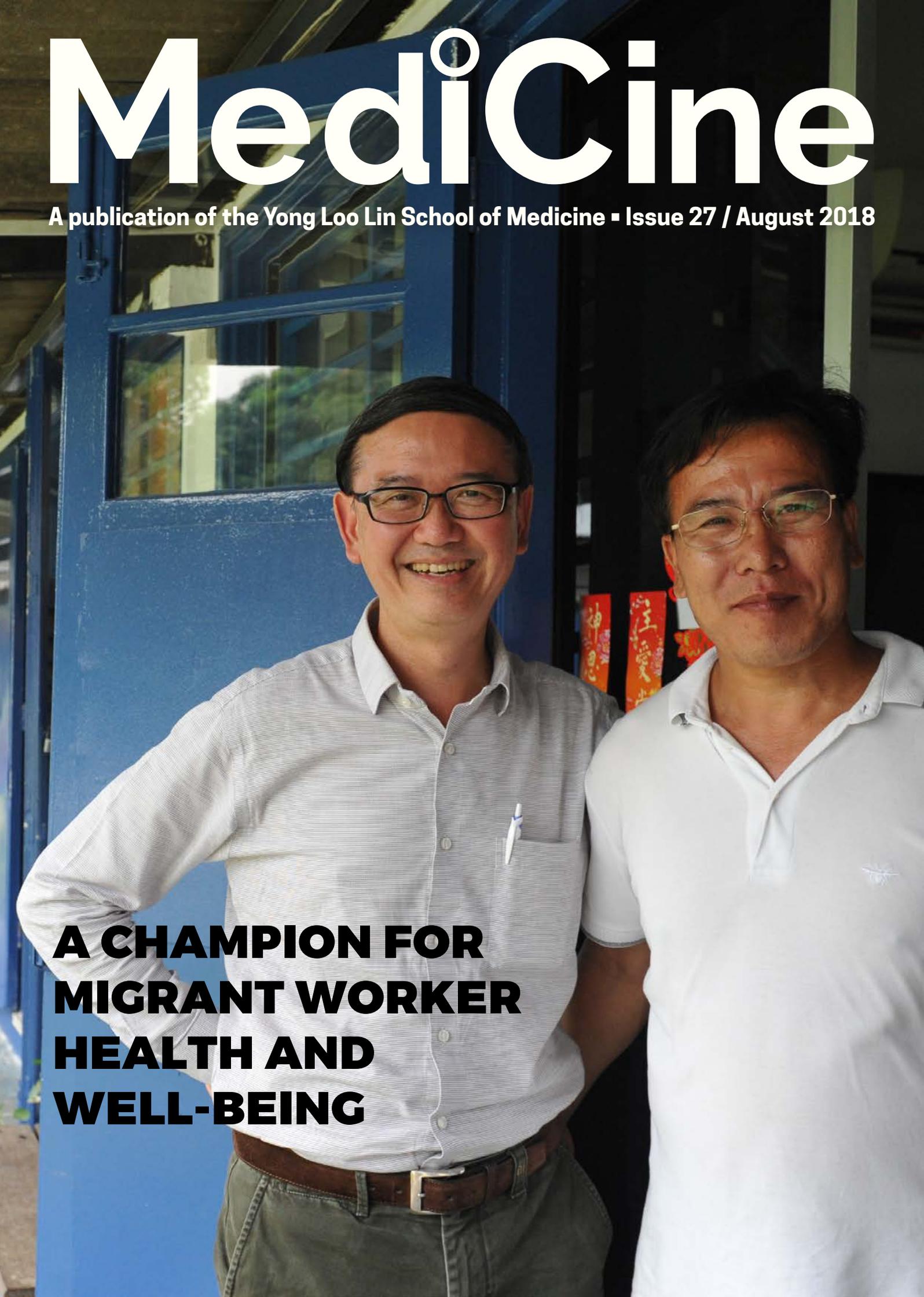


# Medicine

A publication of the Yong Loo Lin School of Medicine ■ Issue 27 / August 2018

A photograph of two men standing in front of a blue door. The man on the left is wearing glasses, a white button-down shirt, and grey trousers. The man on the right is wearing glasses and a white polo shirt. The background shows a blue door with a window and some red decorations.

**A CHAMPION FOR  
MIGRANT WORKER  
HEALTH AND  
WELL-BEING**

# DEAN'S MESSAGE



Dear Reader,

Another academic year has just begun and we bid a warm welcome to the 297 Medicine Class of 2023 students, as well as 282 of their fellows in the Nursing Class of 2021. They are embarking on educational journeys that are stimulating and challenging and it is our hope that they will follow in the footsteps of those who have gone before them, to become caring, competent healthcare professionals who hold their patients' interests and welfare foremost.

As one class commences its journey, another's comes to an end: we extend our heartiest congratulations to the graduating Class of 2018 medical and nursing students and wish them every success in the next stage of their careers. Singapore needs good, caring doctors to look after our steadily ageing population. The Class of 2018 joins a long and distinguished line of NUS medicine graduates that go back to 1905, when our medical school was established. Today, our alumni has grown to include Nursing graduates.

