MediCine

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IN AND OUT OF AFRICA

Rediscovering life lived in service to others

Contents

MediCine

MediCine is published quarterly by the communications office of the NUS Yong Loo Lin School of Medicine.

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Dean's Message

Dear Reader,

The father of American psychology, William James once said, 'You're not what you think you are, but what you think—you are.' Change always begins with new thinking: new knowledge, insights and understanding will challenge, shape and mould the minds of the Medicine Class of 2027 and Nursing Class of 2025, who start their studies and healthcare careers at an inflexion point in Singapore's battle against the coronavirus.

We see hopeful signs of an end to the COVID-19 pandemic after nearly 2.5 years of living and working differently. In doing so, our minds have been opened to the many novel ways in which life can continue, with adaptation and adjustment. Some changes will be permanent, such as flexible work arrangements, using AI and technology deliberately and increasingly to achieve better outcomes and augment limited staff resources.

With a return to more pre-COVID-19 activities, we are also able to revive meaningful events that are rites of passage for our students e.g. the White Coat Ceremony, and the Medicine Dinner.

This year's Dinner on 3 July celebrated the graduating Classes of 2022, 2021 and 2020. Graduates from the latter two classes did not have the opportunity of a final, traditional gathering with classmates and teachers before they were sent off to join the fight against the virus. So, this year's Dinner was also a long-awaited send-off and reunion for these two groups of alumni.

I have always been amazed and inspired by the talent and energy of our students. Here is yet another example: a paper authored by seven of our students and presented by its first author, fourth year student Ng Cheng Han at Digestive Disease Week (DDW) conference in San Diego, has been selected as the best abstract of the entire conference.

Their mentor, Dr Daniel Huang Qingyao told me: "They have done some impactful work that will help change practice for hepatocellular carcinoma, liver transplantation, and Non-Alcoholic Fatty Liver Disease. One of the students has multiple publications on liver cancer in journals such as the *Lancet Oncology*, and several more in press, including articles in *Cell Metabolism* and *JAMA Network Open*. This group of students are really a rare breed and I am really proud to help mentor them."

Our staff meanwhile, continue to do good work and I invite you to read about it in these pages. One example is the need to find a way to better care for patients who are facing stress, anxiety and depression, or when physical restraint is required.

Compounded by the effects of COVID-19, the rise in mental health issues has led to an increase in instances of agitation and violence against healthcare workers in recent years. As inadequate management of agitation can result in physical and psychological injuries, it is important for healthcare workers to be equipped with competencies in managing agitation safely, holistically, and empathically.

To enhance education on managing incidences of agitation in the clinical setting, a team of doctors, nurses and students has developed a new virtual reality (VR) programme to teach medical and nursing students effective management of agitated patients using empathic means, in a safe, repeatable, and controlled manner. Titled "Virtual Reality in Agitation Management (VRAM)", the programme helps students learn the skills while handling VR patients that reflect behavioural characteristics of patients often encountered by healthcare workers.

> *"I have always been amazed and inspired by the talent and energy of our students."*

Led by Assistant Professor Cyrus Ho from the Department of Psychological Medicine, the team developed the programme to integrate the learning for both doctors and nurses, so as to provide holistic care for patients in the future.

Finally, and to close on a high, I am pleased to tell you that one of the world's foremost thinkers in the field of bioethics has joined the School. Professor Julian Savulescu, who has been with the University of Oxford since 2002, brings immense expertise and deep scholarship in the discipline to NUS Medicine as the Chen Su Lan Centennial Professor. His initial three-year appointment at NUS begins in August this year. I am also happy to report that the School has moved up to 21st place (from 24th last year) in the 2022 Quacquarelli Symonds ranking of medical schools globally, and remain number 1 in Asia.

Yap Seng

NUS Medicine Launches Philip Yeo Professorship in Medicine

The National University of Singapore Yong Loo Lin School of Medicine (NUS Medicine) has established a new professorship in honour of one of Singapore's best-known public service leaders.

Named after Mr Philip Yeo, an alumnus of NUS and the former Chairman of Singapore Economic Development Board (EDB) and Agency for Science, Technology and Research (A*STAR), the professorship will see the appointment of a world-class expert to lead and spur innovative research, train the next generation of leaders in public health and medicine and forge partnerships with experts from various disciplines to comprehensively tackle public health challenges.

In an illustrious career spanning four decades in the public service, Mr Yeo made significant contributions to Singapore's economic, military, and biomedical sectors, forging a well-earned reputation as the man who led and transformed Singapore into a leading centre for biomedical research and development.

NUS President Professor Tan Eng Chye said, "In 2021, NUS conferred on Mr Philip Yeo the prestigious Eminent Alumni Award in recognition of his illustrious contributions to Singapore, especially his visionary role in building and growing Singapore's biomedical sector. We are deeply privileged to establish a professorship in the School of Medicine in honour of Mr Yeo. The Philip Yeo Professorship in Medicine will enable NUS to attract leading academics to further advance medical research and education in Singapore."

Established by NUS Medicine to transform the practice of medicine and improve the health and lives of people in Singapore and beyond, the Philip Yeo Professorship in Medicine is the second in a series of new professorships named after prominent contributors to Singapore and the field of Medicine.

"The pandemic in the last two years has brought to the fore, the need for a multidisciplinary approach in tackling global health challenges. Perspectives cutting across the political, public health, social, cultural and technological realms need to be looked at holistically and brought together as an integrated solution. We are excited to work with Mr Philip Yeo on this new professorship which we hope will help attract some of the most radical and brilliant brains in the global biomedical field and nurture the next generation of leaders who are innovative and forward-looking in addressing future healthcare needs," said the Dean of NUS Medicine, Professor Chong Yap Seng.

"We are in a time of great change as a result of technological advancements, ageing populations, changing disease patterns, new discoveries for the treatment of diseases and political reforms and policy initiatives. We live in an ever-shrinking and increasingly interconnected world linked through technology. Advances in medicine, genetics, technology, robotics, big data analytics, machine and deep learning will radically transform and disrupt the practice of medicine. I hope that this professorship can help this fine institution shine even more brilliantly and drive advances in medicine," said Mr Philip Yeo.

“We are deeply privileged to establish a professorship in the School of Medicine in honour of Mr Yeo. The Philip Yeo Professorship in Medicine will enable NUS to attract leading academics to further advance medical research and education in Singapore.”

NUS President Professor Tan Eng Chye

An illustrious service

Known for making things happen at breakneck speed during his four decades in public service, Mr Yeo served in the Singapore Administrative Service (1970-1999). He also held various appointments in the Ministry of Defence. He started multinational corporation-sponsored EDB scholarships, gathered the best brains of the country into A*STAR and spearheaded biomedical research by attracting international pharmaceuticals to do their R&D in Singapore. The benefits of such an initiative were clear to him. Singaporeans’ health and well-being would improve through the research that would be done here and jobs would be created with the establishment of international pharmaceutical R&D and manufacturing facilities. To gain an understanding of the biomedical industry, he became a keen reader of medical and scientific publications and took a course on molecular biology.

Mr Yeo also found time to serve on various bodies. He was a member of the United Nations Committee of Experts on Public Administration (2010-2013), and a member of the World Health Organization Expert Working Group on Research & Development Financing (2009-2010).

In May 2006, he was conferred the honorary Doctor of Medicine by Karolinska Institutet, the foremost medical school in Sweden. Throughout his career, he has received numerous accolades from around the world for efforts in making Singapore one of the most exciting BioScience hubs in Asia, through a variety of policy, fiscal measures and setup of world class infrastructure. He received the Japan Nikkei Prize for Science and Technology in May 2006, the Harvard Business School’s Alumni Achievement Award in September 2006, and was conferred the honorary Doctor of Science by Imperial College London and the Order of Nila Utama (First Class), one of Singapore’s most prestigious National Day Awards.

New One-stop Office for All Student-related Matters

The new Office for Students (OfS) was formed in January 2022. Four faculty staff members directly involved in the functions of OfS tell us more.

Associate Professor Marion Aw
Vice-Dean
Office for Students, NUS Medicine

Q: Why was the Office for Students formed in January 2022?

A/Prof Aw: The current Office for Students (OfS) brings under one roof all the key teams involved in student-related matters. This enables the School to support and journey with students seamlessly from the time they are admitted, and progress with them through medical school, graduation and beyond.

We also want to be more deliberate in actively nurturing our students' personal and professional development—enabling them to improve their self-awareness, relational competence and resilience. These latter goals would be achieved through various avenues, including our longitudinal mentorship programmes (Houses and EnRICH, a longitudinal mentorship programme), service-learning opportunities and numerous student life activities such as sports, team-building events and near-peer mentorship.

We envision building a community of practice, of like-minded faculty, mentors and students.

Q: What do we need to know about OfS?
A/Prof Aw: The Office for Students is made up of three teams, namely Admissions, Student Care & Support (SCS) and Student Life & Development (SLD).

Our Admissions team is the first touchpoint for prospective students who are aspiring to become healthcare practitioners in the future. Our team specialises in engaging potential students through outreach programmes such as NUS Open Day. As we work hard to attract students who embody the right attributes and values, we also continually improve processes in our annual Admissions Exercise to select these students to join our community at NUS Medicine. We work closely with our Admissions Committee, which comprises NUS Medicine faculty members from various medical disciplines and allied healthcare professions.

OfS recognises that while training to be a healthcare practitioner is fulfilling, it is also demanding. Our Student Care & Support team is committed to ensuring that all our undergraduate medical students have adequate access to academic, financial, social and emotional support in their journey with us. Our team provides a safe, confidential, and non-judgmental space for students to consult us in relation to any issues they may be facing.

We believe in nurturing our students to find and develop their professional identity as competent healthcare practitioners, as they acquire content knowledge and hone mastery in their clinical skills required to serve patients in the community. Through various types of experiences outside the classroom supported by our Student Life & Development team, we provide opportunities for students to build self-awareness, self-understanding and self-efficacy, improve their relational competence, and uncover their best potential as a professional, lifelong learner and human being. Relevant programmes, opportunities, events and activities can be found in the Student Handbook.

Dr Inthrani Raja Indran
Assistant Dean
Office for Students, NUS Medicine

Q: What assistance does the Student Care & Support (SCS) team provide?
Dr Inthrani: We will be able to assist you in these three broad areas:

1. Mental Well-Being Support
   - We provide a safe space for students to share their concerns.
   - Students may also independently seek professional help at University Counselling Services (UCS).
   - Full-time NUS students can receive up to eight free counselling services for full candidature.
   - **We understand that students may not be able to access counselling services easily because of their busy schedules. We are pleased to share that out of hours counselling services will be available later this year. Once we have confirmed details, we will inform all students.**

2. Financial Support
   - We can help students determine financial aid eligibility, applications for aid, and identify resources to meet cost of attendance.
   - Please write in to us, if you are not sure about your eligibility status so that we can work together to better assess the situation.

3. Administrative Support
   - We assist students with various administrative concerns including leave application, conference subsidy application, graduate support matters, workplace safety and injury matters.

Q: What can students expect after they email SCS their concerns?
Dr Inthrani: If it is something purely administrative, you will hear from our team via email. If we need to understand more, we will arrange for a meeting. I will attend these meetings with my Student Support Manager(s) to see how we can help you. It will be a casual chat to learn more and figure what would be the best way to support you, so please do not be afraid to reach out to us!

Assistant Professor Benjamin Goh
Assistant Dean
Office for Students, NUS Medicine

Q: When should students approach the Student Life & Development team?
Asst Prof Goh: You do not need a reason or occasion to look for us. We are here to journey through medical school and beyond with you. For Phase 1 students, I hope you are aware by now that NUS Medicine has since inception, founded societies, clubs and Houses that you could be part of.

Groups of students organise several local and overseas community outreach projects that you can participate in. If you have a burning interest to start a new project or initiative, and cannot find existing programmes to fit into, please talk to us! We can help you obtain endorsement from the School, connect you with some relevant stakeholders to jumpstart your idea and perhaps support you in terms of funding.

The SLD team also manages leadership and mentoring programmes to train and develop student leaders. Last but not least, the School organises landmark events every year to enrich student life and nurture a community of learners.

Assistant Professor Derrick Lian
Core Faculty
Office for Students, NUS Medicine

Q: Why should students care about the Houses in NUS Medicine?
Asst Prof Lian: A Latin-sounding House name, a fancy House Crest, a symbolic virtue and animal, and best of all, a physical room to chill in and call your own!

When you join our family as a medical student, you will get sorted into one of ten houses (sorry, no magical sorting hat at work here) where you will learn, play, and bond with your other Housemates. Your community includes caring senior medical students and faculty mentors who will guide you through the various challenges in becoming a doctor (and also adulthood!).

All we are lacking now, is an inter-House quidditch competition! Someone get the broomsticks!

How best to reach us?

medstudentaffairs@nus.edu.sg

We are located at MD11, #05-12, Student & Education Service Centre.

We are currently revamping our website to include more information that is useful for you. Watch this space medicine. nus.edu.sg/office-for-students/

Look out for more social media platforms as we work hard to connect with you!

We Look, but Do We See?

The International Day of Older Persons falls on 1 October every year. This poem, written in 1966 by a nurse, invites anyone and everyone who will grow old to view the elderly in a fresh, new perspective.

Cornered Lady by Mark Sijan

"Crabbit Old Woman"

by Phyllis McCormack

What do you see, nurse, what do you see?
What are you thinking, when you look at me?
A crabbit old woman, not very wise,
Uncertain of habit, with far-away eyes,
Who dribbles her food and makes no reply
When you say in a loud voice, I do wish you'd try.
Who seems not to notice the things that you do
And forever is losing a stocking or shoe.
Who, unresisting or not; lets you do as you will
With bathing and feeding the long day is fill.
Is that what you're thinking, Is that what you see?
Then open your eyes, nurse, you're looking at me.
I'll tell you who I am as I sit here so still!
As I rise at your bidding, as I eat at your will.
I'm a small child of 10 with a father and mother,
Brothers and sisters, who loved one another
A young girl of 16 with wings on her feet,
Dreaming that soon now a lover she'll meet,
A bride soon at 20 - my heart gives a leap,
Recalling the vows that I promised to keep.
At 25 now I have young of my own
Who need me to build a secure happy home;
A woman of 30, my young now grow fast,
Bound to each other with ties that should last;
At 40, my young sons have grown and are gone,
But my man is beside me to see I don't mourn;
At 50 once more babies play around my knee,
Again we know children, my loved one and me.
Dark days are upon me, my husband is dead,
I look at the future, I shudder with dread,
For my young are all rearing young ones of their own.
And I think of the years and the love that I've known;
I'm an old woman now and nature is cruel
Tis her jest to make old age look like a fool.
The body is crumbled, grace and vigour depart,
There is now a stone where I once had a heart,
But inside this old carcass, a young girl still dwells,
And now and again my battered heart swells,
I remember the joy, I remember the pain,
And I'm loving and living life over again.
I think of the years all too few- gone too fast.
And accept the stark fact that nothing can last
So open your eyes, nurse, open and see,
Not a crabbit old woman, look closer -
See Me!

↑ This sculpture of an old woman that was on display in the lobby of a Singaporean bank a few years ago is the work of American hyperrealist artist, Marc Sijan. Hyperrealistic sculptures are uncannily lifelike works of art in which the most intricate details are accurately depicted, e.g. nails, veins, skin blemishes, hair, etc.

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Deeper Understanding of Agitation Management through Virtual Reality

Empathy can be a touchy subject for healthcare workers—how can one possibly hope to understand what a patient is feeling, especially in times of duress when they become increasingly agitated or frustrated, or when physical restraint is required?

How then, can one even impart learned knowledge and experiences of such an abstract concept as empathy?

In their software—Virtual Reality in Agitation Management (VRAM)—Assistant Professors Cyrus Ho and Shawn Goh, along with their team, EMART, hope to help future generations of healthcare workers understand what it is like to be a frustrated and agitated patient, by walking a mile in such a person's shoes.

An increasing number of healthcare workers are facing problems with agitation management and experiencing difficulty in managing them appropriately, resulting in a number of them being injured or traumatised, says Asst Prof Ho.

Patients may also be harmed emotionally because of inappropriate physical restraints being applied to them. They may also have been hurt because of inappropriate remarks by healthcare workers.

"In our current medical and nursing curricula, we don't really give students a holistic overview of how we should be managing such situations, and there's also no dedicated programme for it," says Asst Prof Ho.

"So that's why we decided to do something that has a blended learning approach, combining theoretical knowledge—a didactic lecture—and roleplay, and then ultimately adding on the virtual reality (VR) perspective to it."

VRAM, which won the Grand Prize for the Medical Education Grand Innovation Challenge (MEGIC), AY 2020/2021, aims to teach students and staff across healthcare disciplines effective agitation management using empathic means, through an amalgamation of traditional teaching and technology. VRAM is introduced as part of a module called "Managing Aggression using Immersive Content (MAGIC)", which comprises a didactic lecture and role play.

Asst Prof Ho spearheaded the initiative, providing direction from a psychiatrist's perspective, with Asst Prof Goh guiding the project from a nursing perspective. Having spent time in the fields of education and healthcare, the two teachers drew on their own clinically relevant experiences with patients, and included elements to bridge the gap between curriculum and students that were otherwise difficult to convey through conventional teaching.

Other members of Team EMART, NUH Nursing staff Ms Cecilia Chng and Mr Philip Ong, also channelled their input from a nursing perspective on agitation management, while

Dr Cheryl Chang from NUH Department of Psychological Medicine provided perspectives from a junior doctor's point of view. Medical students Tricia Ng and Ernest Yang provided input as medical students, while Cherine Fok from NUS Medicine Department of Psychological Medicine bolstered the team with administrative and logistical support.

VRAM runs on the Oculus Quest 2 VR system as it is a standalone headset that does not need to be connected to any desktop, making the software easily accessible to students who wish to borrow it to practise the game at home. An external vendor was commissioned to help develop the programme, with the NUS IT team providing technical support and advice.

The VR game within VRAM, called Finding Debbie, puts the viewer into an interactive, dynamic storyline within a VR world. The viewer—who plays the role of an on-call healthcare worker in charge of a ward—is asked to assess a patient who grows increasingly aggressive and disoriented.

Joining the dots

The viewer is tasked with de-escalating the situation, removing stimuli that could possibly further agitate the patient, while piecing together what the patient could be feeling through contextual and behavioural clues.

The virtual patient the viewer is attending to would also be experiencing a drug-induced psychosis—complete with hallucinations and paranoia—having entered the ward after being found by passers-by on the road.

Distractors typically seen in an on-call setting are included in the virtual environment, including other nurses requesting the viewer to attend to tasks, a family member of another patient requesting updates and a TV in the background with its volume turned up.

"We see this very often in clinical practice," says Asst Prof Ho.

"We wanted our students to go through a scenario with things that are commonly encountered—they have to learn to use verbal de-escalation, choosing the right words to talk to the patient, they also have to learn to take away objects in the scene that could potentially be used as weapons against other patients or against ward staff."

