist?” I crossed out the “euthymic” in my notebook, noting the way her voice dipped.

“The first time I overdosed was when I was 13. It was... after I started cutting for a bit. It’s been about seven times since that first time and...I don’t know... I guess that’s why I need to keep coming here.”

“I don’t even know why I started cutting. It wasn’t PSLE or boys or anything like that. I just felt so empty, like I had to do something.”

As Amelia unravelled the history of her illness, it seemed more amorphous than the cookie cutter disease templates we had learnt in lectures just a week prior. She came from a relatively wealthy family, though her parents were seldom at home. Saddled with all the symptoms of major depressive disorder, she also purged regularly, in an

attempt to shrink her already tiny frame.

I had come into the Psychiatric Medicine posting fresh from an international conference in youth mental health and a gap year spent on local and international projects. I was no stranger to the tragic stories and many barriers inhibiting access to care.

Despite this, Amelia’s story weighed heavily on me for days after. She seemed almost cavalier about her eight suicide attempts. Why?

Was it the fact that she had already been struggling in the grip of depression for nearly a quarter of her life, at the time? The eating disorder that muddled her mind and being?





Or that 12-year-old Amelia only received psychiatric aid when an ambulance rushed her to the emergency department, disoriented and with twelve Panadol pills clumped in her throat?

The treatment gap in mental health

Public health runs with the ethos that an ounce of prevention is worth a pound of cure. And yet, the 2016 Singapore Mental Health Study estimates the time taken for individuals to seek help for mental health issues, or the “treatment gap”, runs anywhere between a year for Depression to up to 10 years for Schizophrenia.

This horrifying statistic came to life when I met a young man at the Institute of Mental Health

(IMH) with a severe relapse of Schizophrenia. Charles was a 28-year-old who was acutely psychotic and now unable to return to his job. He came to IMH at age 14 with early signs of schizophrenia. But his father had thrown a fit in the clinic, unable to entertain the prospect that his son could be mentally ill. The next time Charles saw a psychiatrist was over a decade later, after his symptoms became too disabling for his family to cope with.

When I asked the doctor about his prognosis, he shook his head sadly. “It’s much easier when they present early.”

It was a near crippling sense of *deja vu*. During my gap year, I had embarked on two projects with the Ministry of Health and Ministry of Culture, Community and Youth. The same stories reflecting the fear of mental illness or unsuccessful attempts to seek help crept in, over and over again. Back then, I spent hours designing programmes and proposals to address different help-seeking barriers with youthful idealism.

As the doctor prescribed the medication changes for Charles, now disoriented by the villainous voices in his head, there was a sense that these efforts had come a decade too late.

The pandemic has hewn a broader space for discourse about mental health. It is now vague to

prioritise self-care and take stock of one’s mental health. In many companies and organisations, having a workplace mental well-being programme or even pinning up a poster to “care for your mental health!” is considered “woke”.

Yet I wonder if all the bluster about mental wellness neglects the elephant in the room—the fear that fuels denial. Fear that seeking help from public health institutions might jeopardise one’s career prospects. Fear of the emotional and financial expense it takes to “work on one’s mental health”.

Fear of mental illness is a black hole that one falls into, never to recover from again. The fear of losing the people and things closest to you. The fear of losing yourself.

Birthing hope: People, place and a purpose

In psychiatry, a patient’s history and prognosis are summed up in a “psychiatric formulation”. Part of this involves identifying the predisposing, precipitating, perpetuating and protective factors that dip and drown someone in the depths of mental illness.

For instance, predisposing factors include traumatic events during one’s youngest years, or personal or family history of mental illness. Protective factors include religion, a stable support system, and access to support services.



Fear of mental illness is a black hole that one falls into, never to recover from again. The fear of losing the people and things closest to you. The fear of losing yourself.”

It is sobering that, particularly for youth, many of these factors fall outside the circle of their control. Could nine-year-old Amelia have berated her parents for spending too little time with her? Could we have expected Charles to demand that he be treated for a condition which would likely frighten any 14-year-old?

Public discourse often pitches therapy or "seeking help" as the panacea for one's mental health woes. It is lauded as the proverbial pumpkin that portals Cinderella into the palace of eternal well-being.