Our past shapes the present and also influences the future. Thanks to the efforts of our alumni and staff, NUS Medicine assumes a leading role in the education and training of doctors and nurses. The School also collaborates with other institutions in the search for better ways to improve

health and care for our population. This awareness of our School's continuing legacy helped guide discussions and deliberations that took place involving staff, students and alumni this past year, about what the NUS medical school stands for and how it can continue to contribute meaningfully to Singaporeans' health and wellbeing. I am therefore very glad to tell you that we have arrived at what we believe are clear and definitive statements about what NUS Medicine represents and aspires to achieve.

Our Vision, Mission and Values are expressed in the hard work of our alumni, staff and students. They also speak to the future generations of students, who will build on the legacy that has earned the School a special place in Singapore Medicine.

While the focus of our work is constant, the environment in which we operate is dynamic and ever-changing. This presents the School with new opportunities as well as fresh challenges that will now be met with conviction and a clear sense of purpose, grounded upon the values that drive and motivate us.

Thank you for your support and encouragement.

Khay Guan

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# MediCine

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## THE NUS MEDICAL SCHOOL'S VISION AND MISSION FOR THE 21<sup>ST</sup> CENTURY

Singapore's first and most established medical school celebrated its 113th year on 3 July 2018 with an unveiling of a declaration of its raison d'être in the 21st century.

"The NUS Medicine Vision, Mission and Values are lived and expressed daily through the hard work of our alumni, staff and students. They also speak to the future generations of students, who will further build on the legacy that has earned the School a special place in Singapore Medicine," said NUS Medicine dean, Associate Professor Yeoh Khay Guan.

"Our mission is to produce the best doctors and nurses to serve the people of Singapore, and to continue to find better solutions for tomorrow. While the focus of our work is constant, the environment in which we operate is dynamic and ever-changing. This presents the School with new opportunities as well as fresh challenges, that we will meet with renewed conviction and a firm purpose, driven by the values we hold dear."



*Alumni, staff and students putting thought to paper.*



*A group deep in discussion.*

## DOSSIER



*Then and Now, Past and Present - a group goes over key points.*



*Dr Low Lip Ping (Class of 1965) sharing his views.*

## MEDICAL DINNER 2018 – CELEBRATING OUR PEOPLE

On 3 July 2018, graduating students, NUS Medicine alumni and staff gathered at Orchard Hotel to renew old ties and reminisce about school days over food and drink.

Associate Professor Yeoh Khay Guan, Dean of the School led guests – who included NUS President Tan Eng Chye – in a toast to the Class of 2018.

The evening featured a dance performance by Medicine and Nursing undergraduate students, as well as the presentation of awards to educators, researchers and alumni who have done the School and nation proud through their work and service. The recipients are:

### **Educator of the Year**

Dr Ban Hong Kim, Kenneth (Department of Biochemistry)

### **Teaching Excellence award**

Dr Ban Hong Kim, Kenneth (Department of Biochemistry)  
Dr Goh Yong Shian (Alice Lee Centre for Nursing Studies)  
Dr Ignacio Mary Jeanette Jacinto (Alice Lee Centre for Nursing Studies)  
Dr Lau Ying (Alice Lee Centre for Nursing Studies)  
Ms Siriwan Lim (Alice Lee Centre for Nursing Studies)  
Associate Professor Lau Tang Ching (Department of Medicine)  
Dr Soon Tuck Loong, Derek (Department of Medicine)  
Associate Professor Tan May Chin, Theresa (Department of Biochemistry)  
Dr Ho Wai Loon, Calvin (Centre for Biomedical Ethics)  
Dr Thong Kim Thye, Mark (Department of Otolaryngology)

### **Researcher of the Year**

Professor Daniel G Tenen (Cancer Science Institute of Singapore, NUS)

### **Young Researcher of the Year**

Dr Edward Kai-Hua Chow (Cancer Science Institute of Singapore, NUS)

### **Research Excellence Awards**

Associate Professor Wong Wai Shiu, Fred (Department of Pharmacology)  
Associate Professor Reshma Taneja (Department of Physiology)  
Dr Saji Kumar Sreedharan (Department of Physiology)

### **Alumnus of the Year**

Professor Foo Keong Tatt (Class of 1965)

### **Young Alumnus of the Year**

Dr Low Lian Leng (Class of 2006)

### **Alumni Ambassador**

Adjunct Associate Professor Tay Sook Muay (Class of 1988)

# DOSSIER

Assoc Prof Yeoh sharing the School's Vision, Mission and Values.



## DOSSIER

Right: Student performers posing with Medicine and Nursing mascots Meddy and Neddy at the photobooth.