The viewer will have to make medical decisions, such as the correct dosage of medication, and the right time to administer treatment, physical restraint, or a combination of both to the patient.

The scenario also includes ethical dilemmas, such as whether to covertly administer medication to the patient or discharging her against advice, as well as principles of medical ethics such as autonomy, where a patient has the right to refuse treatment, non maleficence, where a healthcare practitioner should not cause harm, and beneficence, where healthcare practitioners should act in the best interest of the patient.

However, a major part of the story lies in the smallest of cues that the viewer has to interpret and uncover in order to fully understand the patient's motivations (no spoilers here!).

"In the VR scenario, we give them the opportunity to choose the most appropriate reaction, with consequences if you choose the wrong one—but it's safe, you don't cause harm to anyone," says Asst Prof Goh, adding that the viewer will then learn the appropriate action to take in the future—which is how they decided on the direction of VRAM's teaching pedagogy.

He notes that more importantly, both medical and nursing curricula now aim to train future generations of healthcare workers to exercise compassion and empathy.

"Moving forward, we will see more patients with such needs, and healthcare workers need to have an empathetic response. So VRAM implicitly teaches this compassion which we hope to inculcate in future generations of healthcare workers."

"This programme is not just about managing agitation," says Asst Prof Ho.

"It's also about helping students to recognise how their actions have implications for patients and how they feel. It teaches students to use the appropriate mannerisms and responses for patients like this."

EMART also plans to begin exploring a second scenario, where viewers would experience life from a first-person perspective of a patient dealing with healthcare workers.

Viewers would go through what it feels like to be misunderstood, and how to deal with hallucinations, delusions and even physical restraint. This would help them understand patients better and increase their empathic responses.

Asst Prof Ho hopes VRAM can be further implemented in the future, possibly as a workshop, for healthcare workers to advance their learning in the area of empathy and agitation management. This would mean reaching not only nursing and medical students, but also junior doctors and nurses in hospitals.

Scan to watch how VR helps students manage agitated patients with empathy:

↑ Assistant Professor Shawn Goh (second from left), Assistant Professor Cyrus Ho (third from left), as well as NUS Medicine and Nursing students.

A Medical Educator's Personal Journey

BY ASSOCIATE PROFESSOR LIU HAIYAN, DEPARTMENT OF MICROBIOLOGY AND IMMUNOLOGY

I was raised by my grandmother. She was a primary school teacher who loved her job so much that the ideal job she planned for me was to be a teacher working with kids. However, I decided to study Medicine and continued on to a PhD in biomedical research.

For a very long time, I felt that I was going away from the path that my grandmother had wished for me. In recent years however, I realise that deep inside, I am still that little girl who loved her grandma's classroom and wished to be just like her.

When I established my independent research programme in a medical school 15 years ago, I was asked to teach undergraduate and graduate students. Without any formal training, I dived right in. For quite a while, I taught what I thought should be taught. I thought I knew what the students needed to learn and how they would learn in my subject domain. A few years later, I reflected on what defines a great educator and came to realise that a great educator supports and inspires lifelong learning in the students, who grow to become better human beings.

I thus strove to develop a student-centred teaching philosophy that would facilitate student learning and development. I understand that students learn well when they are curious about and interested in the topics, when they are motivated to solve challenging problems, and when they are inspired to take on self-motivated and lifelong learning. Therefore, my teaching practice focuses more on engaging students in the learning process, challenging them with questions and tasks to provoke deep learning and critical thinking, inspiring them to continue with their own learning even when the teaching is over.

“I am very grateful for the opportunity to join the Certificate Programme in Medical and Health Professions Education, and subsequently to become a mentor for Young Biomedical Science Educators Programme organised by the Centre for Medical Education at NUS Medicine. This learning and mentoring experience enhanced my understanding and skills as a medical and health professions’ educator and equipped me with tools and resources for my own development.”

I am very grateful for the opportunity to join the Certificate Programme in Medical and Health Professions Education, and subsequently to become a mentor for Young Biomedical Science Educators Programme organised by the Centre for Medical Education at NUS Medicine. This learning and mentoring experience enhanced my understanding and skills as a medical and health professions’ educator and equipped me with tools and resources for my own development. For example, according to the best evidence[1] didactic lectures are not very effective at actively engaging students. Therefore, I incorporated other teaching pedagogies in the process, such as placing learning materials like pre-recorded lectures and pre-reading materials online before the lecture and encouraging the students to self-study. Then, I ask them to perform some tasks to evaluate their learning and provide them the opportunity to raise their questions and get feedback. During the interactive lectures, I engage students in discussions around the key concepts by asking some fundamental questions and providing real-life scenarios to provoke thinking and discussions. I also generate formative quizzes using Poll Everywhere and LumiNUS to engage every student and provide feedback to promote student learning according to the best practice[2].

My research area is Cancer Immunology and Cancer Immunotherapy, a fast-growing field that has drawn a lot of interest from both academia and industry. Particularly, cellular therapy is a focus in the current development of novel immunotherapy strategies. There is a gap in the continuing education domain for learners who are keen to equip themselves, either to get ready for a career switch to cell therapy or to learn more about cell therapy and its applications. Together with the Advanced Cell Therapy and Research Institute Singapore (ACTRIS), the Department of Microbiology and Immunology developed a new professional certificate course to meet this need in Singapore.

As the course director, I worked with many colleagues from both ACTRIS and NUS to design the curriculum to fit the learning schedule of working professionals. We aim to help learners understand the functions of immune effector cells, with emphasis on Chimeric Antigen Receptor-T (CAR-T) cells, gain a better understanding of the regulation of immune effector cells and implications on the practice of cell therapy. The curriculum also familiarises course participants with the quality control and assurance aspects of manufacturing and applying cell-based therapeutics to patients, enables them to gain insights and acquire knowledge in the manufacturing of immune effector cells for cell therapy treatment, and be aware of the considerations involved in cell therapy clinical research.

Encouraged by the enthusiasm from the community, we are planning for a second run. Entering this continuing education domain, I strive to provide feedback to facilitate the learning process and construct an environment in which the students understand that I am open to their thoughts, eager to hear their opinions, and thrill to learn with them.

As an educator, I try to be a model for my students in the practice of lifelong learning. Joining the Coaching Certificate Programme and becoming a coach has not only had a great impact on my own life, but also provided me with a whole new set of tools and skills to help my students navigate their learning and their lives. I believe that every student has the capability to face challenges and tackle the issue in their learning journey. As their coach, I partner them to help them be the best of themselves.

My grandma passed away seven years ago. I often think of her and wonder if she would be happy with where I am now. Although I did not become a primary school teacher, I am making my impact in medical education and helping to shape the future generations of health professionals—inside and outside classrooms.

“As an educator, I try to be a model for my students in the practice of lifelong learning. Joining the Coaching Certificate Programme and becoming a coach has not only had a great impact on my own life, but also provided me with a whole new set of tools and skills to help my students navigate their learning and their lives.”

[1] Michael J. Friedlander, Linda Andrews, Elizabeth G. Armstrong, Carol Aschenbrenner, Joseph S. Kass, Paul Ogden, Richard Schwartzstein, & Thomas R. Viggiano. (2011) What can medical education learn from the neurobiology of learning? Acad Med. 86:415–420.

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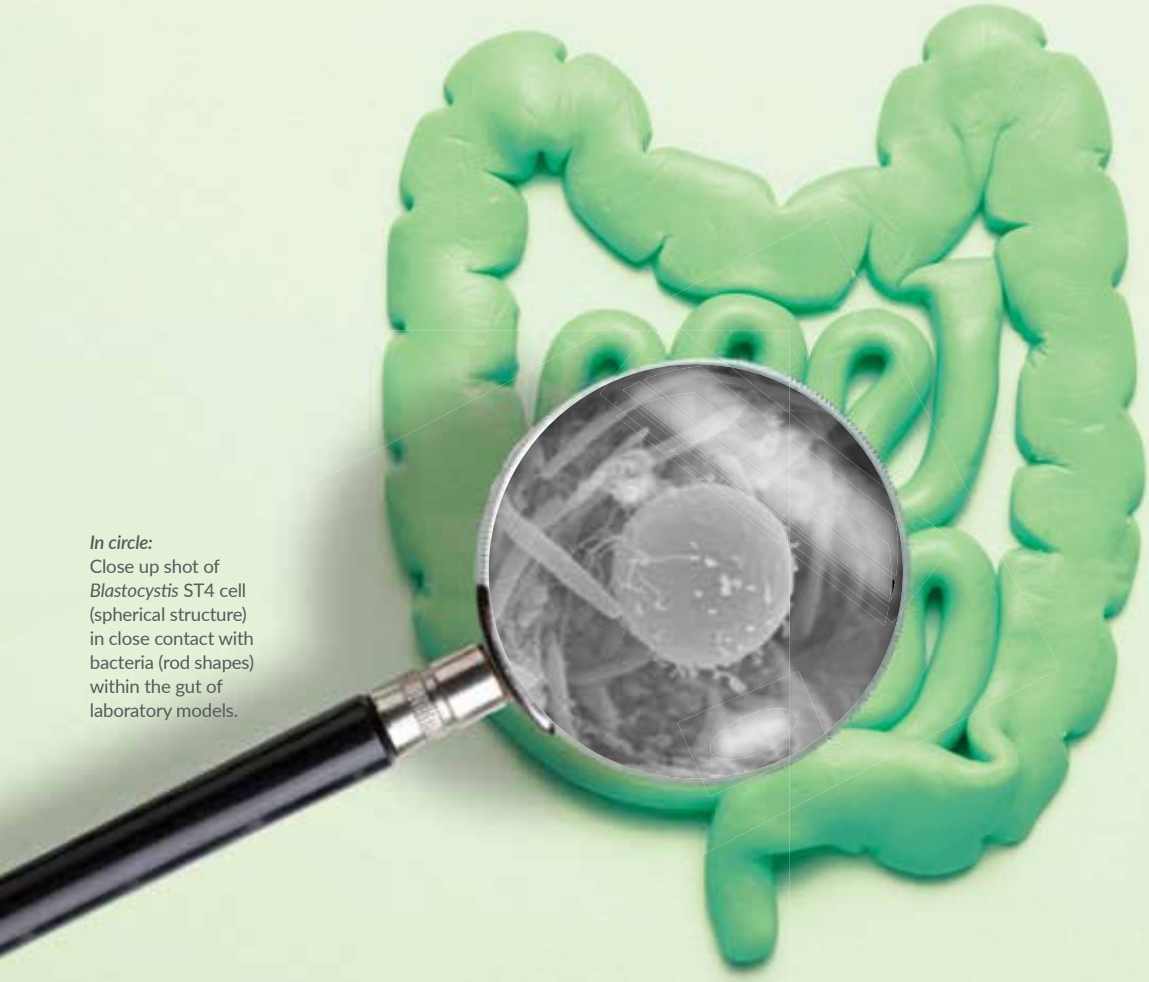


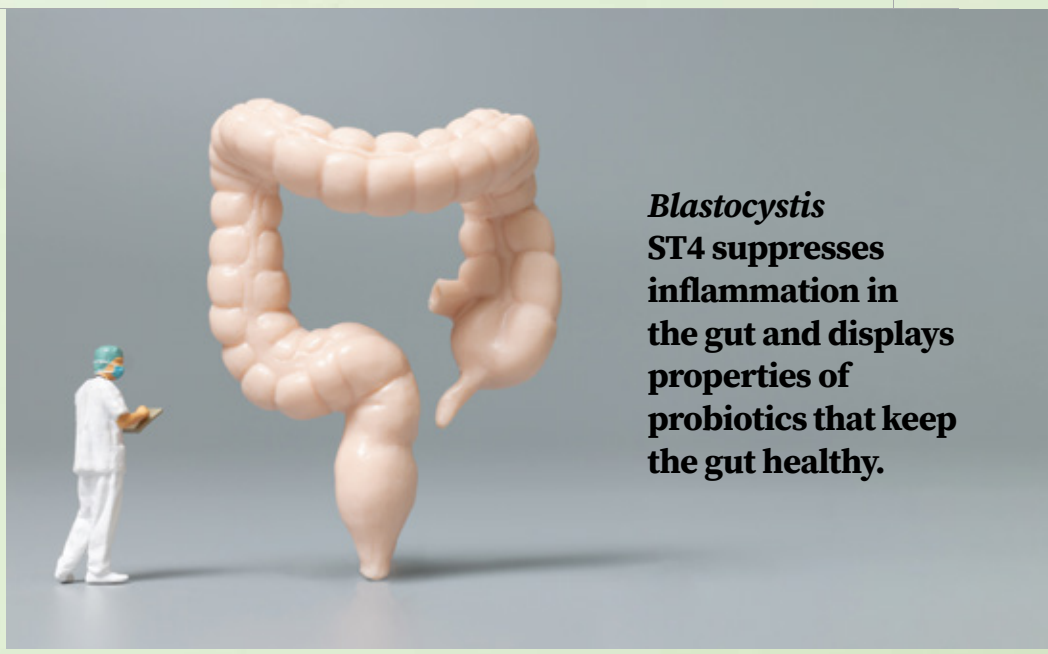
In circle:
Close up shot of *Blastocystis* ST4 cell (spherical structure) in close contact with bacteria (rod shapes) within the gut of laboratory models.

A Friend, Not Foe:

Parasite in Gastrointestinal System Found to Promote Health

BY DR THET TUN AUNG AND DR BENOIT MALLERET, DEPARTMENT OF MICROBIOLOGY AND IMMUNOLOGY, NUS MEDICINE

The human gut—or gastrointestinal system—where food is broken down into nutrients for the body, is an ecosystem that harbours thousands of bacteria species, whose interactions determine its health and susceptibility to diseases.



***Blastocystis* ST4 suppresses inflammation in the gut and displays properties of probiotics that keep the gut healthy.**

While some microorganisms are harmful, many are beneficial and help keep the human body in good health. It is largely accepted that the more diverse the species of bacteria, the greater capacity the gut has in regulating its health and combating diseases.

Higher levels of certain types of bacteria, or parasites, can result in an unhealthy gut, which causes conditions like inflammation disorders, irritable bowel syndrome, stomach cramps, bloating, diarrhoea, and constipation. However, in a study conducted by researchers from the NUS Yong Loo Lin School of Medicine (NUS Medicine), a common parasite that inhabits the gastrointestinal tracts of humans, *Blastocystis* subtype (ST) 4, was found to be associated with benefits for the gut.

Led by research fellows Dr Deng Lei, Dr Png Chin Wen and Dr Lukasz Wojciech from the Department of Microbiology and Immunology at NUS Medicine, the study showed that the parasite suppresses inflammation in the gut and displays properties of probiotics that keep the gut healthy. Published in the journal *Cellular and Molecular Life Sciences*[1], the series of experiments found that the parasite stabilised the bacteria ecosystem in the gut of laboratory models, and promoted quicker recovery from inflammation.

Dr Deng Lei, one of the authors of the study, said, "When one thinks of parasites, we do not normally associate them as beneficial organisms. However, the study proved that *Blastocystis* ST4 is not a pathogen, but could in fact promote better health of the gut."

The ability of *Blastocystis* ST4 in restructuring the state of the gut into a healthy composition of microorganisms could be a result of its ability to increase the types of bacteria that produce beneficial molecules, as well as increase immune cells that dampen inflammation. The findings of the study suggest that the detection of the parasite may in fact be linked to the presence of a healthy gut, and the microorganism could potentially be translated into probiotics to treat inflammation in patients.

Dr Png Chin Wen, another author of the study, added, "Our data indicates that *Blastocystis* ST4 behaves like an 'ecosystem engineer' that helps keep the bacterial environment of the gut diverse and versatile, to better combat potential diseases that may arise."

"The common view of bacteria is that they are either good or bad. However, interactions between bacteria and the human body evolve over time, and the key is finding a balance that can cultivate a healthy environment for the gut," said Dr Lukasz Wojciech, a co-author of the study.

While *Blastocystis* ST4 is shown to have beneficial properties, not all the subtypes of *Blastocystis* necessarily behave the same way, added the researchers. As found in an earlier study, a team from the School proved that another subtype could be harmful to the gut. Clinically, it is key for further studies to investigate the behaviour of the microorganism's various subtypes, for a more complete assessment of their respective implications.

[1] https://link.springer.com/article/10.1007/s00018-022-04271-9.

Intraocular Lenses: Degree of Clarity

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A clear-eyed look at the history of intraocular lenses.

A (random) walk down visionary lane

Sight is one of the five senses, and its importance to humans is perhaps best encapsulated by the cliché, '*the eyes are the window to the soul*'. Our vision constitutes our living reality, and its importance has been extolled extensively across different cultures.

Lenses are paramount in the function of vision and restoration of vision. From eyeglasses to intraocular lenses, there is a multitude of innovations which happened not by design, but by chance.

In this article, we take a brief walk down the evolution of lenses and how the recurring theme of *serendipity* exemplifies the Hummingbird effect and role of cross-pollination in innovative solutions for sight restoration. The history of glasses in general would first be covered in brief, followed by a deeper dive into the incidental discovery and subsequent explosion of breakthroughs in intraocular lens (IOL) technology due to innovations in adjacent industries or associated surgical techniques. Finally, we discuss the future of IOL development and how it attempts to defy the age-old axiom of senescence.

A brief history of glasses—the original man-made lens

In the book by popular science author Steven Johnson, "How We Got to Now: Six Innovations That Made the Modern World",[1] Johnson famously described how the accidental creation of the ornamental crystal glass by Angelo Barovier in the 15th century led to the discovery of the light-bending property—known as refraction—of this clear material. At around the same time and place, Johannes Gutenberg invented the movable-typing printing press, which amplified the need for good reading vision and accelerated the popularisation of reading glasses. Johnson writes, '*printing press created a surge in demand for spectacles, as the new practice of reading made Europeans across the continent suddenly realise that they were farsighted… [this] encouraged a growing number of people to produce and experiment with lenses.*'[1] These experimentations with lenses led to the invention of eyeglasses and microscopes which created the discipline of cellular biology, a phenomenon he coined the *Hummingbird effect*.

Eyeglasses are used to treat a variety of refractive errors, a

Lenses are paramount in the function of vision and restoration of vision. From eyeglasses to intraocular lenses, there is a multitude of innovations which happened not by design, but by chance.

medical condition where the focal point of light does not fall on the retina of the eye appropriately. Concave lenses are used to treat patients with myopia, or near-sightedness, where the light rays converge anterior to the retina (Figure 1); conversely, convex lenses are used to treat patients with hyperopia, or far-sightedness. In the 18th century, Benjamin Franklin, polymath and one of the Founding Fathers of the United States, developed the world's first bifocal glasses—with a top segment correcting for myopia and a bottom half correcting for hyperopia—by sawing two pieces of glass together.[2] He performed this due to the need to simultaneously see the facial expressions of people at distance clearly, while maintaining the ability to read scripts at handheld distance well.