But what happens when one doesn't "vibe" with their first counsellor? Or if one starts seeking help at their breaking point, only to find that the waiting time to see their university counsellor is three months?

While systemic shifts must occur to address the myriad issues inhibiting timely access to care, perhaps we also need to nuance our conversations surrounding mental health.

Moving beyond didactic or consolatory messages (Go see a therapist! It's okay to not feel good!), what if we used hope to power our slogans and stories?

For every case like Amelia and Charles, there is one like Ella's. She is a 30-year-old who ambles into the clinic, perfectly kempt, chatting animatedly about how her kids are all studying diligently for the national exams. Just a decade ago, she was hospitalised for a month after a manic episode from her bipolar disorder—she had flung herself out of a taxi after yelling "they're chasing me, they're chasing me, let me out!". She has not had a relapse in years.



While systemic shifts must occur to address the myriad issues inhibiting timely access to care, perhaps we also need to nuance our conversations surrounding mental health.”

Dr Tom Insel, psychiatrist, and former director of the National Institute of Mental Health in the United States, traces the road to mental health recovery as optimising for "people, place and purpose". People, in fostering social support; place, in having a safe and supportive environment to be in; and lastly, purpose: having a reason to be, to care about and wake up for.

While the psychiatric formulation is largely oriented around the psychiatric issue at hand, perhaps there is room for us as a society to consider a more optimistic approach in enabling recovery. Instead of disease minimisation, what if we chose to optimise for hope and flourishing? To look at nourishing a patient's purpose, fostering a place for them to recover in, and empowering others to support them?

What we don't talk about: closing the discourse gap

The word stigma derives from the Greek *stizein*, meaning "to tattoo". "Stigma" in English first

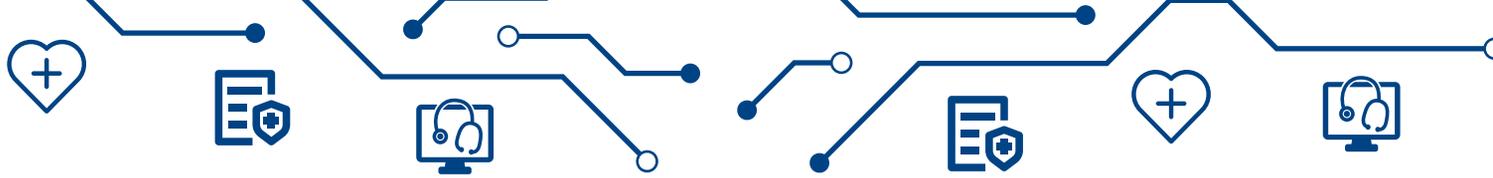
referred to the mark left by a hot iron—that is, a brand.

We speak passionately about breaking the stigma surrounding mental health and talk about how mental health is important, but the discourse is rarely immediate and personal.

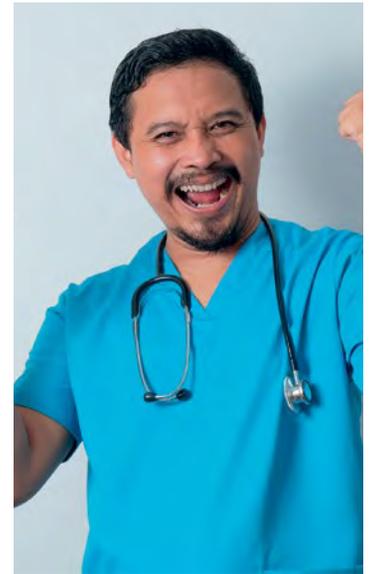
When I wrote about my own struggle with mental health for The Straits Times, I hesitated to hit send on the email. It felt "grittier" to keep it under wraps and power through, like a well-oiled machine. I was afraid of being labelled as exploitative for using my mum's cancer as a "get out of jail free card". I didn't wish for my experience as a caregiver to turn into a caricature or cliché.

But I believe there's power in being vulnerable, even when the story isn't neatly bow-tied and packaged. Let's move beyond sterile revelations from stats or manicured testimonies—I think we shatter stigmas by being straight and candid with our own stories.

* Names and minor details have been modified to protect the identities of the patients mentioned in this article.



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