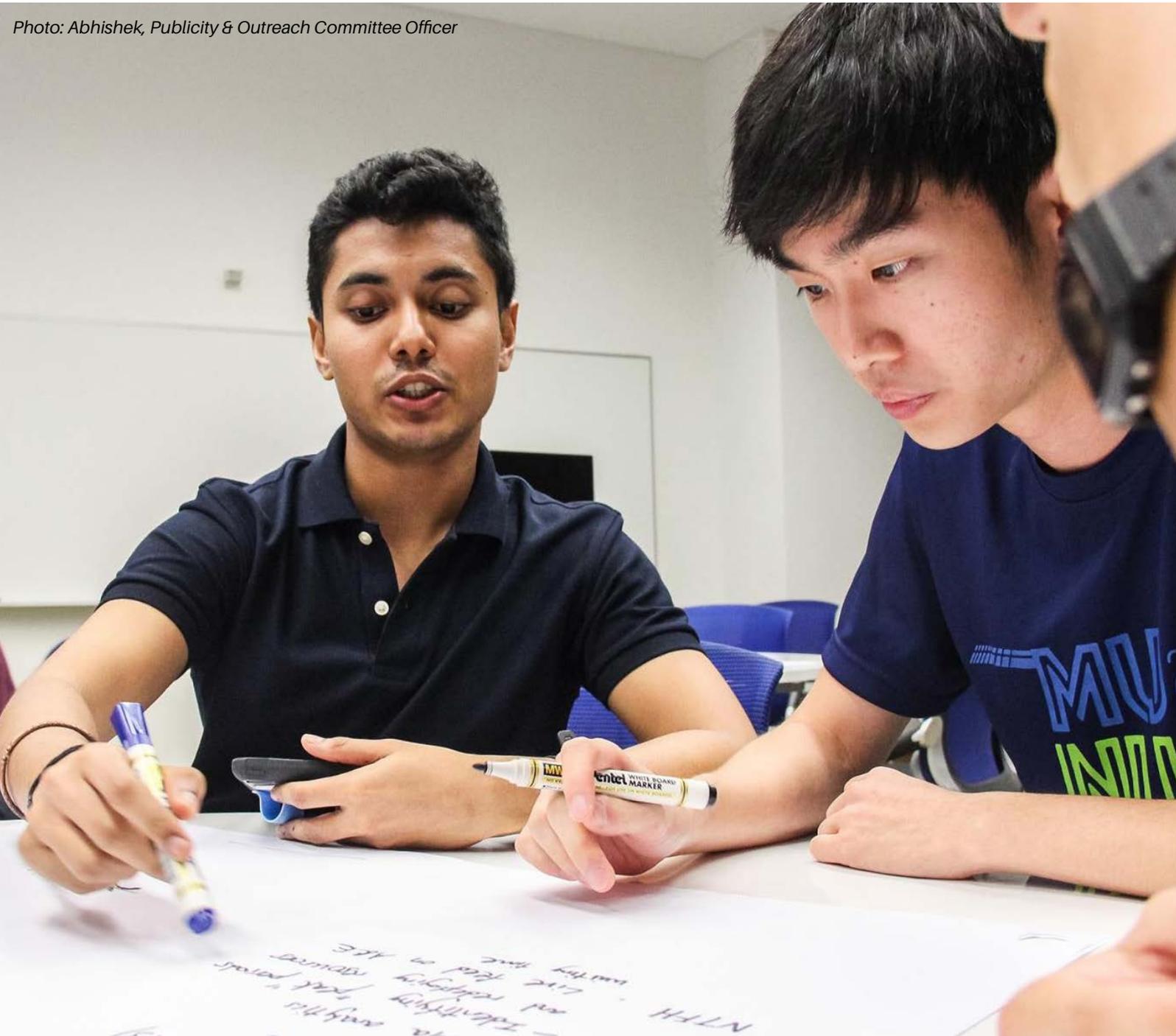


Bottom: NUS President Prof Tan Eng Chye (4th from right), Assoc Prof Yeoh Khay Guan, Dean, NUS Medicine (3rd from right), Assoc Prof Lau Tang Ching, Vice-Dean, Education (5th from right) and Professor Chong Yap Seng, Dean-Designate (extreme right) with the graduating Class of 2018.



For keepsake:  
alumni and friends.

Photo: Abhishek, Publicity & Outreach Committee Officer



## MEDICAL GRAND CHALLENGE – A PLATFORM FOR MEDICAL INNOVATION

By Lily Yang, Partnership & Sponsorship Committee Officer & Lim Jia Ying, Co-President of Medical Grand Challenge Phase III Medicine students

The Medical Grand Challenge enters its second year much as it started its inaugural season last year – getting students to address unmet healthcare challenges through developing creative and innovative solutions in collaboration with other National University of Singapore (NUS) students and various healthcare professionals.

It was first introduced in 2017 and was led by NUS Medicine students. This year, the Challenge is being organised by co-presidents Lim Jia Ying, Park Chang Joon, and Vikaesh Moorthy.

“I believe that innovation is critical in the medical field because there must be constant improvements and



Students tackling a problem.

upgrading to provide the best patient care. I want to help encourage a culture of creativity and innovation among our peers and provide them with a platform to bring their ideas to life," said Jia Ying, a first-year medical student.

The MGC challenges students to develop practical, real-world solutions to unmet healthcare needs. In this year-long challenge, teams comprising students from multi-disciplinary fields, including Medicine, Engineering, Business and Computing Science, go through interdisciplinary boot camps to develop and refine their innovations, from ideas and concepts to actual solutions and prototypes. They will then present their products at the Finale Night on 14 September 2018, and will also have the opportunity to share their ideas with guests. These hail from various industries that may step in to take truly outstanding student innovations forward to the next stage of development and eventual commercialisation.

Team projects are evaluated by a panel of judges, based on factors such as the impact on healthcare, a sound business model, creativity and innovation, and the feasibility of bringing their ideas to market. The prize for the most outstanding and marketable idea is S\$20,000, followed by S\$15,000 and S\$10,000 for the runner ups. There are also five additional special prizes for categories such as Best in Environmental Friendliness, Most Popular

on Social Media, and Best Pitch. Each team is helped with with a seed fund of S\$500.