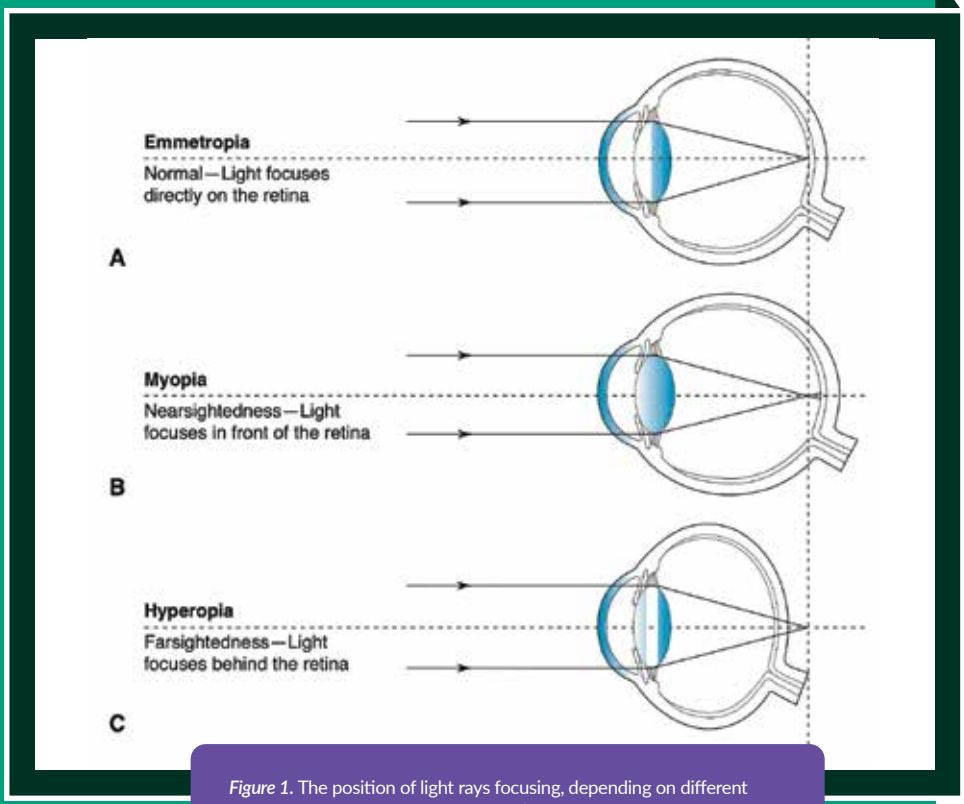


Figure 1. The position of light rays focusing, depending on different refractive statuses of the human eye. (Reproduced from Brodie SE et al, 2021 AAO Basic and Clinical Science Course Section 3: Clinical Optics)

Originally a medical device limited to the gentrified minority with resources to own them, eyeglasses have become progressively more accessible with the maturation of technology, making refractive error a correctable condition when it used to be debilitating to many. Today, the term 'eyeglasses' is perhaps even a misnomer at times; it is not necessarily made of glass (many are made of different polymers of plastic) and are sometimes worn as a fashion accessory (without optical correction properties), spurring a lucrative industry for fashion designers.[3] This further exemplifies how innovation can take multiple shapes and forms.

Cataract—the (reversible) nemesis of sight

However, the invention of man-made lenses was long preceded by the natural refractive elements in the human body. Transparent solid elements in the human eye—namely, the cornea and crystalline lens—provide an *au naturel* solution to refractive correction. To put numbers in perspective, while eyeglasses typically cover a range of +6 dioptres (D) to -15D of correction (corresponding to 600 degrees of hyperopia and 1500 degrees of myopia respectively), the human cornea and crystalline lens provide a combined refractive power of more than 60D.[4] The crystalline lens itself also has a shape-shifting property—known as *accommodation*—which allows it to change its refractive power on demand from ~20D to ~33D.[5] This ability allows the human eye to see clearly from distance to near, provided the individual is emmetropic (Figure 1). If the person is myopic or hyperopic, eyeglasses which provide the accurate prescription could solve this problem, as explained earlier.

However, this ability is only valid insofar as the media involved in the optical pathway remains clear. Unfortunately, a cataract is a natural age-related degenerative condition, in which the crystalline lens becomes opacified and is no longer able to provide adequate transmission of light (Figure 2). This typically occurs when a person reaches the age of 50 years, and progressively worsens over many years leading to blindness if untreated. As life-expectancy improved from a mean of less than 30 years old in 1770 to more than 60 years old in 2001,[6] the problem of reversible blindness from cataracts has become more prominent as the world ages and lives longer.

The first cataract surgeries restored light but not sight

Cataract 'surgery' prior to the Renaissance era was a morbid affair. A technique known as *couching* was commonly the only 'treatment' available, where the 'surgeon' rapidly inserts a needle into the eye, pushing the cataract deep into the core of the eye (vitreous) and removing it from the visual axis. While this technique eliminates the media opacity, it effectively leaves the patient lens-less, or aphakic, thus about 20D hyperopic. This means the patient restores light, but not sight, and often at the expense of great pain and risks of severe infection (endophthalmitis).

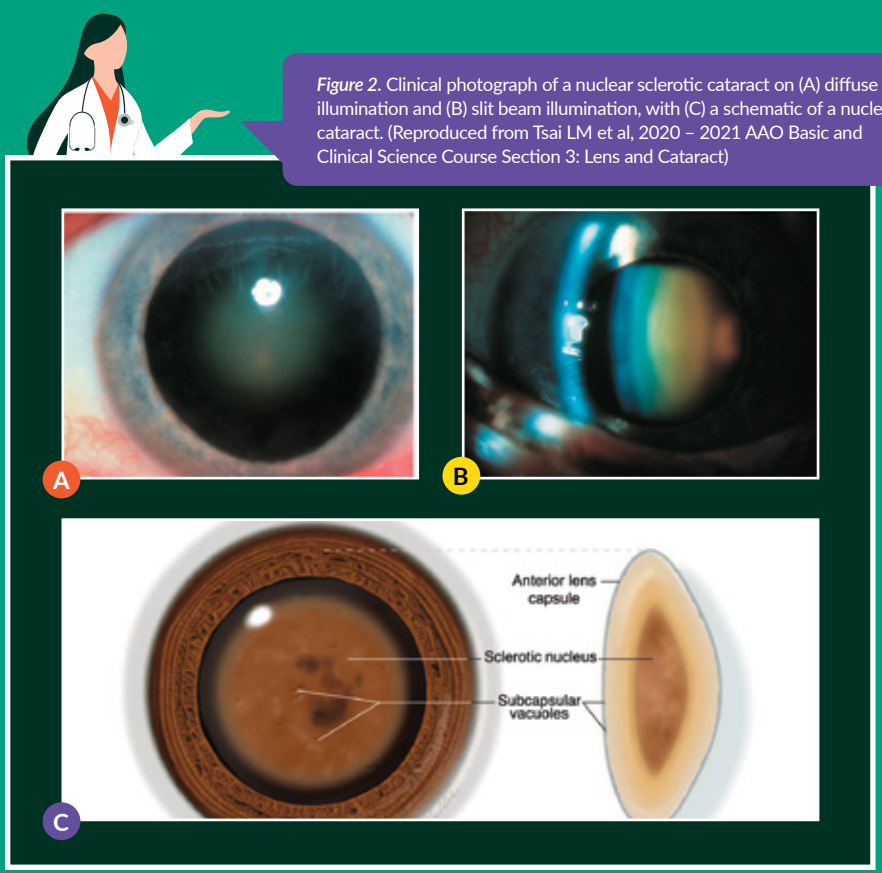


Figure 2. Clinical photograph of a nuclear sclerotic cataract on (A) diffuse illumination and (B) slit beam illumination, with (C) a schematic of a nuclear cataract. (Reproduced from Tsai LM et al, 2020 – 2021 AAO Basic and Clinical Science Course Section 3: Lens and Cataract)

In the 17th century, greater understanding of fine human anatomy (enhanced by the invention of the microscope) led to the refinements in surgical techniques, and Jacques Daviel (1696 – 1762) introduced a method to remove the cataract through a surgically-constructed 10–12mm corneal-limbal wound, a technique known as extracapsular cataract extraction (ECCE).[7] This refined technique is more elegant than traumatically dislocating the cataract into the eye through couching. ECCE resulted in improved surgical safety (reduced infection and discomfort), but still only restored light, not sight.

Several centuries then ensued with no significant improvements in visual outcomes, as there were no lenses available to be placed after cataract surgery, and patients remained aphakic—and therefore severely hyperopic—after surgery. To see better, patients had to wear thick aphakic eyeglasses, which are heavy and provided severely magnified and distorted vision.

The accidental discovery of the intraocular lens

The invention of the intraocular lens (IOL) was a serendipitous accident. Harold Ridley, an English ophthalmologist, was working as a medic with the Royal Air Force during World War II. On 15 August 1940, he received and treated a fighter pilot Gordon Cleaver, whose aircraft had been hit by cannon shells during combat over Winchester.[8] Cleaver's eyes sustained traumatic injuries from the Perspex (polymethylmethacrylate, PMMA) of the shattered cockpit of his *Hurricane* aircraft, and Ridley performed several emergency eye operations to restore his vision. While Cleaver only regained partial vision in one eye and was blinded in the other, Ridley discovered that PMMA did not induce inflammation in the eye.[8]

Inspired by his discovery, Ridley proceeded to find manufacturers to produce a PMMA IOL and performed his first ECCE with IOL implantation on 29 November 1949 at St Thomas Hospital, London, on a 45-year-old woman (Figure 3). Due to the surgical challenges of this technique, complication rates were high initially, including glaucoma, uveitis, and dislocation.[7] Ridley's work was considered highly unconventional during his time, and he faced significant backlash from the medical community, though he was eventually recognised for his important contributions to cataract surgery and awarded a knighthood in February 2000.[9] In the 1990s, Ridley received bilateral cataract surgery and IOL implantation at the same hospital where, 40 years ago, he stumbled on his seminal discovery.[10] Interestingly, the fighter pilot Gordon Cleaver who had contributed to Ridley's finding also underwent successful cataract surgery with an IOL implant in the 1980s, made from a material none other than PMMA. This time, it was intentionally and appropriately placed in his eye to restore vision.[9]

A visit to the dentist and the unexpected inspiration behind phacoemulsification

Sir Harold Ridley is not the only unconventional ophthalmologist in recent times. Since his invention of IOLs, cataract surgery was still limited by significant morbidity and inflammation due to the relatively large, imprecise 12 mm wounds created through ECCE, with some patients having to rest in hospital for up to two weeks.

Figure 3. Photograph of the original Ridley lens, which was implanted in November 1949 – note how its biconvex design closely mimics that of the human eye. (Reproduced from Tsai LM et al, 2020 – 2021 AAO Basic and Clinical Science Course Section 3: Lens and Cataract)

As life-expectancy improved from a mean of less than 30 years old in 1770 to more than 60 years old in 2001, the problem of reversible blindness from cataract has become more prominent as the world ages and lives longer.

In 1964, frustrated by the limitations of ECCE, Charles Kelman, a New York-based ophthalmologist, applied for a $299,000 research grant from the John A Hartford foundation to develop 'a method for removing a cataract through an incision small enough so that no hospitali[s]ation will be required'.[11] His initial ideas on creating smaller-wound cataract surgeries were unsuccessful, and repeated experiments on cats were futile. As chance would have it, six months before his grant funding ran out, Kelman visited his dentist for tartar removal, and experienced the newly introduced ultrasound probe (US3380446A, patent filed 3 September 1965).[12] Kelman, a jazz musician, was intrigued by the high-pitched buzz of the ultrasonic probe, and thus the idea of using ultrasound to pulverise the crystalline lens was born. In 1967, he filed his own patent on a novel ultrasound probe for a technique that would become the standard of cataract surgery today, phacoemulsification (US3589363A, patent filed 25 July 1967).[13]

Though he published his technique describing how phacoemulsification allowed incisions as small as 3 mm to be used for cataract surgery in 1967,[14] his contemporaries were not convinced. He faced significant criticism and skepticism in the 1970s, with some critics calling the procedure 'ridiculous'.[11,15] In 1973, some prominent ophthalmologists, perhaps concerned that they were losing their cataract patients to surgeons who practiced newer techniques, convinced the National Eye Institute to declare phacoemulsification experimental and not reimbursable through Medicare, the national insurance of the United States.[16] Kelman, however, eventually proved his critics wrong, and he had IOL innovation to thank for that.

The Hummingbird effect of phacoemulsification on intraocular lens innovation, and vice versa

Prior to phacoemulsification, IOL development had stalled after Sir Ridley's original invention for several decades. This was primarily because the bottleneck of vision restoration was not IOL design, but the unpredictability of wound sizes. With a 12 mm wound from ECCE, refractive outcomes were imprecise due to the surgically induced astigmatism which could be as high as 8D, and patients typically would expect a variability of at least 2D of refractive error no matter which IOL was chosen.

The advent of phacoemulsification greatly reduced wound sizes. Phacoemulsification, however, had its own existential crisis initially because no IOLs could fit through a 3 mm wound at the time of its invention! As a result, surgeons then had to manually open the wound to 6 mm for the IOL insertion.[17] While this improved the visual outcomes as compared to ECCE, overall vision and predictability were still poor. The indirect beneficiary of phacoemulsification, however, was the renewed interest in IOL innovation, and various surgeons began experimenting with newer IOL designs.

In 1982, Thomas Mazzocco invented the first foldable IOL made of silicone (CA1275351C, priority date 5 February 1982).[18,19] Using a plate design, this IOL could be inserted through a 3 mm wound, meaning surgeons no longer had to expand the typical phacoemulsification wound for IOL insertion. This, together with improved surgical techniques, intraocular materials and viscoelastic devices, catapulted phacoemulsification into the mainstream. Wound sizes continued to reduce (as small as 1.8 mm incisions are possible) while visual outcomes and refractive predictability continued to improve (≥80% of patients achieve within 0.5D of refractive target).[20] This led to a flurry of new lenses which provided further improvements in visual quality beyond simple visual acuity (e.g. toric lenses which correct astigmatism, apheric IOL surfaces which reduce visual aberrations, etc).

Today, a healthy patient undergoing cataract surgery could expect distance vision equivalent to that of a healthy 20-year-old. Figure 4 summarises the timeline and close interlink between cataract surgery development and IOL development in recent times.

True accommodative IOLs remain an elusive goal and a problem yet to be solved. Current attempts at accommodative IOLs have proven to have limited success and true accommodation remains the holy grail of cataract surgery.

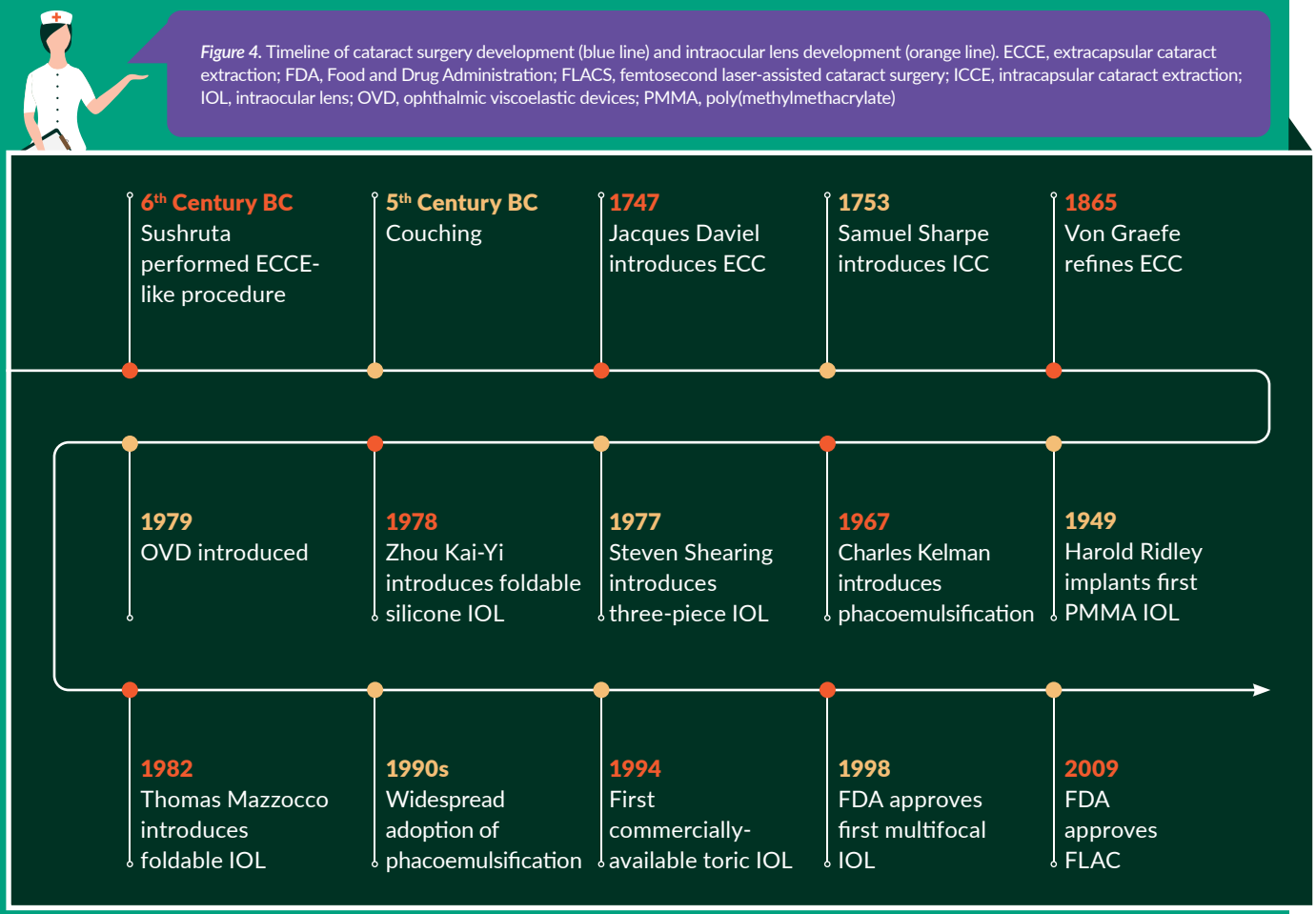


Figure 4. Timeline of cataract surgery development (blue line) and intraocular lens development (orange line). ECCE, extracapsular cataract extraction; FDA, Food and Drug Administration; FLACS, femtosecond laser-assisted cataract surgery; ICCE, intracapsular cataract extraction; IOL, intraocular lens; OVD, ophthalmic viscoelastic devices; PMMA, poly(methylmethacrylate)

Presbyopia—the next hurdle and the future of intraocular lens innovation

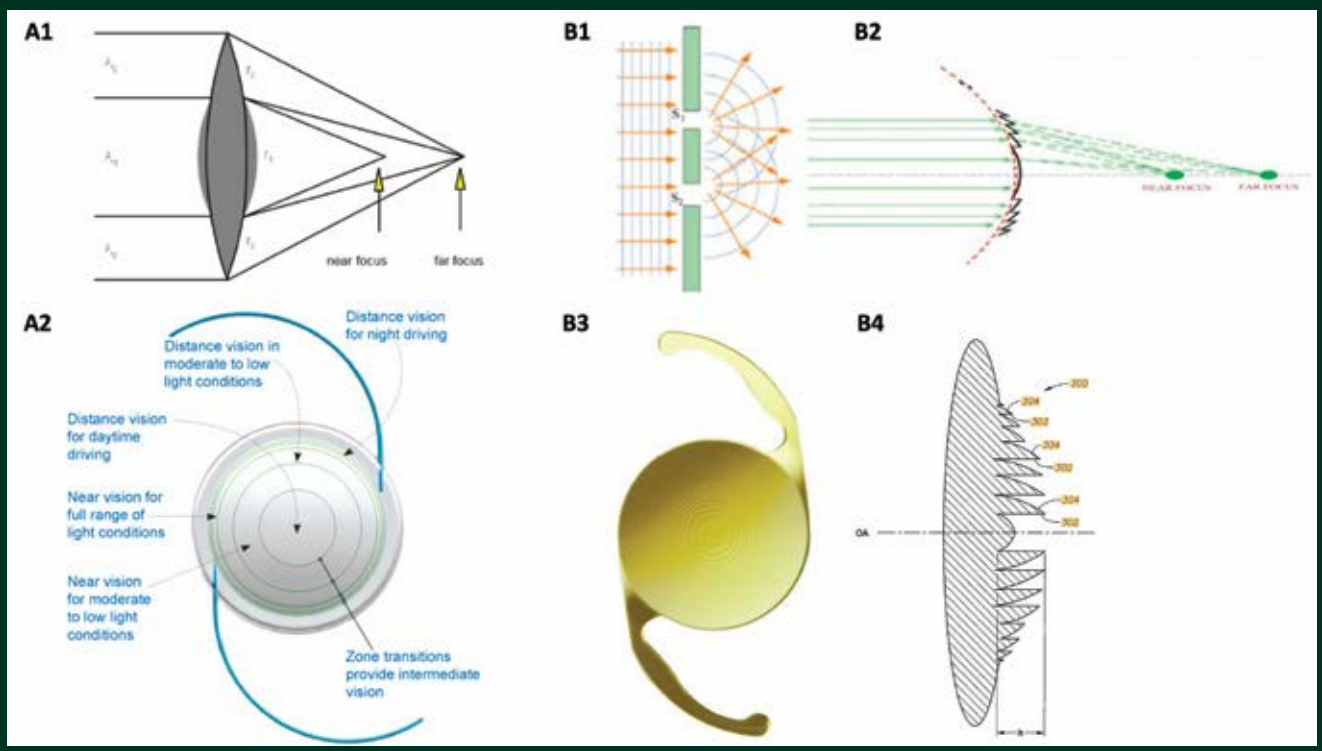
IOLs have continued to improve with each iteration. Today, cataract surgery restores both light and sight. There is yet one problem, however, which has not been adequately addressed.

Presbyopia refers to the loss of accommodation over time, meaning a person loses his or her natural near reading ability from around 40 years old.[7] With improved life expectancy and literacy, functional performance and visual expectations after cataract surgery have increased as well. Spectacle-independence has become a need instead of a want especially in the mask-wearing COVID-19 era.

Thus far, lens makers have made use of different optical principles to achieve pseudo-accommodation, creating a category of IOLs called multifocal lenses.[7] These multifocal IOLs either bend or split light into different focal points, creating distinct zones of sharp vision—typically, distance, intermediate, and near reading. Two current leading concepts have improvised on light principles discovered centuries ago: the principle of refraction (Figure 5A) and the principle of diffraction (Figure 5B). When Dutch mathematician Willebrod Snel van Royen discovered the law of refraction in the early 1600s and English physicist Thomas Young described his double-slit experiment in 1801, they could hardly have imagined that their discoveries would one day find their way into implants to correct vision.

True accommodative IOLs, however, remain an elusive goal and a problem yet to be solved. Current attempts at accommodative IOLs have proven to have limited success and true accommodation remains the holy grail of cataract surgery.

Figure 5. Examples of two designs of multifocal intraocular lenses based on different principles. (A1) Refractive design, where lenses have different zones of refractive indices bending light to distinct foci; (A2) an intraocular lens with refractive design; (B1) diffractive principles based on Young's double-slit experiment, and (B2) diffractive design incorporated onto a lens where different constructive and destructive interferences provide blending zones of clear vision; (B3) and (B4) showing an example of diffractive intraocular lens in en face and cross-sectional view, respectively.



Lessons from the journey of intraocular lens discovery

This random walk down visionary lane has illustrated that the journey of innovation is replete with accidental discoveries, sometimes literally so. From the tragic salvation of Gordon Cleaver by Sir Harold Ridley to the million-dollar trip to his dentist by Charles Kelman, inspiration can strike anytime, anywhere. It is amazing how far cataract surgery has come from what was essentially brutally invasive trauma to the patient and which merely restored light but not sight to an elegant bloodless procedure which (almost) perfects vision beyond senescence. Biologists would be familiar with the anti-ageing role of telomerases, and cataract surgery increasingly resembles the age-defying telomerase of lens ageing. The elderly who would naturally be blind are seeing better than ever before, thanks to the culmination of innovations in IOL technology. Several lessons can be learnt from this meandering journey.

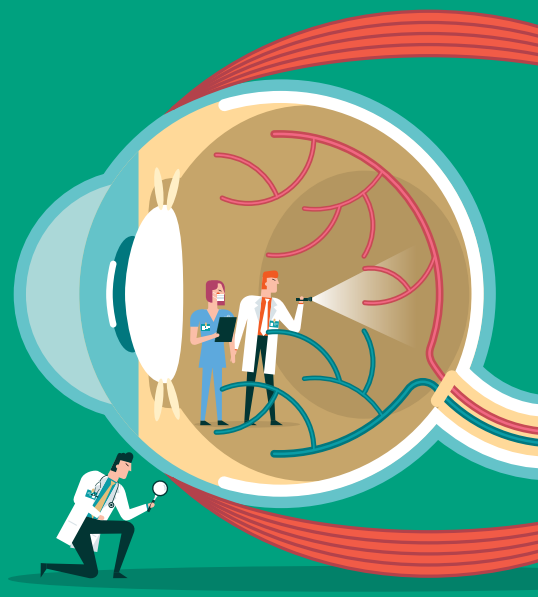
Firstly, beyond the charm of Hummingbird effects—from the unexpected innovations in eyeglasses to the discovery of IOL catalysing small-wound cataract surgery, to the continual improvements in IOL precision when phacoemulsification enabled small-incision cataract surgery—it is evident that discoveries made today may only realise their full potential decades down the road. In the case of Snel's discovery of refraction and Young's discovery of diffraction, it may even ring true centuries down the road.

Next, besides mimicking the flight of insects to get nectar from flowers,[21] hummingbirds are also responsible for another important analogy in innovation—cross pollination. Applicable technologies

are disease- and domain-agnostic, and often find ways of application in parallel but distinct fields. High-frequency ultrasound-based technology do not only scale teeth, but also emulsify cataracts, and provide non-invasive imaging modality used throughout medical practice, most recently in super-resolution vascular oncological imaging.[22]

Finally, the path of innovators is often fraught with detractors. Both Sir Ridley and Dr Kelman faced their fair share of naysayers who continually discouraged their innovations, sometimes for cynical reasons. It takes a certain fortitude and can-do spirit in a lonely journey as the underdog who persistently strives against Goliaths of the day. Nonetheless, so long as the pursuit is for a genuine, unsolved clinical need, the persistence would often pay off eventually.

In a world where efficiency maximisation and opportunity cost-optimisation continue to dominate headlines and performance milestones, it is worth remembering that just like the best lessons, moments of inspiration are often caught, not taught.



In a world where efficiency maximisation and opportunity cost-optimisation continue to dominate headlines and performance milestones, it is worth remembering that just like the best lessons, moments of inspiration are often caught, not taught.

Therefore, do not fret the more scenic path, for you never know what you might chance upon.

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What Comes Next in the COVID-19 Pandemic?

BY DALE FISHER, SAMEERA SURI, GAIL CARSON, ON BEHALF OF THE GOARN COLLABORATORS

The COVID-19 pandemic is not over, but with collaboration and solidarity, we can transition to a manageable endemic disease state sooner, and better mitigate the most severe health and socioeconomic impacts.

In this third year of pandemic response, society needs to focus on improved implementation of effective interventions to end the acute phase. Governments and health authorities have the necessary knowledge and tools in hand, in the form of vaccines, diagnostics, and therapeutics, but equitable availability of these tools remains a challenge globally.

Today's decisions and efforts will continue to affect the pandemic's overall health, social, and economic toll. According to *Our World in Data*, 700,000 deaths were recorded as COVID-19 related between January and March, 2022, and only 14.5% of people in low-income countries have received at least one dose of a COVID-19 vaccine. SARS-CoV-2 variants continue to emerge as trust between governments and their constituents is tested, rendering sustained implementation of broad community-based interventions challenging. In many communities, crucial non-COVID-19 health services are yet to be fully restored to pre-pandemic levels.

The emergency phase of the COVID-19 pandemic will eventually end, but when will be determined by collective actions. Likewise, what is learnt and how society grows from this experience can still be influenced. The next pandemic need not catch the world so unprepared.

The extraordinary nature of this pandemic calls for extraordinary analyses at global, national, and organisational levels. Society must reflect on what has been learnt about ourselves, our communities, our governance, and our preparedness and response systems. SARS-CoV-2 has caused too much harm in terms of death, morbidity, careers, relationships, finances, plans, and dreams for us to fall short of rigorous and independent after-action appraisal of the pandemic response. Communities have a right to understand why and how the pandemic response unfolded the way it did and to be assured improvements will be made. National and global leaders must use the knowledge gained from this pandemic and its reviews to ensure more robust multidisciplinary governance, and equitable health and public health systems going forward.

Communities have a right to understand why and how the pandemic response unfolded the way it did and to be assured improvements will be made. National and global leaders must use the knowledge gained from this pandemic and its reviews to ensure more robust multidisciplinary governance, and equitable health and public health systems going forward.

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A fresh approach to global health security is needed as well as the development of better measures of preparedness, with a greater emphasis on collaboration and equity. We call for improved funding to enhance both preparedness efforts and alert, and rapid response capabilities at both national and international levels. Sustained financing for institutions is necessary to train future leaders and build a global response workforce that embraces multidisciplinary scientific and public health networks as core. Immediate operational response needs at the country and local levels must be supported with sufficient resources.

Since its inception in 2000, the Global Outbreak Alert and Response Network (GOARN) has grown to encompass 270 partners and responded to almost every major national and international outbreak through deployment of more than 3,500 experts to over 100 countries. Drawing from this experience, the Steering Committee of GOARN offers the following recommendations outlining important next steps at this stage of the COVID-19 pandemic that would enable communities to better mitigate the health and societal impacts of the next pandemic.

The emergence and re-emergence of high consequence diseases highlight the need for better global coordination; national level preparedness; closer involvement of communities in prevention, preparedness, alert and response; directed and interdisciplinary training of stakeholders; and integration of applied research for the strongest outbreak response.

Total death counts resulting from the pandemic exceed the mortality registered from COVID-19 alone. Excess deaths are attributable to fear to seek medical care, postponed treatments and overwhelmed systems that could no longer provide essential health services. The early post pandemic phase will realise a need to manage excess physical and mental health consequences, whether immediately COVID-19 related or indirectly related, including interrupted programmes that identify chronic diseases, provide vaccines, and prevent infectious diseases and malnutrition.

In addition, the content of future independent reflective after-action reviews will help inform global policy discussions regarding future governance, systems improvement, and financing to develop healthy communities that are adequately prepared to respond to future health emergencies.

In this context, we make the following observations and recommendations.

01 Decisions made today influence the impacts of this pandemic. Communities and their leaders must endure, applying the lessons from the last two years. The multidisciplinary technical and operational pillars of outbreak response must remain coordinated and enabled to continue their function, underpinned by strategic community engagement via two-way communication to ensure concerns are being addressed and trust is optimised.

02 Case numbers are not a helpful measure now and can be replaced by sentinel surveillance systems to understand trends. Further refinement of metrics that matter is needed, including excess mortality, severe disease, overall physical health issues, health and social care capacity, absenteeism of essential workers, school continuity, mental health consequences and the social and economic impacts that affect people.

03 Non COVID-19 health and social services must be restored as quickly as possible to ensure people are not unnecessarily suffering from other illnesses including mental health and maintain preventative efforts via cancer screening, vaccinations, etc. Priority should be given to health and social services for women and children that have been disproportionally affected by the public health and social measures implemented to reduce COVID-19 transmission.

04 Enacted by governments across the globe, a proactive and collaborative approach to scaling production and sharing the response tools (including vaccines, diagnostics and therapeutics) available now can expedite the end of the acute phase of the pandemic.

05 Support vaccine equity through the evolving network of global vaccine manufacturing and technology hubs with patent suspension and active support for manufacturing (licensing, know-how, removal of export barriers).

06 The vaccine response needs concurrent social and public health measures to slow transmission when health and social systems are being overwhelmed. Border controls have deleterious effects and should not be relied upon to sustainably prevent spread of emerging SARS-CoV-2 variants.

07 Science and decision-making need a refreshed alignment with governments countering deliberate misinformation through a strategic approach to risk communications and community engagement. Regulation can be introduced or reinforced as deemed appropriate.

08 Thorough, evidence based and unbiased analyses of the impact of the pandemic should be planned. Longer term preparedness efforts as well as the response itself can be analysed by the many components to drive improvement in governance and health systems.

09 Availability, accessibility, and affordability should be built in at the very early stage in any tools development and should be conditional for any international sponsorship.

10 Vulnerabilities identified within various settings and systems mustn't be forgotten and communities must push for longer term societal reform for high-risk individuals and contexts.

11 Assessment tools of national epidemic and pandemic preparedness need review, moving away from static measures and checklists towards scenarios and exercises that can identify weaknesses, including coordination and tensions at leadership interfaces.

12 Beyond the support to most socio-economically vulnerable and underprivileged populations and communities that need to be kept as a top priority by national and international organisations, it is critical to ensure that a COVID-19 response is community-based, with community needs and perspectives driving public health decision-making.

13 Outbreak prevention, preparedness, alert, and response measures need greater recognition through the resourcing, stress testing and coordination among GOARN partners who are capable of assisting the development of a global health workforce to ensure adequacy of capacities including alert and rapid response, coordination through incident management systems, integrated data and analyses, communications and support to communities, and life-saving support to patients.

14 These measures require a commensurate political and financial commitment to lead to healthier communities with broad-based improvement in health across infectious diseases as well as non-infectious conditions.

GOARN is an international and highly agile network established 21 years ago, and partners are practised in working with governments and public health institutions. The network has the potential to considerably amplify outbreak preparedness, alert and response efforts through its partners and long-standing relationships to further strengthen the global safety net of a trained workforce and engage with the communities.

Professor Dale Fisher is a professor at the Yong Loo Lin School of Medicine, National University of Singapore (NUS Medicine), and the chairman of GOARN

The full text was first published on 11 April 2022 in The Lancet.

International Study:

Myopericarditis Risk after COVID-19 Vaccination is Low

As of March 2022, more than 10 billion doses of COVID-19 vaccines have been administered globally. While most side-effects of the vaccine are mild and self-limiting, myopericarditis or inflammation of the heart is increasingly being reported after COVID-19 vaccination.

A new study published in *The Lancet Respiratory Medicine*[1], found that the overall risk of myopericarditis following COVID-19 vaccination is very low, affecting 18 people per million vaccine doses. This confirms that the risk is comparable to or lower following COVID-19 vaccination than some of the other non-COVID-19 vaccines.

A team of researchers from the National University Heart Centre, Singapore (NUHCS), the National University Hospital (NUH) and the Yong Loo Lin School of Medicine, National University of Singapore (NUS Medicine), examined international databases, looking at more than 400 million vaccination doses, to compare the risk of myopericarditis following vaccination against COVID-19 and other diseases such as influenza and smallpox. They found no statistically significant difference between the incidence of myopericarditis following COVID-19 vaccination (18 cases per million doses) and other vaccinations (56 cases per million doses).

"Our research suggests that the overall risk of myopericarditis appears to be no different for this newly approved group of vaccines against COVID-19, compared to vaccines against other diseases. The risk of such rare events should be balanced against the risk of myopericarditis from infection and these findings should bolster public confidence in the safety of COVID-19 vaccinations," said Dr Kollengode Ramanathan, Senior Consultant in the Department of Cardiac, Thoracic & Vascular Surgery at NUHCS and the corresponding author of the study.

Risk of myopericarditis is

18 PEOPLE PER MILLION

of COVID-19 vaccine doses

The incidence of myopericarditis is significantly higher in people younger than

30 YEARS

and after a

2ND

dose of vaccine

Myopericarditis is a condition that causes inflammation of the heart muscle and, in some cases, severe permanent heart damage. It is most often caused by viruses but can also occur after vaccination in rare instances. There have been reports of myopericarditis following mRNA-based COVID-19 vaccination, especially in adolescents and young adults. This study aimed to determine whether this increase in reporting was due to a true increase in incidence or a result of improved reporting systems and recall bias.

Researchers analysed more than 20 studies from international databases with reported incidences of myopericarditis following any type of vaccination between January 1947 and December 2021. Of these, 11 studies looked specifically at COVID-19 vaccinations, covering over 395 million COVID-19 vaccine doses—nearly 300 million of which were mRNA vaccines. The rest of the studies covered other vaccinations such as smallpox (2.9 million doses), influenza (1.5 million doses), and others[2] (5.5 million doses).

Among people who received COVID-19 vaccines, the incidence of myopericarditis was significantly higher in males (vs females), in people younger than 30 years (vs 30 years or older), after receiving an mRNA vaccine (vs non-mRNA vaccine), and after a second dose of vaccine (vs a first or third dose).

To put the findings into context with the risk of myopericarditis following COVID-19 infection, the authors conducted a post-study analysis. Among 2.5 million patients who were hospitalised with COVID-19, many of whom had clinical or radiological suspicion for myopericarditis, 1.1% had myopericarditis. However, while these figures provide a frame of reference, the authors note that the results are not directly comparable with the number of cases of myopericarditis following COVID-19 vaccination due to different units of measurement.

"The occurrence of myopericarditis following non-COVID-19 vaccination could suggest that myopericarditis is a side effect of the inflammatory processes induced by any vaccination and is not unique to the SARS-CoV-2 spike proteins in COVID-19 vaccines or infection," said Dr Jyoti Somani, an infectious diseases specialist at NUH, and a co-author of the study. "This also highlights that the risks of such infrequent adverse events should be offset by the benefits of vaccination, which include a lower risk of infection, hospitalisation, severe disease, and death from COVID-19."