Last year, the winning team led by a Phase II medical student created the Hipportable to assist in patient transfer – such as from the bed to the wheelchair. This novel solution came about after the team noticed caregivers' difficulties in physically transferring their loved ones. The device enables one-to-one lifting of immobile patients, helping caregivers to transfer their loved ones with ease.

As the second instalment of MGC continues this year, we are excited to see the creative solutions our teams have developed for our healthcare system, and more importantly, how these innovations can bring about patient benefit. Working on a range of different topics, from developing an immersive (Augmented and/or Virtual Reality) solution to tackle eye problem to redesigning the wheelchair to maximise the efficiency of patient transfers, 17 groups will be showcasing their work on 14 September 2018 at the NUHS Tower Block Auditorium. Do come down to support the teams.

For more updates, please follow the MGC Facebook page at <https://www.facebook.com/nusmgc/> and the website at <http://medicine.nus.edu.sg/cenmed/mgc/nus.html>.



*Student volunteers conducting a health screening at a resident's home. NHS brings the screening to residents' doorsteps – that includes phlebotomy and triage.*

## NEIGHBOURHOOD HEALTH SERVICE NOW A NATIONWIDE, INTER-PROFESSIONAL COMMUNITY HEALTH SERVICE

By Benjamin Tan Kye Jyn, Koh Ying Ying  
& Alicia Yip Swee Yan  
Project Directors & Publicity Head  
Phase II Medicine students

### **The mission**

In 2007, a small group of enthusiastic medical students found a gap in the healthcare system that they believed they could help bridge. They pooled what little resources they had, garnered the support of their teachers, and introduced Singapore's first student-organised health screening.

Twelve years later, the Neighbourhood Health Service (NHS) has grown by leaps and bounds to become NUS Medicine's iconic community service project. It is the only student-led School project that has nationwide reach and scale – partnering all three Regional Health Systems to serve more than 5,000 residents in nine different districts, from Taman Jurong to Eunos Crescent.

NHS remains an NUS Medicine student-led initiative, but we now welcome student volunteers from Singapore's two other medical schools – the NTU Lee Kong Chian

## DOSSIER



*NHS partners the National Dental Centre Singapore (NDCS) to provide a basic dental check-up and follow-up referrals to CHAS dentists in the vicinity.*

School of Medicine and Duke-NUS Medical School. We also increasingly play a key role in inter-professional education by engaging nursing, social work, physiotherapy and occupational therapy students from NUS, Nanyang Polytechnic and Singapore Institute of Technology.

While many things have changed since 2007, one thing has not – our core ethos of serving the underserved. We found that lower-income residents living in HDB rental blocks are four times less likely than the average Singaporean to go for regular health checkups – hence our mission to reach out to them at their doorsteps.

### **Going beyond the basics**

Today, NHS is more than just another health screening.

We bring a comprehensive, holistic health service right to the doorsteps of residents-in-need. This is especially convenient for immobile residents, who are thus encouraged to participate. Our screening module comprises five distinct categories – chronic diseases, functional, mental health, frailty, and cancer. Each contains multiple modalities and add to a total of 26.

The work does not stop there. NHS continues to engage more than 300 residents with abnormal results through our comprehensive follow-up programme. The aim is not to replace primary care physicians, but to motivate these

residents to see GPs to follow up on their screening results. To ensure that they do so, our committee members – trained in motivational interviewing techniques frequently used by family medicine physicians – engage residents via phone calls (and house visits in more complex cases). This happens at regular 3-monthly intervals, for up to a year after these residents' last screening, thus encouraging positive health-seeking behaviour.

Crucially, we take a holistic view on health. We are well aware that healthcare decisions are always influenced by socio-economic factors. Thus, NUS Social Work students form a core part of our committee and volunteer group. They work tirelessly to connect residents-in-need to social support organisations, in order to overcome socio-economic barriers to healthcare.

### **2018 screenings**

This year, NHS will be holding two screenings. It will be our second year serving the residents of Kampong Glam, and our first year in Queenstown.

#### **8 – 9 September 2018**

**Kampong Glam Community Club**

#### **6 – 7 October 2018**

**Leng Kee Community Club (Queenstown)**

# DOSSIER



*NHS student volunteers engaging residents in health education through a modified Snakes and Ladders game.*

## **You can help to make a difference!**

If you are a healthcare professional and you would like to give a few hours of your time to our residents, please contact us at [yllsom.nhs@gmail.com](mailto:yllsom.nhs@gmail.com). We are always looking for passionate volunteers who can help provide residents with meaningful health advice to guide their healthcare choices. Any help would be greatly appreciated!

The NHS family also welcomes NUS Medicine and Nursing students to volunteer with us and make a difference today. Here at NHS, we spare no effort in creating a meaningful experience for volunteers and enabling skills development, which includes training where necessary. You will learn how to walk a resident through the entire screening – as opposed to performing a repetitive, specialised task for the whole day. This means engaging in conversation, befriending the resident, taking his/her blood pressure (don't worry M1s, we'll train you!), and even motivating the resident to adopt healthy lifestyle habits. These are all skills that you will need as doctors and nurses – so why not start now?

On top of that, many of our volunteers receive the opportunity to conduct door-to-door health screenings for less mobile residents. We believe the interaction with these residents will be an instructive and transformative one that will help you to become a more compassionate and empathetic person.