Mr Ryan Ruiyang Ling, co-author and a medical student at NUS Medicine, added, "The scale of mass global vaccination and enhanced surveillance might account for the increased reporting of this adverse event in the context of COVID-19 vaccination. Nonetheless, certain subpopulations—those of male sex or younger age and those receiving an mRNA vaccine, particularly the second dose—appear to be at increased risk of myopericarditis following COVID-19 vaccination. These findings are important additions to the conversation when weighing the risks and benefits of COVID-19 vaccination during this pandemic."

The authors acknowledge some limitations with this study, particularly noting that the findings include only a small proportion of children under the age of 12 who have only recently been eligible for vaccination, and that results of this study cannot be generalised to this age group. In addition, comparisons have been made across different time periods for different vaccines. Diagnostic tools might have differed or not been available leading to lower reporting of cases in earlier studies.

Dr Ramanathan said, "There are several areas to which future research can build on our current study. Firstly, most of the studies included in our review did not report on outcomes of patients younger than 12 years receiving vaccination against COVID-19, as vaccination of this younger age group is relatively recent. Future research investigating the incidence of myopericarditis in this age group would inform clinical decision making for vaccinating children against COVID-19. More research also needs to be conducted to better understand the risk- benefit profile of COVID-19 vaccines in the context of protection against infection, hospitalisation and severe disease, and its potential adverse effects. The impact of booster vaccines will require further research as well."

1 https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(22)00059-5/fulltext.

2 Other viral vaccines in this study included: varicella, yellow fever, oral polio vaccine, measles, mumps and rubella, meningococcal, diphtheria, pertussis and tetanus, Bacillus Calmette-Guerin, hepatitis, and typhoid.

INNOVATING FOR THE FUTURE

Celebrating talent and innovation at NUS

NUS, in partnership with CNA, has developed an inspirational documentary series, Innovating for the Future. The series looks at how diverse talents in the university community – each leaders and luminaries in their own areas of expertise – are catalysing positive change in Singapore and beyond. Catch this 10-part series – delving into topics like ageing, finance and food – to find out how NUS faculty, students and alumni are jointly creating a better world for the future.

Scan to watch Episode 1 featuring NUS Medicine and the rest of the series:

The Future of Healthcare

Professor Chong Yap Seng, Dean of the NUS Yong Loo Lin School of Medicine, shares his views on the future of healthcare and the roles medical schools and philanthropic organisations play in promoting health and well-being.

Empower clinicians to better support the public health system

Speaking to The Straits Times on the support needed for the public health system in future, Prof Chong identified a "new breed of doctors". These would be healthcare professionals who understand the importance of population health. He feels that too many doctors are currently trained to function in a specialised setting, such as a hospital, rather than in a community setting. He believes that clinicians should only go on to specialise in public health after having practised medicine, and underscored the importance of doctors needing to understand the health system in order to properly hand over their patients to the next stage of their treatment.

To address these gaps, he said that NUS will be introducing five pillars of knowledge that will be common across NUS Medicine and the schools of dentistry, public health and pharmacy: communications and behavioural science; health ethics, law and professionalism; data literacy; social and emotional determinants of health; and digital literacy. NUS Medicine will also be recruiting experts in family medicine to improve training in this area, conduct research into longevity and human potential, and offer courses in health economics and health systems.

Scan here to read the full article:

From left: Global CEO of Tanoto Foundation Dr J. Satrijo Tanudjojo, Professor Chong Yap Seng, Dean of the NUS Yong Loo Lin School of Medicine

In the latest episode of Tanoto Foundation's Podcast series, Unlocking Potential, Prof Chong discussed the current gaps in medical research and education with the Global CEO of Tanoto Foundation Dr J. Satrijo Tanudjojo. He outlined many areas in the healthcare landscape that philanthropies are well-positioned to drive as well as research and education gaps that they can help fill. Prof Chong and Dr Satrijo also spoke about how Tanoto Foundation's initiatives can help build capabilities needed to support future health systems in the region.

Watch the full episode here:

Fighting the Good Fight – When Does One Stop Resisting the Inevitable?

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

There is a scene in Wes Anderson's delightfully quirky film "The French Dispatch", in which one of the characters is praised for his bravery. He replies "I'm not brave, I was just not in the mood to disappoint everyone."

That scene came back to me recently when I was sitting with a patient as she shared her cancer journey, which stretched through eight years of multiple types of treatments and investigations. Surgeries, chemotherapy, all manner of scans, regular visits to the Cancer Centre, more blood tests than she could count... it sounded very arduous.

When I asked her how she had coped, she shrugged and said she just followed her doctor's orders. But after a pause, she added that her primary motivation was her family, and actually, with their encouragement and support, the first five or six years had been quite manageable. They had managed holidays abroad together—her doctors had been good at scheduling the treatments to allow for those breaks—and she had seen one child married, and welcomed a grandchild.

However, the last year or so, things had started to change. The treatments had been getting harder, even gruelling, and the response poorer, such that she was changing to a new treatment every few months. At present she was on a clinical trial which had required her to visit the clinic three times a week. But the doctor had hinted that the last scan result "is not positive".

"I'm so tired," she said with a heavy sigh. That statement rested in the silence that followed, and then I offered, "But ..." and she continued, "... my children say I mustn't give up, I should fight on." And in that moment, her deep love for her family changed from being something that strengthened her, to something that now burdened and isolated her.

The language of fighting or battling is common in people diagnosed with diseases like cancer, but this kind of analogy can be problematic because in any fight, it is assumed that there are winners and losers. Sometimes we are not even sure what winning looks like anymore, or whether that longed-for result is even possible. And if we are not careful, then patients who despite all their efforts are inevitably going to succumb to their illness, will feel like they have "lost", when realistically, they were never going to be able to "beat" the disease anyway.

There are a few patients and families—and this really is the minority—for whom the fight itself is the most important, no matter what the outcome is. In fact, even when the outcome is certain death, that is acceptable, as long as the patient strives to the utmost. I have had a patient's son declare that his father must "go down fighting" or "go out with a bang". Another patient told me that he would want to go through dangerous surgery and die on the operating table: "Don't worry, I will sign a paper to say the surgeon is not at fault".

For those patients who do want to fight to the end, I sometimes describe them as wanting "no regrets" and seeking "glorious death". They know they are going to die, but they have to know they tried everything. To quote from Dylan Thomas' famous poem, these are the ones who "rage against the dying of the light".

In my experience, most patients "fight", or perhaps strive, for something or someone. They are motivated by the chance of a cure, a hope for better health, more time with loved ones, the ability to fulfil life goals, pass important milestones, etc. All these goals are deeply personal and equally valid and are a vital source of support for people going through very difficult periods in their illness journey.

The difficulty comes when the goal posts shift, when a person starts deteriorating, when the disease no longer responds to treatment and when the end of life looms. At this time, a person's goals and priorities often change. But when that person no longer wants to carry on the fight, despite the support and urging of family members and other loved ones, that person can end up feeing alone and unsupported.

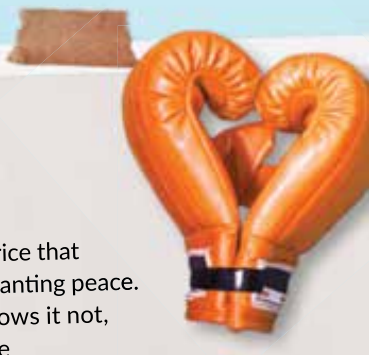
Family members, in their grief, may interpret the person's desire to give up disease treatment as giving up on them. This perception may be articulated thus: "You don't love me anymore, you're not even going to try, aren't you going to fight for us?" Doing something out of love for others is generous and beautiful. All of us have at some time or other, put our own wants and needs second to someone we care about. But how much is enough?

Finally, is it giving up, or giving in, and what is the difference? These terms are similar, but they are subtly different. To give up means to stop trying, to give in means to "yield to pressure or entreaty". I tend to think of "giving in" as making a tactical or strategic decision in the face of circumstances. This could be making a graceful retreat, or going with the flow, or changing tack and "fighting" for something that one can "win" at.

I remember speaking with an athlete—a marathoner in fact—who was newly diagnosed with cancer, and grappling with what this meant. I asked him what a good race meant, whether it was when he won a medal or beat his personal best. Not at all. He explained that it wasn't just physical preparation but psychological readiness, that no matter how much he trained, on the day itself circumstances could be unpredictable. For example, bad weather, other runners crowding the road, or he might not be feeling his best. But he would still try to run the best race he could, and occasionally, he might even have to make a difficult decision of opting out of that race altogether. All his years of training had in fact, already prepared him to run the marathon of his cancer journey. What he needed now was to gather around him the people who would help him to run the race well.

It is not always possible to "beat" a disease like cancer, but it is possible to obtain some "wins". First decide what you want to do with the time left to you—where you want to be, who you want to be with, what you want to say. Then harness your resources to work towards achieving those goals, making every day the best day possible.

What palliative care promotes is a) honest and balanced conversations that allow people to rebalance their priorities and decide what is most important; b) care that addresses physical, emotional and spiritual suffering of patients and families; and c) support that fosters connectedness and allows a person to live in the most meaningful way, from today until the last day. And that is worth fighting for.



Courage

by Amelia Earhart

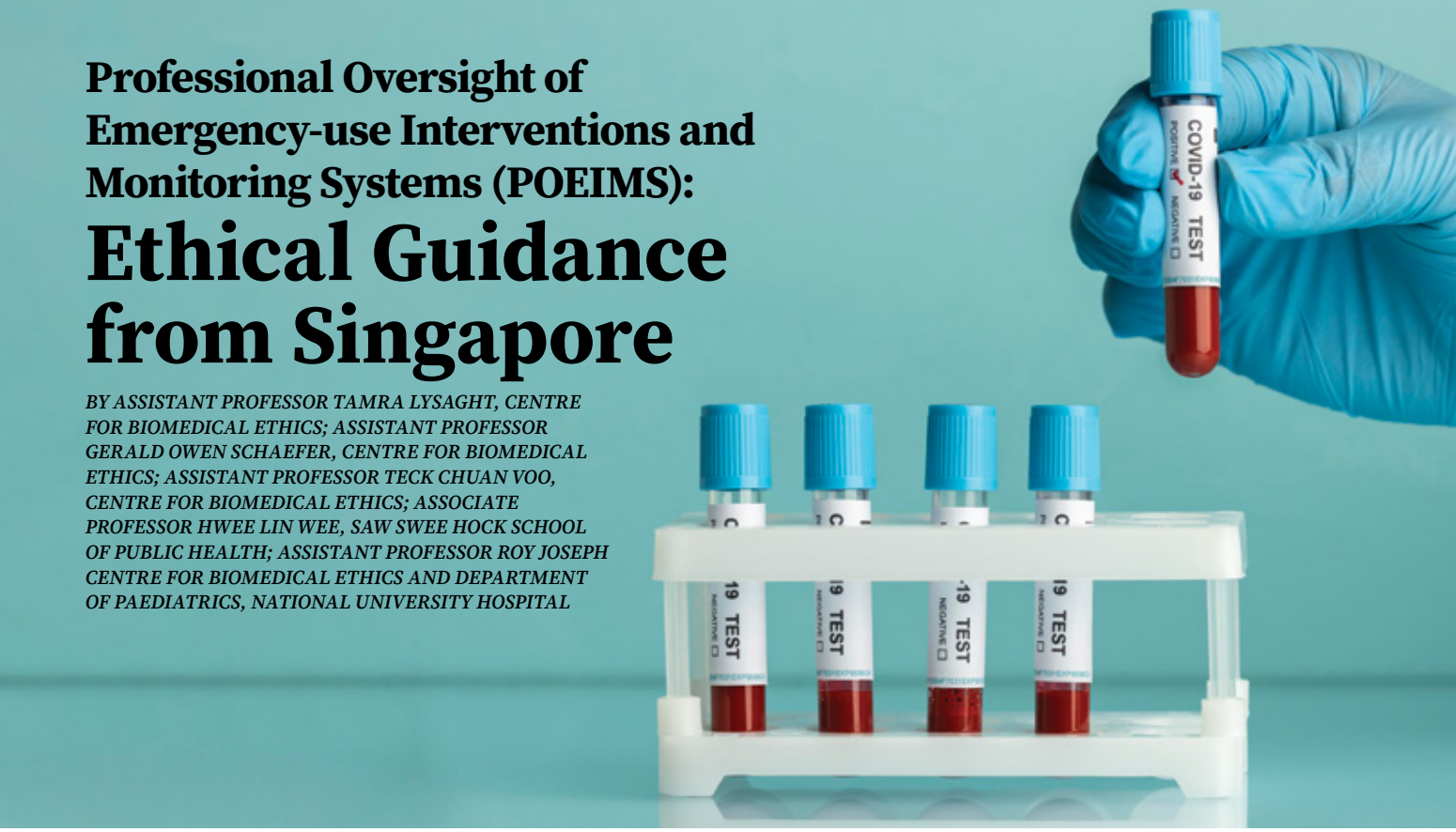
Courage is the price that
Life exacts for granting peace.
The soul that knows it not,
knows no release
From the little things:
Knows not the livid loneliness of fear,
Nor mountain heights where
bitter joy can hear
The sound of wings.

How can life grant us boon of living,
compensate
For dull gray ugliness and pregnant hate
Unless we dare
The soul's dominion?

Each time we make a choice, we pay
With courage to behold the resistless day,
And count it fair.

Professional Oversight of Emergency-use Interventions and Monitoring Systems (POEIMS): Ethical Guidance from Singapore

BY ASSISTANT PROFESSOR TAMRA LYSAGHT, CENTRE FOR BIOMEDICAL ETHICS; ASSISTANT PROFESSOR GERALD OWEN SCHAEFER, CENTRE FOR BIOMEDICAL ETHICS; ASSISTANT PROFESSOR TECK CHUAN VOO, CENTRE FOR BIOMEDICAL ETHICS; ASSOCIATE PROFESSOR HWEE LIN WEE, SAW SWEE HOCK SCHOOL OF PUBLIC HEALTH; ASSISTANT PROFESSOR ROY JOSEPH CENTRE FOR BIOMEDICAL ETHICS AND DEPARTMENT OF PAEDIATRICS, NATIONAL UNIVERSITY HOSPITAL



Background

Throughout the 2020 COVID-19 pandemic, reports about the provision of unproven and experimental interventions outside clinical trials were common. Such reports were especially prevalent in the early stages of the pandemic when no safe and effective treatments were available for COVID-19. Examples included experimental interventions being investigated in clinical trials, such as Remdevisir before it received an emergency authorisation, market approved medications being prescribed 'off-label' (e.g. hydroxychloroquine) as well as immunotherapy products (e.g. interleukin inhibitors and convalescent plasma) and highly experimental stem cell-based products being provided as an 'innovative' therapy. While the default position rightly restricted the use of these interventions to clinical trials, it was recognised that there would be situations where some patients would be unable to gain access to them – either because trials were not being conducted locally or, if they were, an individual patient may not meet the eligibility criteria or may not wish to participate.

In many cases, these practices were likely motivated by physicians who want to save lives and relieve the suffering of their patients. However, they were also controversial because the interventions lacked evidence of safety and efficacy for treating COVID-19 and, in some cases, deprived non-COVID-19 patients of (proven) drugs for treating their conditions (e.g. hydroxychloroquine for treating lupus). Critics were also concerned that widespread, uncontrolled access to unproven interventions outside of research may derail or prolong ongoing clinical trials by diverting limited resources. It may also undermine initiation of and recruitment for new trials, as well as consent and trust in research (National Academies of Sciences Engineering and Medicine 2017).

Critics were also concerned that widespread, uncontrolled access to unproven interventions outside of research may derail or prolong ongoing clinical trials by diverting limited resources. It may also undermine initiation of and recruitment for new trials, as well as consent and trust in research.

Some practitioners invoked the MEURI (Monitored Emergency Use of Unregistered and Investigational Interventions) framework of the World Health Organization (WHO) as justification for providing unproven interventions. MEURI is an ethical framework for developing a protocol to monitor the use of unproven medical interventions outside of research for therapeutic or preventive use during a public health emergency (Mastroleo, Smith, and The WHO MEURI Working Group 2020). MEURI was developed in response to the 2014-16 Ebola epidemic in West Africa, and was applied in infectious disease emergencies (WHO 2016) prior to COVID-19.

During the COVID-19 pandemic, the Pan American Health Organization (PAHO 2020) issued a document clarifying MEURI by categorising its requirements into features of justification; ethical and regulatory oversight; consent process; and contribution to the generation of evidence or knowledge. Notably, PAHO emphasises that while MEURI share common features of observational research, it should be applied only under exceptional circumstances i.e. access to unproven interventions outside clinical trials during an emergency situation should be provided only when clinical studies are unavailable or infeasible to initiate because of reasons such as an overwhelmed health system, lack of research capability or resources, insufficient patient numbers and so forth. Nevertheless, PAHO (2020) mandates that MEURI protocols *must be* reviewed by a research ethics committee or institutional review board (IRB), and *must* contribute to the generation of knowledge. This qualification could lead MEURI to be defined as research in some jurisdictions, triggering research regulatory requirements.

Applying MEURI as described above within the Singapore regulatory context would be legally and ethically problematic. Although the Singapore Medical Council (SMC) 2016 Ethical Code and Ethical Guidelines (ECEG) permits physicians to prescribe medications off-label and also to provide unproven interventions outside the context of formal research under certain circumstances as 'innovative therapies' the MEURI requirement to contribute to knowledge production through the monitoring, documenting, and sharing of results with the wider medical and scientific community may be viewed as an activity that the *Human Biomedical Research Act (HBRA) 2017* defines as research. HBRA defines research as "any systematic investigation with the intention of developing or contributing to *generalisable knowledge*". Whether monitoring, documenting, and sharing results with the scientific and medical community constitutes the development or contribution to generalisable knowledge is unclear, but if such activities fall within the scope of the law, they would require ethics review from an IRB.

Since COVID-19 had no known effective standard of care treatments at the time of the outbreaks in Singapore, any intervention aimed at treating the disease and not just the symptoms would fall within the SMC's definition of an 'innovative therapy'. These therapies may be provided outside formal clinical research when conventional therapy is unhelpful and "it is a desperate or dire situation" (Singapore Medical Council 2016b, sB6.4). In those circumstances, physicians should seek professional consensus on the use of the intervention in that particular clinical situation and obtain informed consent as appropriate. If no clinical trials or IRB-approved studies have been established in Singapore, then physicians would require guidance on when it would be ethically acceptable to provide various non-standard or experimental interventions in the treatment of moderate and severe COVID-19 disease. In view of such existing professional guidance, we propose the Professional Oversight of Emergency-Use Interventions and Monitoring System (POEIMS) as an alternative pathway to MEURI.