If you're ready to devote (not just a few hours but a year of) your time to this worthy cause, NHS is also looking

forward to expanding our committee! Incoming first year NUS Medicine and Nursing students are welcome to sign up as committee members. The main committees are: (1) Operations (2) Follow-up (3) Volunteer Management (4) Logistics (5) Publicity, Health and Community Outreach (PHCO) (6) Research and Development. Recruitment for NUS Social Work and NTU Lee Kong Chian School of Medicine committee members will be conducted separately.

More details on NHS and how to sign up as a volunteer or committee member will be released on our social media platforms below:

A blue poster for NHS recruitment. At the top left is the NHS logo with the text 'NEIGHBOURHOOD HEALTH SERVICE'. To the right is a white medical cross icon and a white stethoscope icon. Below the logo, the dates and locations are listed: '8 &amp; 9 SEP '18 KAMPONG GLAM CC' and '6 &amp; 7 OCT '18 LENG KEE CC'. In the center, it says 'SIGN UP AS A VOLUNTEER OR A COMMITTEE MEMBER'. At the bottom, it says 'be a part of NHS' in large white letters. Below that, it says 'DETAILS OF SIGN-UPS WILL BE RELEASED ON INSTAGRAM AND FACEBOOK'. At the very bottom, there are social media icons for Instagram (@NHS.YLLSOM), Facebook (NEIGHBOURHOODHEALTHSERVICE), and a website link (NEIGHBOURHOODHEALTHSERVICE.COM).



*Dr Tan Wee Hian, Family Physician, Associate Consultant and Deputy Head at Pioneer Polyclinic, sees a patient in his clinic.*

## NATIONAL UNIVERSITY POLYCLINICS WILL HELP SHAPE FAMILY MEDICINE, DELIVER VALUE CARE

American entrepreneur and author Tim Fargo once said, “Who you are tomorrow begins with what you do today.” Indeed, steps taken today lay the foundation for the journey ahead and the outcomes of the future. Having a vision and purpose is thus important as they chart a clear direction for the organisation and its employees. This is especially so for new organisations such as the National University Polyclinics (NUP), the primary care arm of the National University Health System (NUHS).

As the integrated healthcare cluster for the west, the NUHS envisions a healthy community by shaping medicine and transforming care. In line with this, the NUP formed its purpose of Shaping Family Health, Delivering Value Care. “NUP looks after patients of all ages and is likely a person’s first touchpoint to healthcare. At the same time,

we know that family members play a big part in influencing the patient’s readiness to make the necessary behaviour and lifestyle changes. This puts us in a position to shape family health – the way care is delivered to the family and community, and the way the family and community should be involved in managing their health. We will do this by delivering value care – care that is patient-centric, safe and clinically- and cost-effective.” Chief Executive Officer Dr Lew Yii Jen explained.

This is opportune in the face of an increasingly ageing population and a rising chronic disease burden. With primary care being the first line of care for the public, demands on primary care – both in volume and complexity – will grow correspondingly in the coming years.

### **Transforming Patient Care**

As health needs continue to morph and grow, a care model that is multi-disciplinary and collaborative is needed, so that there are synergies that can be tapped on. The NUP will look for ways to improve the delivery of clinical care to its patients. This will be done by managing patients with chronic conditions holistically, empowering them in self-care, involving their caregivers in the process, and partnering institutions within the NUHS and relevant organisations to ensure that patient care is seamless and coordinated.

# DOSSIER

Some of the initiatives the NUP is undertaking include increasing patients' activation, or patients' ability to manage their personal health and care, so that they take ownership of their health, integrating diabetes care with other institutions to help patients manage their conditions well within the community, and developing community mental health programmes across the polyclinics.

For example, the NUP is working with the National University Hospital (NUH) and the Ng Teng Fong General Hospital (NTFGH) to help diabetic and hypertensive patients manage their chronic kidney disease (CKD) under the Holistic Approach in Lowering and Tracking Chronic Kidney Disease (HALT-CKD) programme. Patients with early-stage CKD will be taken care of by the polyclinics, while those whose conditions have deteriorated would be referred to the hospitals' Renal Departments. Patient cases are discussed between the respective teams for continuity of care.

The Health and Mind Clinic in Jurong Polyclinic is another example where the NUP is working towards making lives better for our patients. The clinic looks after patients with common mental conditions and emotional issues. It started the Assessment and Shared Care Team (ASCAT) programme – a tie-up with NTFGH's Psychiatry Department. In addition to discharging stable patient cases to Jurong Polyclinic, the Psychiatric Department also provides training for doctors at the polyclinic.

The NUP and NUH have also streamlined the process so that infants with neonatal jaundice can be directly admitted to the NUH with NUP doctors' recommendations.

Said Dr Lew, "We also need to coordinate with General Practitioner (GP) partners and community health and social care providers to ensure the well-being of the community we serve. We can do so by working through the cluster's Regional Health System to review and enhance current health screening programmes. We can also partner GPs, Family Medicine Clinics and Primary Care Networks to drive health screening initiatives and community outreach programmes on chronic management for the residents in the Western region of Singapore."

## **Contributing to Research**

Leveraging on the NUHS' research expertise, the NUP will work closely with its partners to deepen its research efforts, especially in areas related to family medicine and chronic diseases, such as diabetes, chronic kidney disease, geriatric medicine and mental health.