Ethical guidance for treating COVID-19 patients with POEIMS

POEIMS allows for the provision of interventions in public health emergencies that fall within the ECEG definition of innovative therapies and may be triggered in very limited circumstances where patient(s) have no other helpful options and are "in a desperate or dire situation". In the context of COVID-19 pandemic, severely ill patients for whom an intervention may save their lives or ameliorate their pain and suffering, and who are not able to enrol in an IRB-approved study for any reason, may be judged to be in a sufficiently dire situation to justify providing the intervention solely as part of their clinical care. Patients with moderate disease who are at high risk of developing severe disease may also be considered, provided the individual patient's best interest are clearly served by early intervention and when the potential risks are materially lower than the likelihood of averting progression to a severe state.

Having met these criteria, physicians should be guided by the following:

1. There should be consensus among relevant professionals on a favourable benefit-risk ratio in the patient's specific clinical context.
2. The physician should be appropriately qualified to treat the disease with the novel therapeutic.
3. The physician should provide to the institution's hospital or Clinical Ethics Committee (CEC) on case-by-case basis a written plan outlining treatment goals, the system for monitoring and reporting outcomes, and exit criteria.
4. Where relevant, the institution should obtain appropriate approvals from regulatory authorities (e.g. the Health Sciences Authority for unlicensed drugs).
5. Consent from the patient or permission from their next-of-kin should be secured, based on relevant information on the uncertainty regarding the probability of benefits and adverse outcomes.
6. Proper documentation should be maintained and outcomes should be reported in a timely way to the relevant national and international authorities for monitoring purposes.
7. If the proposed clinical goals are achieved, the intervention should be made subject of an approved IRB study as soon as practical.

The CEC is preferred over an ad hoc committee convened for the purpose of reviewing such proposals as the latter would lack the continuity and training of an established CEC. It is also preferred over an institutional innovation ethics committee because it would not require creating an entirely new entity and the process can be folded into the existing committee's scope of work. Although this requirement places additional demands on CEC members, many of whom are clinicians who are likely to be stretched in the context of a public health emergency, it is ultimately for the benefit of patients. To support these interventions, institutions or the relevant authorities should have in place specific requirements for notification of such plans for approval, while consideration of these requests should be expedited. They should also have in place mechanisms for reporting and monitoring.

Ethical justifications for POEIMS

The ethical justifications for POEIMS lie in the physician's duty to provide care to patients that is in their best interests with professional oversight and support for learning health systems. Shared decision-making models would normally aim to establish whether an intervention meets that standard through physician advice and patient reflection on the goals of care, and what is achievable given their condition and the existing available treatments. However, professional advice is not based on the insights of a physician alone but is built on a larger body of peer judgment and evidence on the safety and efficacy of treatment options. At the same time, by definition,

unproven or experimental interventions lack such an evidentiary framework and an individual physician may be mistaken in their judgment of the risks and benefits.

POEIMS provides safeguards for these epistemic limitations by requiring a clear protocol that helps promote rigorous, consistent applications of good practices, especially when multiple patients in similar situations may receive the same unproven treatment. In addition, review by a CEC provides the opportunity for broader peer input and feedback, minimising the impact of idiosyncratic judgments of individual physicians and bring to bear a larger body of experience and expertise to inform decision-making. Our proposal may be regarded as a modification of the Declaration of Helsinki (DoH) guidance on "Unproven interventions in Clinical Practice", (World Medical Association 2018) which is not specifically directed at public health emergencies:

In the treatment of an individual patient, where proven interventions do not exist or other known interventions have been ineffective, the physician, after seeking expert advice, with informed consent from the patient or a legally authorised representative, may use an unproven intervention if in the physician's judgement it offers hope of saving life, re-establishing health or alleviating suffering. This intervention should subsequently be made the object of research, designed to evaluate its safety and efficacy.

POEIMS aims to protect patients from ineffective or harmful innovative therapies through its requirements for structured protocol and peer review. In the absence of a standard of care, as with unproven treatments, the above conditions help provide a substitute for systemic review by a group of peers and prevent limitations on the scope of treatments in circumstances where the risk-benefit ratio is most favourable.

Given that monitoring outcomes is an essential component of POEIMS, medical institutions have an obligation (qua advancing the best interests of all their patients) to future patients to learn from their experiences in using the interventions. Systematic monitoring facilitates internal evaluation of safety and efficacy of a given unproven protocol, information which may inform adjustment of future treatment applications. This is a very imperfect substitute for more rigorous evidence from clinical trials, and so institutions (and health systems more broadly) have an obligation to carry out clinical trials of unproven interventions as soon as feasible—a component that has recently been characterised as the duty to support learning health systems (London 2021). POEIMS aims to provide oversight and rigour for care in this context.

An alternative suggestion is to much more tightly restrict the application of unproven interventions outside formal research settings (Menikoff 2021). This may better advance the duty to support learning health systems than our proposal, insofar as it would push many more treatments into research contexts that would contribute to knowledge generation and further improve healthcare and health systems. However, such restrictions may conflict with physicians' duty of care towards individual patients. There are myriad reasons why formal research may not be established in a given context beyond clinician and patient reluctance, including the availability of resources, expertise and institutional support. Restrictions on access do not address these barriers, and so will often result in no innovative treatment being provided at all rather than an innovative treatment within an approved study protocol. Our POEIMS proposal, by contrast, provides a balance between potentially conflicting duties of care and duties to support learning health systems.

Conclusion

We have proposed POEIMS as an ethical alternative to the provision of experimental interventions during public health emergencies outside of formal research settings based on the best interests of individual patients and commitments to learning health systems. The framework would only be triggered in very limited circumstances where there is an urgent unmet medical need and no standard of care interventions or authorised products are available for treating the disease, and when formal clinical studies cannot be set up for patients to access the intervention in a supervised trial setting.

Scan for the full version of the paper here:

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With an End-of-life Doula, No One Has to Die Alone

Joanne Gan was six years old when her grandfather died. His passing troubled her for a long time, and she would avoid any talk of death and dying.

Over the years, however, she has overcome her fear and has become a volunteer, accompanying strangers on the final stretch of their lives.

Joanne, a third-year undergraduate in the part-time Bachelor of Science (Nursing Practice) programme, volunteers as an end-of-life doula at the Institute of Mental Health (IMH) in Hougang. "Doula" is a Greek word meaning "female helper".

"I make time to visit selected patients, or persons with mental health issues who have been diagnosed with a terminal illness or are deteriorating from old age," says the full-time nurse at Assisi Hospice.

Joanne, who is in her 30s, began volunteering at IMH in 2014. When the *No One Dies Alone* programme was started in 2018, she knew it was something she wanted to be a part of. The IMH took in its first patient for this programme in January of the following year.

In her role, Joanne provides physical, emotional and informational support to the dying who do not have any next-of-kin. As their conditions deteriorate towards their final days, Joanne stays at their bedside to accompany them in their last moments.

As grim as it may seem, Joanne said she finds her role meaningful, and fondly remembers her interactions with patients.

One key approach in befriending any patient is through the element of touch, which is thought to be the first of the senses a person develops, said Joanne.

"For the longest time, some of these patients might have forgotten what it was like to have a family or friend figure in their lives. It might mean a lot for the patients just to have a '*No One Dies Alone*' volunteer sit with them, and simply talk or hold their hand," she said.

Joanne also uses music to form connections. She learnt to play the harp in 2018 after learning about the instrument's effectiveness in end-of-life care, and usually carries a small harp with her when she goes to IMH.

Connecting through music

"Madam Tan was a lady in her 80s who would sing Christian songs and go into prayer whenever I played the harp for her," Joanne shared.

Despite losing her ability to walk as her health declined, Madam Tan's strong Christian faith helped her remain optimistic and joyful, and she would greet volunteers with words of blessings, before her passing in mid-2019.

Another patient who left an impression on Joanne was Mr Goh, who was in his mid-60s when he died.

"Mr Goh was a gentleman who loved 4D and Toto so much, so I brought him actual 4D and Toto betting slips for him to look at and touch," says Joanne. "Churning out four-digit numbers to volunteers and playing cards brought him much joy in his final days."

"For the longest time, some of these patients might have forgotten what it was like to have a family or friend figure in their lives. It might mean a lot for the patients just to have a '*No One Dies Alone*' volunteer sit with them, and simply talk or hold their hand."

She visited him over Christmas last year, to accompany him on an occasion which most people would typically spend with family or friends.

It turned out to be his final Christmas.

Mr Goh died a few days later, just five minutes before Joanne reached his ward.

"I was calm when I arrived, but just felt sad that he had no family or friends by his side, except for another volunteer and me. We had but just a few weeks to build our bond with him, prior to his passing," she recalls.

After the patients' deaths, Joanne also attends their funerals. She explained that apart from the undertakers, these individuals usually have no one else to send them off at the crematorium or at a sea burial.

Joanne attributes her desire to enter the field of end-of-life care, to the female role models in her family.

"My late grandmother—a young widow back in the 1950s—was ostracised by her in-laws as widows were perceived to bring bad luck to the family. However, she single-handedly raised four young children, and started a church in a small town in Malaysia—which still exists today—by herself. She was a church preacher who would spend time, even when she was already in her 80s, to visit socially isolated people," she says.

Joanne's mother was a nurse before she retired, and now spends her time helping the less fortunate in the community. For example, she recently helped secure food rations for families which were financially affected by the pandemic.

"My aunt was a sociologist who worked on a PhD related to married Australian women living with mental health conditions, after which she also taught a module on death and dying at Monash University, during the 1970s and early 1980s. She certainly made an impression as a young migrant Asian woman, as that period was when women were just beginning to champion for a more egalitarian society with equal rights," Joanne adds.

And there is also a more personal side to her decision to enter the sector.

Her father and uncle are both cancer patients who had to endure many months of radiotherapy treatment, before their illnesses were brought under remission.

"The decision to go into the field of end-of-life care was for the purpose of learning how to care for my own loved ones, because parents, aunts and uncles don't stay young forever," says Joanne.

However, the challenge of removing stigma associated with providing end-of-life care for persons with mental health issues remains. The challenge is two-fold, because many people are still uncomfortable about confronting both issues, says Joanne.

Many individuals with mental health issues are ostracised or looked at askance because of their illness, she noted.

"Adding salt to the wound is the taboo subject of death and dying," she adds.

"'Who in their right mind would want to make friends with a dying mental patient? What can you do with someone who's not able to hold a proper conversation with you?' some might think."

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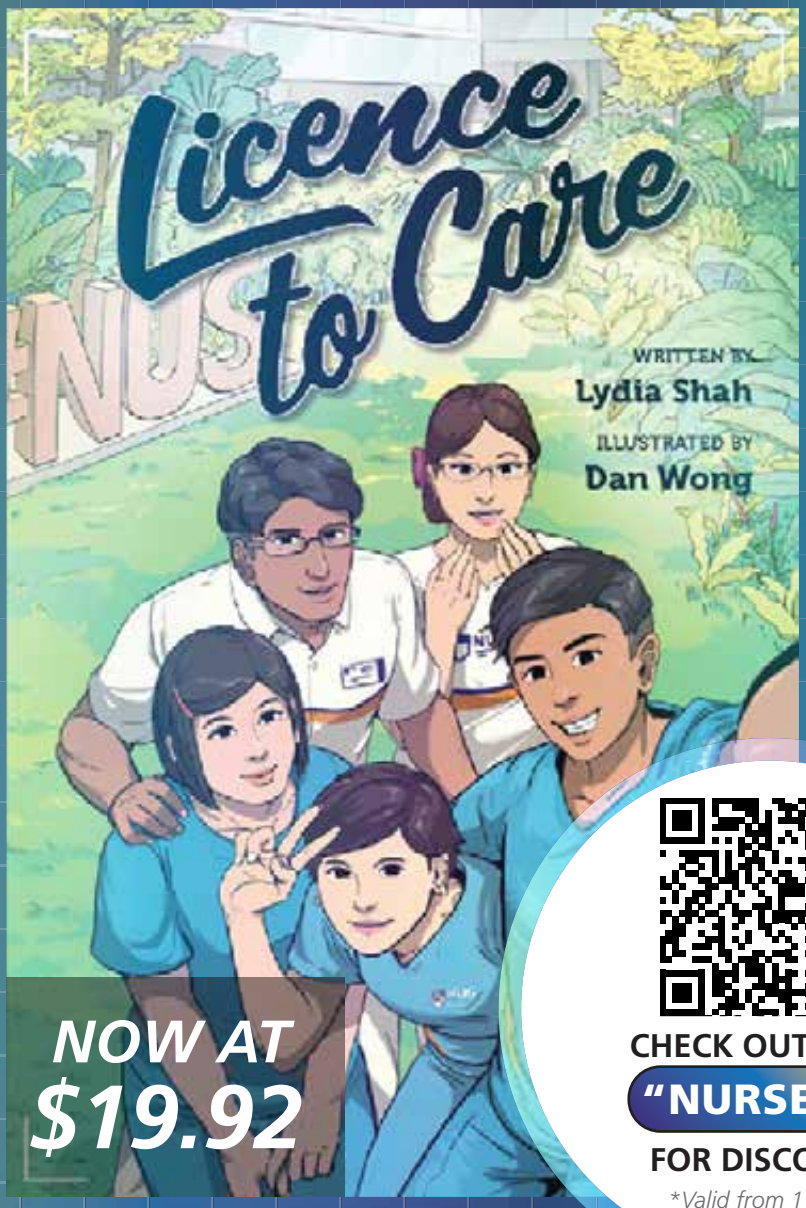

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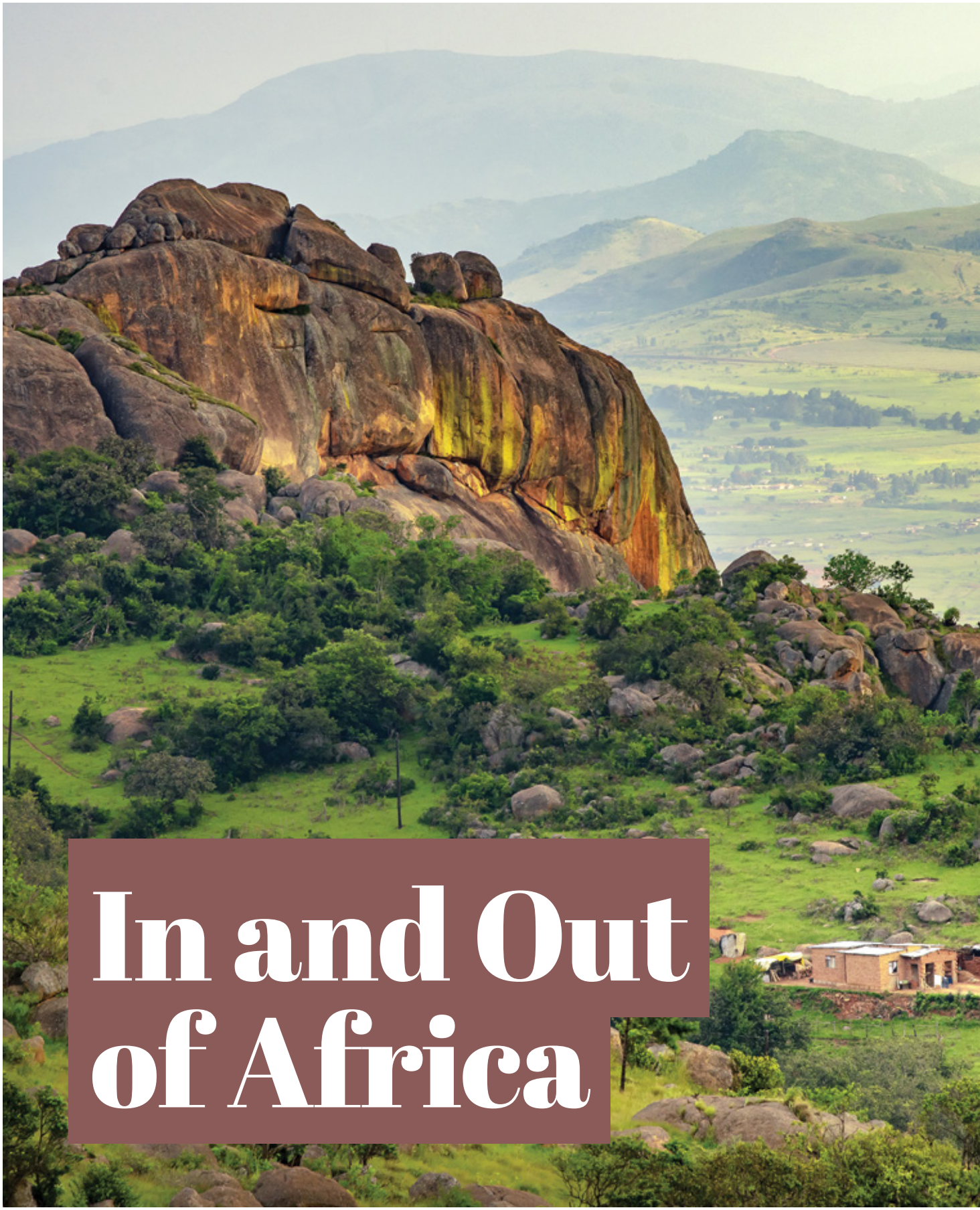


In and Out of Africa

In responding to a call to go to Eswatini to help with COVID-19 management efforts as part of a UNICEF team, alumna Dr Tam Wai Jia (Class of 2011) rediscovers the meaning of life that is lived in service to others.

"Are you kidding me?"

When I first saw the email, that was my reaction.

Deep inside, I knew I wanted to respond to the call for humanitarian assistance for the COVID-19 crisis in Africa by UNICEF, GOARN (Global Outbreak Alert Response Network) and the World Health Organization. My mentor, Professor Dale Fisher had forwarded it to me.

Yet, as a young mother who co-homeschool our two toddlers with my husband, it felt impossible—irresponsible even—to leave my family for six weeks and put myself in the middle of a multiple of unknowns. Where would they send me to? What would I do? Could I really be useful?

Those questions plagued me. I replied tersely, then tucked the email away.

Weeks passed. But the continual stirring to do more persisted.

The truth was—all my life, I had preached a message of risk to young medical students and Singaporean youth. Take the leap, step out in faith, take courage to serve others—these were my life messages. I'd even started an international non-profit called Kitesong Global that empowered youth to pursue their dreams to catalyse change in communities. Yet, when it came to my turn to say yes to an opportunity to make a substantial difference to communities that needed help, I let my own concerns get in the way.

Studies show that when we assess risks, we are biased towards what is familiar. Even if one's risk of dying in a car accident is greater than that in a plane, most people would prefer to drive. In Susan David's bestselling book "Emotional Agility", she says the curse of comfort is when our brains confuse safety with comfort. If something feels new, difficult or even slightly incoherent, fear kicks in.

I was petrified.

Yet, the more time went by, the more intense the nudging inside of me became.

But surely my cancer-surviving, immunocompromised husband would say no. Surely this was illogical. Surely, this was not a wise decision.

Yet, a still small voice continued to whisper to me, that this is the mirage of security. Much of our lives is a hypocrisy we buy into that the decisions we make based on our perceived levels of safety and comfort really are for the best, when in fact, we merely buy into a sense of security that doesn't even exist.