"Being part of the NUHS means that opportunities abound to work with the Schools and Faculties under the National University of Singapore (NUS)," said Dr Lew, "and to

establish partnerships to work together on patient-related collaborations and other projects, which may improve the overall productivity in the way we do things."

## **Nurturing Future-ready Healthcare Professionals**

A key priority for the NUP is to educate, train and develop its workforce, as well as the future generations of doctors, nurses and medical professionals, so that they will always be ready to meet the evolving health needs of the population.

In particular, the NUP is planning to train more family physicians in the assessment and screening of mental conditions for the community, and is working with the NUS Yong Loo Lin School of Medicine (NUS Medicine) and the other two local medical schools to train undergraduates.

Dr Lew elaborated, "We are working with NUS Medicine to pilot short attachments for the Year 1 medical students, so that they can gain more exposure to Family Medicine at an earlier stage. Similarly, we will help to enhance the NUHS Family Medicine residency programmes, and gradually ramp up the number of new Family Medicine residents we enrol." Plans are also in place for the NUP to develop more post-graduate doctors to become proficient family physicians for the community.

Another upcoming NUP-NUS collaboration is with the Alice Lee Centre for Nursing Studies. It is hoped that through this collaborative effort, NUP is able to work on modules to better train Care Managers under its teamlet care model. "We're constantly innovating and incorporating best-evidence pedagogies into the training of our staff," added Dr Lew.

## **Creating Culture And Establishing Operational Excellence**

To serve our patients well, one must also possess more than just clinical knowledge. Technology is a strong enabler in this regard, and the NUP strives to enhance its operations to deliver quality care and optimise its resources. One of its plans is to explore the use of robotics in the polyclinics, with a one-week robotic trial that took place at the Choa Chu Kang Polyclinic in June. "We will also harness new technology such as tele-treatment, tele-collaboration, tele-monitoring and tele-support," added Dr Lew.

Creating an NUP identity and building a collegial and person-centric culture across the polyclinics and departments is also a key emphasis, as the NUP moves into its second year.

Dr Lew hopes that the Purpose Statement will permeate all that the NUP does. "Regardless of our job scope, all of us need to ask ourselves how we can value-add to the patient experience, be it through direct or indirect means."

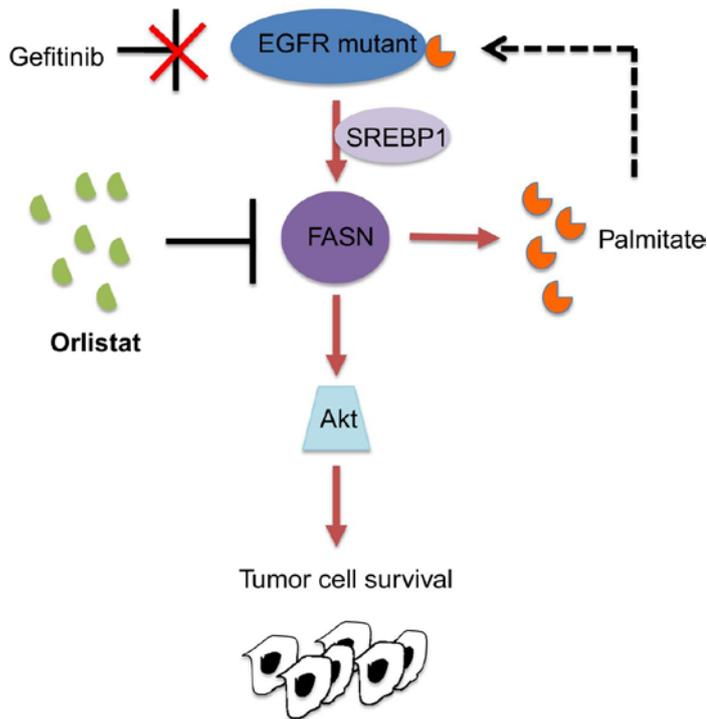
# FAT HOPE

ENZYME IN FAT SYNTHESIS INTERACTS  
WITH A LUNG CANCER CELL PROTEIN  
TO INDUCE DRUG RESISTANCE

By Dr Khor Ing Wei  
Dean's Office

Cells use nutrients such as glucose, amino acids and fat (lipids) to produce the energy to support the essential processes that keep them alive and functioning. Cancer cells, those ultimate survivors, have figured out a way to tweak their own metabolism to increase the supply of energy, allowing them to multiply uncontrollably. These altered metabolic pathways can serve as targets for new cancer therapies.

A team of researchers at the Cancer Science Institute of Singapore (CSI) and Beth Israel Deaconess Medical Center in the U.S., led by Dr Azhar Ali, has discovered that a key enzyme in lipid metabolism controls the response to a class of targeted drugs called tyrosine kinase inhibitors (TKIs) in lung cancer.



Left: The authors found a new mechanism by which some lung cancers develop resistance to tyrosine kinase inhibitors (TKI) drugs. They found that an enzyme in fat synthesis, fatty acid synthase (FASN), is key to the process. FASN facilitates the production of the fatty acid palmitate, which modifies the mutated EGFR protein on some lung cancer cells, making them resistant to TKIs such as gefitinib. Blocking FASN with the drug Orlistat wipes out the production of palmitate, making the cancer cells susceptible to gefitinib and stunting their growth.

Lung cancer is the most common cancer in the world and the top cause of cancer deaths, accounting for one in five deaths from cancer.<sup>1</sup> A large majority of lung cancers (85%) are known as non-small cell lung cancers (NSCLC). A significant proportion of NSCLC patients (ranging from 10%-15% in Europe and the U.S., to more than 40% in Asia) have alterations (or mutations) in the epidermal growth factor receptor (EGFR) gene.<sup>2</sup> Currently, the most effective treatment for this type of NSCLC are TKIs that specifically target the altered EGFR, with an overall survival of 2 to 4 years.<sup>3-5</sup> However, over time, resistance to TKIs develops. At that point, patients have very limited treatment options and a very poor prognosis.

Understanding how this inevitable resistance to TKIs develops is crucial to tackling the problem. Several different mechanisms for TKI resistance to this type of lung cancer have already been described. As discussed in their article in the February 2018 issue of the prestigious journal *EMBO Molecular Medicine*, Dr Azhar Ali, Dr Chin Tan Min, Professor Daniel Tenen and colleagues discovered a completely new mechanism involving fatty acid synthase (FASN), a key enzyme in lipid synthesis that facilitates the production of the saturated fatty acid palmitate.<sup>6</sup> When palmitate modifies mutated EGFR in the cancer cells, it affects the way these tumor cells behave, making them resistant to the effects of TKIs.

Orlistat is a weight loss drug that blocks FASN, thus preventing the production of palmitate. In resistant cells, without palmitate, EGFR can no longer be modified by palmitate and is degraded instead. Treatment with Orlistat stunted the growth of EGFR-mutated NSCLC cells in cell culture systems and preclinical models. These findings provide strong evidence of the importance of FASN in survival and growth of this common type of lung cancer.

The next step is to target FASN using a modified version of Orlistat, which is poorly distributed throughout the body when given orally. A more effective therapy that blocks FASN will serve as a valuable treatment option for NSCLC patients with EGFR mutations who have developed resistance to TKI drugs.

Says Dr Azhar, "Identifying molecular targets that are responsible for the development of resistance to chemotherapy has important implications for treatment. Drugs that interfere with fatty acid synthesis may thus be useful in treating these lung tumours that are driven by FASN and resistant to TKI drugs."

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# NURTURE OR NATURE? RESEARCH PROJECT REVEALS ANSWERS

*A little over a decade ago, a team of intrepid researchers from the National University Health System, KK Women's and Children's Hospital, and A\*STAR's Singapore Institute for Clinical Sciences set up one of the world's largest birth cohorts. Working with partners from research institutions in New Zealand, the UK and other countries, they set out to understand how conditions in pregnancy and early childhood influence the health and development of mothers and their children. Dr Khor Ing Wei, Dean's Office, reports.*

Ten years on, the Growing Up in Singapore Towards healthy Outcomes (GUSTO) continues to yield a treasure trove of information that is helping scientists and doctors understand how the health and potential of Singaporeans can be improved. It has amassed clinical data and samples from more than 1,200 mothers and their children since 2009. More than 15,000 variables relevant to diverse disease areas have been collected, making GUSTO the most deeply phenotyped and sampled cohort in the world.

The impetus to embark on this enormous project was to understand how fetal development and prenatal influences are linked to future health and disease, especially neurodevelopmental diseases and non-communicable illnesses such as obesity and metabolic disease. Ultimately, the goal is to use the deep understanding of the underlying mechanisms acquired through the study to develop clinical and public health interventions.

The school of thought that biological and environmental factors in early life affect health throughout an individual's lifetime has gained ground in recent years. These ideas form the basis of a relatively new field of research called Developmental Origins of Health and Disease (DOHaD).

### **Maternal mental health affects foetal brain development**

Some of the largest influences on our health could happen even before we are born. Led by Professor Chong Yap Seng, senior consultant in obstetrics and gynaecology and Dean-Designate of the NUS Yong Loo Lin School of Medicine, GUSTO has already revealed some important findings about the effect of foetal life factors on later health and disease. For example, researchers in the programme showed that anxiety and depression in the mother around the time of birth was linked to reduced brain size and changes in brain structure in their babies, and affected the children's reactivity to stress and mood disorders later on.

Based on these findings, the National University Hospital (NUH) implemented systematic surveillance and support for expectant mothers with mental health concerns in 2014. GUSTO researchers also presented a paper to the Singapore Ministry of Health (MOH) in September 2015 that recommended routine screening for anxiety and depression for all women during pregnancy and the postnatal period, as well as follow-up and intervention for those who screen positive for the conditions. GUSTO was recently awarded \$200,000 through the President's Challenge programme, "Promoting Parental emotional health to Enhance child Learning (ProPEL)," to study the effects of a mother's mental health on her children.

### **Diabetes in pregnant women common**

Another finding from GUSTO that has had a large clinical impact was the discovery that gestational diabetes (GDM) was much more common in Singapore than doctors had suspected. GUSTO researchers showed that screening of only high-risk pregnant women (the previous standard practice in Singapore) missed as much as 50% of all cases. GDM is usually discovered during the late second trimester of pregnancy in women who did not have diabetes beforehand. Although the condition usually goes away after delivery of the baby, GUSTO found that nearly half of the women with GDM developed prediabetes/diabetes within five years post-delivery. Their children are also at higher risk for obesity, type 2 diabetes and neurodevelopmental disorders.