Weeks after I received that email, I finally showed it to my husband.

"Of course, you should say yes!"

"What?" I shot back. "Do you know what you're saying?"

"Well, at least offer yourself, no?"

Walking the talk

I knew he was right. All my life, I had dreamt of making a difference in underserved communities. Since the age of 18, I had been involved in philanthropy, advocacy and humanitarian work in developing countries all over the world, raising up to a million dollars for underprivileged communities. Yet, when it came to answering a call where my level of skill finally matched up to making a significant impact, I turned away.

There was too much uncertainty. I feared the unknown.

Drawing a deep breath, I said yes. Submitting my CV felt like turning in a blank cheque.

For days, I awoke at 4am, mind churning, wondering what it was that I had done. Would I be sent to a war-torn area? Would I be in a tent? Would I get along with the other specialist-consultants?

The news came. When I read the words "The Republic of Congo," my heart stopped.

I kept it folded like a secret. Perhaps if I didn't tell my husband, I could ignore the call again.

Reading me like a book, he said, "They've told you, haven't they?"

"Yup. It's Congo."

"What?"

We parted for the day. With him needing time to process the big news, I took my two toddlers to the zoo.

When he picked us up in the afternoon, he had tears in his eyes. "It's hard for me to say this. But I do think you need to go. People will blame me for letting you go, but the question that's been on my heart is, with people in need, how can you not go? This is what you've been training to do, all your life. You're made for it."

I said yes.

"All my life, I had dreamt of making a difference in underserved communities. Since the age of 18, I had been involved in philanthropy, advocacy and humanitarian work in developing countries all over the world, raising up to a million dollars for underprivileged communities. Yet, when it came to answering a call where my level of skill finally matched up to making a significant impact, I turned away."

In a twist of events, I received news two days later that because I did not speak French, it was not a good match. Would I be willing to give technical support remotely from home?

By this time, with surrendered heart, I said no. If I was going to be deployed, I was now willing to give 100%, in-person support.

Christmas came and passed with no news. I packed a suitcase, without knowing where I'd be deployed to, prepping my 4- and 2-year-olds mentally for Mama's big trip away.

Then the big news came. Eswatini. Where was that? What was it like? I had no idea. I had days to leave.

Yet, with my luggage all packed and my family mentally prepared, I was ready to go.

On the ground with UNICEF

The rolling hills of beautiful Eswatini took my breath away.

Even more so, was the beautiful hospitality and heart of the local people. Naming me "Sibusissiwe", I felt honoured to discover it meant "we are blessed because of you".

Overwhelmed by the tasks ahead to increase vaccination rates from 33%, we hit the ground running. All at once, all the skills I had picked up leading the Risk Communication and Community Engagement efforts among the migrant worker COVID-19 outbreak in Singapore kicked in.

In January 2022, only 38.8% of the total eligible population in Eswatini had been fully vaccinated. The age groups with the highest proportion of people fully vaccinated was 60+ and 50-59 with 69.6% and 69.4% respectively. However, numbers fully vaccinated within the 18-19 age group were 23.2% and those within 12-17 years were 6.5%. Of the 18,462 healthcare workers, approximately, 78.6% were fully vaccinated, with the remaining resisting vaccination efforts. Given the vulnerability of the elderly population, the high-risk exposure of health workers to COVID-19, and the large percentage of unvaccinated young persons, the team identified the priority groups as the vulnerable elderly, health workers and young people.

As the weeks went by, I supported the national Risk Communication and Community Engagement (RCCE) Coordinator to convene, conduct a mapping and mobilise participation of strategic partners to support the promotion of the COVID-19 vaccination plan. I catalysed collaborations with the UNICEF Eswatini consultant to support the national RCCE working group meetings, helping to strengthen coordination mechanisms to strengthen linkages between government and implementing partners.

Using a social and behavioural assessment that I customised and contextualised for the elderly, youth and health workers in Eswatini, we identified barriers which informed the vaccine uptake, working closely with various regional stakeholders.

In January 2022, only **38.8%** of the total eligible population in Eswatini had been fully vaccinated.

Sibusissiwe (Dr Tam Wai Jia) visiting rural villages to conduct focus group discussions and engaging village chiefs in the vaccination exercise.

Developing research tools and recommendations, capturing best practices, building capacity of various on-ground community leaders and strengthening coordination with Ministry of Health and other key stakeholders felt like second nature. All at once, 11 years of seemingly incoherent work in rotating through surgery, general medicine, health promotion and my pursuing a Master of Public Health at Johns Hopkins converged and aligned. As I worked with the local team to develop a training plan to enhance the capacity of Rural Health Motivators, volunteers, faith leaders and other community mobilisers and influencers to collect feedback and promote confidence in the vaccination programme, we saw our goals checked off one by one as time passed.

In collaboration with the ESARO (East and Southern Africa Regional Office), Social and Behaviour Change data analyst and the Social Behavioural Change Project manager for COVID-19 vaccines, I helped analyse the findings of the rapid assessment and produce a Data for Action brief with key insights and programmatic actions, including revised messages and actions to promote vaccination confidence. The field visits oragnised enabled me to capture and document examples of RCCE best practices, including community-driven approaches to COVID-19 prevention and management and share three case studies for dissemination in the region to promote learning and research-based implementation.

I was privileged to develop a training plan and curriculum to enhance the capacity of Rural Health Motivators, Red Cross Volunteers, religious leaders and other community mobilisers and influencers to collect feedback and promote confidence in and adherence to the vaccination programme.

Over the course of the deployment, public health gaps identified included limited, infrequent and irregular data about vaccine confidence, trust, social processes and detailed data on disaggregated groups such as the elderly, health workers and youth. While a text message poll called U-report was encouraged as a means to collate information on people's knowledge, attitudes and perceptions of COVID-19, it was difficult to reach the elderly and health workers, as young people were the main users of the phone poll. As such, I led our team to conduct several focus group discussions with various subgroups.

To accurately assess the knowledge, attitudes and perceptions of the elderly, health workers and youth, I thus led the team using a mixed method assessment of quantitative surveys via U-report and a series of focus group discussions with each of the three groups. These were then used to inform programmatic recommendations.

A detailed policy brief with policy and programmatic recomendations were presented to the Ministry of Health and UNICEF Eswatini, advocacy meetings to present evidence-based key recommendations to Regional Stakeholders and Health Promotion Board, sensitisation meetings with Regional leaders to activate social mobilisers in different regions, and involving over a dozen youth stakeholders in regular steering Committee meetings to ensure strategy alignment, sharing of resources and training facilitators and champions to create a community-led campaign for Eswatini—were outcomes of the six-week deployment.

Insights

On my birthday, as I turned 35 in Eswatini, I received a voice note from a mentor who said, "Although this might feel like a huge sacrifice, I know it'll become a huge gift back to you."

He knew, that to be in Eswatini, I had missed my firstborn's 5th birthday, her first day at school, my own birthday and the Lunar New Year.

Left: Farewell by UNICEF Eswatini:, Dr Tam sports the Lihiya, a traditional wrap-dress.

Right: The sunflower her girls had planted as a seed just before she left.

With uncanny coincidence, I was invited to train 80 rural health mobilisers from cross-sectoral organisations on my birthday. As I taught, implementing and exercising the skills I had gained over the years, I discovered that I was indeed gifted with the memorable opportunity not only to serve, but to receive the gift of identity and calling.

As I looked back, I treasured the opportunity to confront my initial fears, to step out in spite of it, and to work out the why of my life—to serve others. I learnt that courage is not the absence of fear, but walking in spite of it. Faith is not the absence of uncertainty, but stepping out in spite of it.

Our lives, when lived showing up to our fears and uncertainties, become lives lived true to our innermost callings.

As Susan David says, "Discomfort is the admission price to a meaningful life."

"I learnt, that when we do the hard work of clarifying our values, when we give wholly of ourselves to others, whatever we perceived as loss in pursuit of our goals, becomes received back as gifts back to us."

On the last day of my time in Eswatini, my neighbour in Singapore, unaware that it was the final day of my stint, sent me a photo. It was a sunflower, planted as a seed by my daughters before I had left, which had chosen to bloom on my last day in Africa.

It spoke to me, that what we sow in tears, will be reaped with joy.

I learnt, that when we do the hard work of clarifying our values, when we give wholly of ourselves to others, whatever we perceived as loss in pursuit of our goals, becomes received back as gifts back to us.

And perhaps the greatest gift of all, is the gift of identity.

For when we discover the "why" of what we do, then go ahead and do what we do in spite of our fears, anxieties and circumstances, we live the lives we were always meant to live, to fulfill our true calling.

Scan to read more about Eswatini:

"What Matters Most":
Listening for the Patient's Voice in Medical Training and Clinical Practice

BY DR VICTOR LOH, ASSISTANT PROFESSOR AND EDUCATION DIRECTOR OF FAMILY MEDICINE, NUS MEDICINE; DR YEW TONG WEI, SENIOR CONSULTANT ENDOCRINOLOGIST AT NATIONAL UNIVERSITY HOSPITAL (NUH); DR CHOONG SHOON THAI, FAMILY PHYSICIAN AT JURONG POLYCLINIC, NATIONAL UNIVERSITY POLYCLINICS (NUP); AND DR TAN WEE HIAN, CONSULTANT FAMILY PHYSICIAN AND HEAD OF PIONEER POLYCLINIC, NATIONAL UNIVERSITY POLYCLINICS (NUP)

"How do we listen out for what matters most when doctors are so rushed at the polyclinic?"

This was at the tail-end of the day-long motivational interviewing workshop in the Family Medicine (FM) posting and I was thinking to myself: *"Now how do I respond to this student?"*

How indeed may polyclinic physicians contending with queues of patients living with long-term conditions, within allotted 10-to-12-minute consultation windows, go through the following: explain investigation results, explore outcome targets, disentangle medication side-effects, perform a focused physical examination, address disease complications and clarify

follow up plans? And how should or could physicians still carve out time to *actively listen, reflect, affirm,* and *elicit those aspirational goals* that would spur patients to exercise regularly, eat healthily, lose weight, forgo cigarettes, and propel all manner of behaviour to positively impact their health?

It was a conversation along a corridor a number of years back that then-assistant dean Associate Professor Lau Tang Ching popped the question which started us teaching students to listen to what matters most to patients: *"Victor, how about teaching motivational interviewing in the FM posting?"*

Motivational interviewing training

Motivational Interviewing (MI), an evidence-based approach for positive behaviour change has grown in traction as an effective intervention to improve health outcomes. Miller and Rollnick, the promulgators of MI in the 80s, described it as a *"collaborative, goal-oriented style of communication designed to strengthen personal motivation for and commitment to a specific goal by eliciting and exploring the person's own reasons for change within an atmosphere of acceptance and compassion."*

So, after attending hours of training by the Health Promotion Board (HPB), nights of reading books bought off Amazon, multiple conversations with local MI champions, and even more conversations with stakeholders, we were ready to launch the MI workshop for medical students. It would comprise training videos, verbatim transcripts, live demonstrations, student role plays, standardised patients, feedback, and more feedback.

We wanted future doctors to be curious about a patient's experience of illness, to give voice to that experience, and to respond skillfully to what they hear.

With the explicit intention of addressing the often-one-sided doctor dominated conversations in time-pressed clinical consultations, we felt it important to train our learners to weave into their communications repertoire MI elements of reflective listening: first to content heard in the patient's narrative, and then more deeply to the feelings and tacit meanings of what was being conveyed within the doctor-patient dyad. Learners and faculty staff took some time to get accustomed to this practice; it takes training and effort to listen beyond clinical content to excavate affective content and "what matters most" to patients. We wanted future doctors to be curious about a patient's experience of illness, to give voice to that experience, and to respond skillfully to what they hear.

Dr Victor Low facilitating a training workshop for students doing their Family Medicine posting.

The initial run of the MI workshop was largely well-received. After undergoing several iterations, it is now an OSCE (objective structured clinical examination) assessment item in the FM posting (since AY2017/18), and a fixture and hallmark of the NUS Medicine curriculum. Interest among school-based health screening projects has resulted in it being embedded in the informal curriculum of a broad range of NUS Medicine community involvement projects (CIP).

Person-centred care

"Person-centredness" sits close to the heart of Medicine. Widely written about in the healthcare literature, one of its early proponents was American Carl Rogers whose humanistic psychology viewed persons as beings inherently motivated toward personal growth and development. His work has spawned learner-centred teaching in the education sphere, and *person-centred care* and *shared decision-making* in the medical sphere. Enshrined in conceptual frameworks such as Mead & Bower's "patient-centred care", and in the Pendleton Consultation Model endeared by family physicians, shared decision-making hinges on supporting patients in decision-making, and on understanding that such decisions rest on the quality of exploration and response to "what matters most" to patients as autonomous individuals.

Year of Care Partnerships (YOCP)

I first met Nic and Lindsay in 2018 when they trained a number of NUP/NUHS physicians to become Care-and-Support-Planning practitioner trainers at Pioneer Polyclinic. Nic and Lindsay brought with them extensive experience training and supporting General Practitioners in Care and Support Planning (CSP) under Year of Care Partnerships (YOCP) in the UK's National Health Service.

YOCP answers the question: how could patient care be different if existing resources expended in one year to care for patients living with diabetes (and other long-term conditions) was reconfigured so that better health outcomes could be attained? After over a decade of iteration in the UK, the YOCP approach features training practitioners in elements of motivational interviewing. This is so that "what matters most" to persons living with diabetes and other long-term conditions may be elicited, but which on its own is inadequate for patient-centred care to occur.

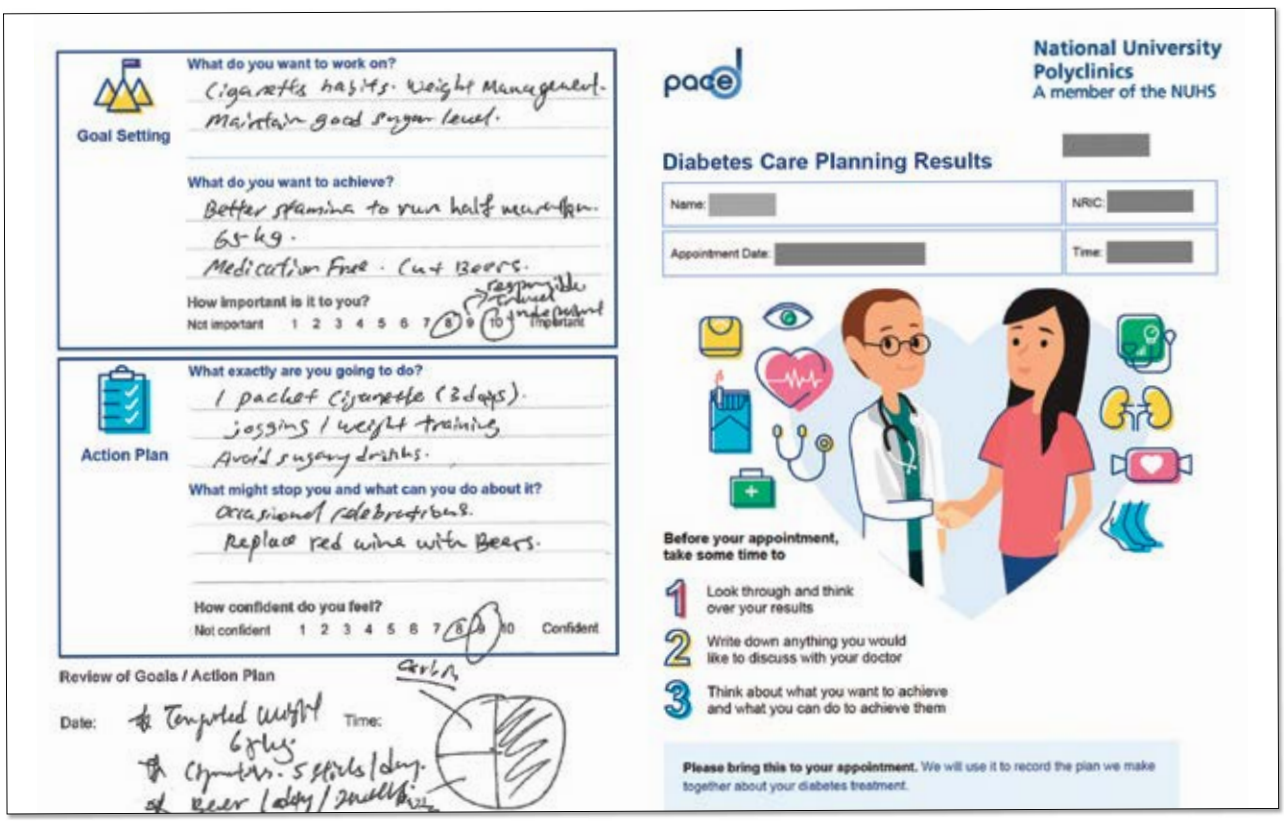
Dr Victor Low supervising 3rd year student, Bryan Peh, as he put his MI skills to practice with a Standardised Patient (SP) during his Family Medicine posting.

The initial run of the MI workshop was largely well-received. After undergoing several iterations, it is now an OSCE assessment item in the FM posting (since AY2017/18), and a fixture and hallmark of the NUS Medicine curriculum.

Crucially, YOCP also added health system enablers so that practitioners could more readily place patients in the driver's seat of self-management and support decision-making for their long-term conditions. The YOCP approach to foster person-centred care through CSPs includes:

- ***The Trained CSP Practitioner:*** CSP practitioners are trained to facilitate conversations with prepared patients so that "what matters most" to patients may truly be at the centre of the shared decision-making, goal setting and action planning process. These involve elements that correspond with, and are not exclusive to, MI training.
- ***The "Prepared Patient":*** Patients enrolled in the CSP process are prepared for a meaningful discussion with the CSP practitioner by having mailed hardcopies of the *care planning letter* containing the latest battery of investigation results and health outcomes mailed to them two weeks before the designated "CSP conversation". The letters serve as reflective and discussion prompters for patients, who may attend consultations with trusted family members, so that concerns and decisions to be considered may be raised before the CSP.

Excerpt from a Care and Planning letter with actual entries by a (deidentified) patient.



Care and Support Planning (CSP) trainers Dr Nick Lewis Barned (third from left) and Ms Lindsay Oliver (middle) flanked by Dr Victor Loh, Dr Yew Tong Wei, Dr Choon Shoon Thai and Dr Tan Wee Hian, with nurse clinician Yap Hwee Luan (second from right) and assistant nurse clinician Sapta Haji Ahmad (first from right) during a CSP training at NUP Pioneer Polyclinic.

- ***Health system redesigned to elicit "what matters most":*** As a CSP practitioner at Pioneer Polyclinic, I have found that the 20-30 minutes set aside for each CSP has given me time enough to work with patients on "what matters most" while minimising any guilt around eating into subsequent consultations, or worse, over-burdening colleagues with additional patient-load. In addition, the presence of a coordinator who ensured care planning letters were dispatched on time, and who would inform, educate, and even coach patients before and after the CSP conversation made a huge difference in nudging patients along in working towards care goals.

Patient voice: Time and space needed

It has been three years since Care-and-Support-Planning for Diabetes has been rolled out at the National University Polyclinics (March 2019). Preliminary programme evaluation results are indicative of positive patient experiences, with some patients reporting increased agency and involvement in decisions around diabetes self-care. At time of writing, the results of the main evaluation study for PACE-D (Patient Activation and Care Empowerment for Diabetes) are being analysed.

I return to the question posed at the beginning of this article:

"How do we listen out for what matters most when doctors are so rushed at the polyclinic?"

What we have learnt is that if we truly believe in the benefits of patient-centred care and hearing the patient voice, then the active listening and facilitation skills of motivational interviewing need to be given the time and space for its use in clinical practice. The YOCP approach to Care-and-Support-Planning with patients receiving the care planning letter two weeks prior to the CSP and a spacious 20-30 minutes for CSP conversations, is clearly one such approach to set aside time so that *the patient's voice* may be heard.

As medical curricula, CSP practitioner training, and healthcare processes further evolve, perhaps the day the *patient's voice* and person-centred care becomes the norm in daily clinical practice may not be too far off.

Acknowledgements
My thanks to the army of facilitators, tutors and standardised patients that has enabled us to train and assess 300 medical students in motivational interviewing each year at NUS Medicine. Likewise, my thanks to CSP trainers Dr Nick Lewis Barned and Ms Lindsay Oliver, our mentors Profs Tai E Shyong and Doris Young, and my co-authors and CSP co-trainers with whom I have learnt much about patient-centred care.

At the time of writing, the PACE-D team won the ***Mochtar Riady Pinnacle Team Award*** for the systematic implementation of Care and Support Planning of diabetic patients at NUP Polyclinics.

What we have learnt is that if we truly believe in the benefits of patient-centred care and hearing the patient voice, then the active listening and facilitation skills of motivational interviewing need to be given the time and space for its use in clinical practice.

Remembering Professor P. Balasubramaniam,

Department of Orthopaedic Surgery, 1981-1994

Hailed for his mastery of orthopaedic knowledge and consummate clinical skills, Prof P Balasubramaniam completed his training in the UK in 1966 before joining the University of Malaya and later, the University of Singapore University Department of Orthopaedic Surgery in 1981. He was also Vice-Dean of the medical school, served as Deputy Chairman of the Medical Board as well as Director of Medical Affairs, before retiring in 1994 at the age of 65. But retirement was just another word for business as usual for Prof Bala. An article in the July 2015 edition of the Singapore Medical Association newsletter reported that over the next 20 years, orthopaedic trainees would congregate at his home for tutorials.

Remembering Dr Oon Chiew Seng, Pioneering Alumna and Gynaecologist, Champion for Dementia Sufferers

Dr Oon Chiew Seng was a compassionate champion of underserved communities. From opening a clinic to cater to women who she observed felt more comfortable with female Obstetrics and Gynaecology (O&G) doctors, to volunteering at a home for the aged sick, to establishing a home for dementia patients, Dr Oon made service to the community her life's theme.

A graduate of the King Edward VII Medical College whose studies had to be continued in India because of World War II, the years of hardship that followed as she doggedly pursued her studies upon being evacuated forged the steely, unwavering determination—defining her approach to life. Awarded a Queen's Fellowship for specialist training in O&G and qualified as a member of the Royal College of Obstetricians and Gynaecologists in 1955, Dr Oon worked at Kandang Kerbau Hospital before leaving to start her private practice as Singapore's first female O&G specialist before retiring in 1991 at the age of 75. She later established the Apex Harmony Lodge—the first nursing home for dementia residents in Singapore—in 1999—and was heavily involved in the procurement of funding for its establishment, while also pioneering a new care concept for Alzheimer's patients here in Singapore after studying elder care homes around the world. In 2013, she established a Trust to raise awareness about dementia and support caregivers. The Trust has contributed millions of dollars to fund research in women's health, anti-ageing science and dementia at NUS Medicine. She once explained why she had provided funds for medical research in women's health and ageing issues: "In this society," she said, "everything is men, men, men. So I come along and say, 'Pay more attention to women. I'm a woman.' I would like to have more done for women. It's as simple as that."

12 January 2021, NUS

*President of Singapore, Mdm Halimah Yacob, who is also Chancellor of NUS

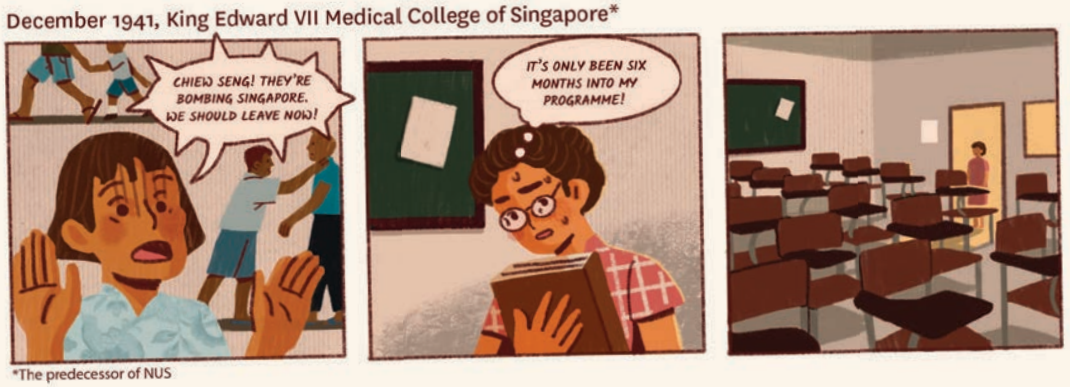
1916, Penang, Malaysia

*Seng means 'success' or 'achievement'

1937, Penang General Hospital

1940, Singapore

December 1941, King Edward VII Medical College of Singapore*



*The predecessor of NUS

February 1942, Escape from Singapore

1942, On board the *Felix Roussel*

1942, Bombay, India

1943–1945, Lady Harding Medical College for Women, New Delhi

1943.
With friends from Wilson College at picnic outside Bombay

1944
At Agra with friends from the Lady Hardinge College.

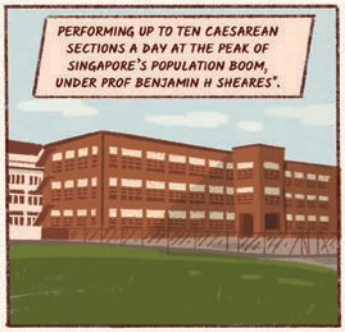
1945
New Delhi.

1946
On board the "Straithaird" heading for Singapore.

1946, King Edward College, Singapore

*Holne Chase Ladies' Hostel at Grange Road

1948, Kandang Kerbau Hospital



1955, England

1957, Kandang Kerbau Hospital

*The first Singaporean O&G Professor and President of the Republic of Singapore, 1971–1981

1959, Armenian Street

1978

1991

1995, Sree Narayana Mission Home for the Aged Sick


HOW ARE DEMENTIA PATIENTS TAKEN CARE OF IN OTHER COUNTRIES?
Australia
YOU'VE GOT A BEE IN YOUR BONNET, DR. OON
VISITING ALL THESE CARE CENTRES HERE IN AUSTRALIA.
1999, Apex Harmony Lodge, Pasir Ris
DR OON PIONEERS A NEW CARE CONCEPT FOR ALZHEIMER'S PATIENTS IN SINGAPORE.
CONGRATULATIONS ON FOUNDING SINGAPORE'S FIRST PURPOSE-BUILT HOME FOR PERSONS WITH DEMENTIA, DR OON.
THANK YOU, MR. TEO*!
BUT I CAN STILL DO MORE....
*Then-Minister for Education and Second Minister for Defence Mr Teo Chee Hean
2011
OON CHIEW SENG PROFESSORSHIP FUND FOR TRANSLATIONAL RESEARCH IN THE FIELDS OF AGEING AND DEMENTIA AT NUS MEDICINE
OON CHIEW SENG DISTINGUISHED VISITOR PROGRAMME
2012
HAPPY RETIREMENT DR OON!
APEX HARMONY LODGE
FAREWELL TO OUR FOUNDING CHAIRMAN.
2021
YET ANOTHER AWARD, AND AT 104 YEARS OF AGE; YOU CERTAINLY HAVE ARRIVED!
BETTER LATE THAN NEVER!
ARRIVED? ARRIVED WHERE?
LIFE IS NOT A RACE...
THERE IS NO FINISH LINE. IT IS A JOURNEY WHICH I WILL COMPLETE IN MY OWN TIME AND AT MY OWN PACE...

Seminar Series on Ageing and Ethics –

Making Healthcare Ethics Education More Accessible to Working Professionals

THE BANYAN TREE

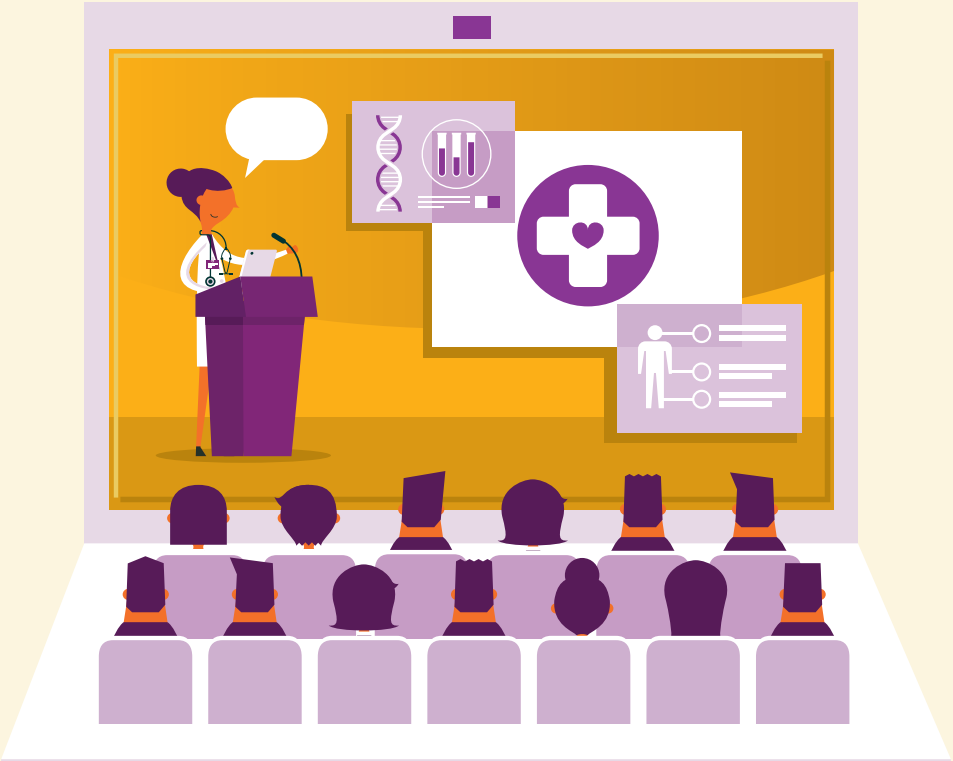
This column is dedicated to the pursuit of continuous learning and development and takes its name from the banyan tree. It has roots that grow deep, anchoring it firmly in the soil. The tree spreads its shade wide and far and provides space for reflection and discussion. We invite you to come and take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

SkillsFuture Singapore has identified 'professional, legal and ethical healthcare practice' as the top priority skill for healthcare professionals in the Skills Demand for the Future Economy Report (2021).

Maybe some of us were surprised by this! On reflection, perhaps we should not be too surprised since the provision of healthcare is constantly evolving because of advances in medicine and changing contexts, such as our rapidly ageing population and the COVID-19 pandemic. As a result of these developments and challenges, healthcare professionals are increasingly encountering unfamiliar and new ethical dilemmas in clinical practice.

While most healthcare professionals would have been taught healthcare ethics in their undergraduate courses, it is essential that they continue to deepen their understanding of healthcare ethics, and seize opportunities to reflect on the ethical and moral dimensions of clinical practice with their peers and ethicists.

The NUS Centre for Biomedical Ethics (CBmE) recently launched a Seminar Series to make healthcare ethics education more accessible to the wider community of healthcare professionals. The inaugural Seminar Series was launched in February and March 2022 on the theme of Ageing and Ethics.



Four seminars were led by Dr Jacqueline Chin and Associate Professor Michael Dunn on the following topics:

Seminar 1 opened with the question "How Do We Age?", pondering what it means to "age successfully", and considered the efforts being put into extending healthy life years and compressing years of frailty.

Seminar 2 explored the changing nature of relationships and in particular, the complexities of loneliness as a person ages, set against the context of available social support networks and especially Singapore's "many helping hands" model.

Seminar 3 examined the ethical dimension of what makes for good care for ageing in place (i.e. non-institutionalised), and the fairness of the social care system that supports ageing at home and in the community.

Seminar 4 rounded up the series by delving into the question of what makes for a "good life" for older people living with dementia (of varying severity), and considered the issue of advance care planning in anticipation of future loss of mental capacity.

The first run of this seminar series was well-received. Spots for all the seminars were quickly taken and we had a turnout of healthcare professionals from different backgrounds, with a majority of them being doctors and nurses.

Each two-hour seminar was priced at $80.25 and participants could choose to attend any of them. The seminars were conducted via Zoom in the early evening to make it more convenient for working professionals to participate, and carried Continuing Professional Education (CPE) points for doctors, nurses and pharmacists.

The first run of this seminar series was well-received. Spots for all the seminars were quickly taken and we had a turnout of healthcare professionals from different backgrounds, with a majority of them being doctors and nurses.

The seminar series is CBmE's most recent programme offering for healthcare professionals. Upcoming seminars will include focus on topics such as healthcare ethics and law, biomedical research ethics, and the ethics of biotechnology and innovation.

[1] Skills Demand for the Future Economy Report (2021), https://www.skillsfuture.gov.sg/-/media/Skills-Report-2021/Skills-Report-Documents-FINAL/SSG-Skills_Demand_for_the_Future_Economy_2021.pdf.

Insights on Lifelong Learning from NUS Medicine Senior Management

Chong Yap Seng
Lien Ying Chow Professor in Medicine
Dean, NUS Yong Loo Lin School of Medicine

Q: How does the school's vision and mission translate to its commitment to leading and advocating lifelong learning in healthcare?

Prof Chong: The School's vision is "Inspiring Health for All". This means that the School is intent on going beyond sick care and the management of diseases to promoting health for everybody. To do that, doctors need to broaden their knowledge by continuously learning and training in topics such as information technology, economics and humanities.

Q: How is the school's Continuing Education and Training (CET) changing global healthcare through its work? What are your goals for the school in shaping the global healthcare CET landscape?

Prof Chong: The Yong Loo Lin School of Medicine (NUS Medicine) is perfectly situated to help educate the world about Asian health patterns, diseases, and environments. We have a diverse range of faculty members who are experts, and we are also working with global partners to create platforms that will effectively deliver continuing education and training through the use of technologies and social media.

Professor Emily Ang
Head, Alice Lee Centre for Nursing Studies
NUS Yong Loo Lin School of Medicine

Q: What are the motivations and goals for delivering CET programmes and how are the programmes designed to translate theory into practice?
Prof Ang: A major part of what we do in CET is to collaborate with hospitals and institutions worldwide to advance learning and research. Synergistic exchanges help ensure the sustainability of the global healthcare ecosystem.

Q: How does hands-on learning help advance a learner's career development and deliver high quality care to patients?
Prof Ang: Utilising simulation technology, we immerse our learners in realistic scenarios, so that they get an acute awareness of their surroundings and the stress of applying knowledge under pressure. To effectively train our learners in both clinical health assessment and clinical reasoning, we combine virtual simulation and role play. After learners practise history taking and hone communication skills with computer-generated patients on the Virtual Integrated Patient application, we scaffold and reinforce the learning through role play with standardised patients.

Dr Dujeepa Samarasekera
Head, Centre for Medical Education
NUS Yong Loo Ling School of Medicine

Q: What is the andragogy teaching framework that NUS Medicine adopts in training adult learners in continuing medical education?
Dr Samarasekera: Our continuous education and training programme is anchored on andragogy principles. As mature learners, they like to take control of their learning, which is what we term to be "self-directed learning behaviours". When they use self-directed learning behaviours, we co-create some of the content with them, so that it is meaningful to them, and they can apply that in their immediate learning or immediate practice.

Q: How does transformative learning theory drive the creation of relevant, useful, and high-value CET programmes for adult learners?
Dr Samarasekera: Transformative learning theory posits that learning transcends simply acquiring knowledge. Our CET programmes use the best evidence and examples to create content. This content is then contextualised to one's own practice areas to make it meaningful for our learners. In this way, learners can apply what they learnt into their respective practice areas that then creates a transformative learning process and experience for them.

Scan the QR code to view the full video of medical professionals sharing their insights on lifelong learning:

Take 5:

Q&A with Alexandra Hospital's Mr Xu Weiming

Q: What are your views on pursuing lifelong learning in healthcare?
Mr Xu: In the era of COVID-19, we can see that there's so much that we actually know so little about; everything is continually changing. This really goes to show how important it is for healthcare professionals to be able to keep in touch with what's happening so that we can continually improve ourselves.

Q: What are the challenges faced by healthcare professionals in continuing education?
Mr Xu: I think one of the biggest challenges faced today by healthcare professionals is that there's really a vast amount of knowledge and information that's being created. It is important for us when we are looking at continuing education and learning, to be able to find courses that are really relevant and current, so that we are better able to pick up what's most useful for us within the short amount of time that we have.

Q: What was a recent CET course that you took with NUS Medicine?
Mr Xu: My last CET course with NUS Medicine was the Basic Health Literacy Workshop. The course offered very relevant information related to what many of us were curious about, such as demystifying complementary alternative medicine, and better understanding its benefits and risks. I enjoyed my learning experience with NUS Medicine because the course content is comprehensive and very relevant to the current interests and narratives of health and healthcare in Singapore.

Q: How has the CET course supported your career development?
Mr Xu: The courses at NUS Medicine supported my professional development by providing me with the latest and most current information, including the trends and needs of people and patients today, as well as the areas of interest for healthcare professionals.

Q: What motivates and drives you to pursue continuing education in healthcare?
Mr Xu: The knowledge that I gained through continuing education helped improve my knowledge and confidence in speaking with patients and people that I meet on the topic of healthcare. For instance, it has helped me to be able to impart important, basic knowledge about taking care of themselves to the elderly.

Scan the QR code to view an excerpt of the interview with Mr Xu Weiming

Mr Xu Weiming
Head of Relate, Integrate, Connect and Engage (RICE) Community Care
Alexandra Hospital

"The knowledge that I gained through continuing education helped improve my knowledge and confidence in speaking with patients and people that I meet on the topic of healthcare."

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