The researchers submitted another paper to MOH in September 2015 to change the screening policy. In an inspiring example of the impact of science upon changing clinical practice, the three public maternity units in Singapore (KK Women's and Children's Hospital, Singapore General Hospital and NUH) implemented universal screening for GDM in February 2017.

The researchers hope to continue following the mothers and children in the study for a full generational cycle, until the children reach young adulthood. This will provide an unfolding picture of the effects of early life factors on health and disease as these children literally "grow up in Singapore."

### **A globally recognised programme**

Like the other NUS Medicine Summit Research Programmes, GUSTO has a strong global reputation and is well poised to keep growing in recognition and stature. Although the decade-old GUSTO is the "new kid" in the DOHaD field, the programme has already attracted interest and admiration from leaders of global organisations. One of these leaders, Dr Tadataka Yamada, Executive Vice President of Takeda Pharmaceuticals and former President of the Bill & Melinda Gates Foundation Global Health Program, hailed GUSTO as "truly world-class and best-in-class." Among its many collaborations, GUSTO is working with the Gates Foundation to provide a reference data set for Asian populations.

GUSTO is also partnering with similar cohorts in Europe (Generation R and Southampton's Women's Survey) and Canada (MAVAN), and collaborating with many institutions in Singapore and globally to facilitate replication of findings and broaden the scope of future research directions. GUSTO is also partnered with companies in the nutrition space, such as Abbott, Danone and Nestle to translate the work into clinical and commercial applications.

### **Sustaining the momentum**

Since DOHaD is quite a young field, nurturing upcoming researchers to continue the work is especially important. To achieve this goal, the GUSTO programme is training and mentoring early-career clinician scientists through regular investigator meetings and discussions with established clinician scientists and basic scientists.

Prof Chong expressed his sense of gratification about how GUSTO has evolved. "GUSTO is truly an amazing study! There is so much richness in the data and bio-samples we have collected that I am constantly surprised at what we are able to study. The findings are not just interesting scientifically but have been incredibly relevant in guiding policy and practice changes in Singapore. Every time the GUSTO research fellows present their work, I am thrilled as their findings are so obviously translational," he said.



Assoc Prof Nga Min En (seated) with NUHS Pathology residents, (from left to right) Dr Gideon Tan, Dr Nicholas Tan, Dr Gwyneth Soon, Darren Chua (NUS Medicine student, class of 2021), and Dr Tan Hui Min.

## A TEACHER'S LABOUR OF LOVE

A medical student is scrutinising a diseased heart housed in a transparent container, or a pot as it is more commonly called, while the rest of the class crane their necks in a bid for a better view. They await their turn to inspect the pot, which makes its way around the lecture room. When the specimen is finally handed to the last student at the back, the teacher has already moved on to another topic. In a different session, the class will then learn, from a separate tutor, how these diseases look on microscopic slides.

This was how pathology was taught at the National University of Singapore (NUS) Yong Loo Lin School of Medicine in the past.

Today, the learning of pathology has been enhanced and aided through technology, thanks to the efforts of Associate Professor Nga Min En and colleagues at the Department of Pathology. Painstakingly, one specimen at a time, the team has rendered more than 700 specimens in digital format and made more than 250 of these specimens available

online for medical students. It is a labour of love that begun more than six years ago. It is still going on and will end when the last and final specimen has been digitised, said Assoc Prof Nga, who is a consulting pathologist at the National University Hospital.

The benefits are greatly appreciated by students, who no longer have to wait for their turn in class to view the specimens, nor borrow them from the department to study for examinations. The digitised specimens of the diseased body parts can also be viewed alongside microscopic slide images of the same disease, which helps students better understand the morphology of diseases with more clarity. Classes do not have to be split into two groups too, since both the images of the disease and the specimens can be viewed concurrently during lessons.

“The students gave us very good feedback, because they had trouble viewing the specimens clearly in the past. Now, they are able to examine the details of specimens clearly and at leisure and this also means they are able to give their attention fully to tutorials,” Assoc Prof Nga said.

“We received positive feedback from tutors as well. Most of them found the resolution (of the digitised pots) very good.”



*The team behind the Pathology online portal: Assoc Prof Nga Min En (seated), NUHS Pathology residents, and non-academic staff at NUS Medicine's Department of Pathology. (Left to right) Dr Gideon Tan, Dr Nicholas Tan, Mr Muhamad Aidil, Dr Gwyneth Soon, Mr C. Rajendran, Darren Chua (NUS Medicine student, class of 2021), Dr Tan Hui Min, Ms Tan Bee Fong, and Ms Norlela Bte Mohamed, Ms Norliana Bte Abdul Aziz. Absent: Ms Tran Anh Phuong (research assistant) and Dr Noel Chia.*

The pathology department is home to more than 5,000 dissected and preserved specimens of human organs and tissue. While more than 700 of these pots have been digitised since 2012, Assoc Prof Nga hopes to digitise a further 1,000 specimens by the end of 2019, with the help of her team.

### **The digitisation process**

The work to photograph the samples and then convert them to digitised images is done by a team of non-academic staff at the Department of Pathology adept at IT and photography. They are helped by students as well as NUHS Pathology residents. The latter help to check the teaching materials for the online platform, provide ideas for improvement and make value-added contributions such as annotations, adding links or cases.

The digitisation process involves a carefully orchestrated photoshoot. Staff position the specimens on a turntable inside a light box, then photograph them with a 18-megapixel camera at multiple angles. A total of 24 photos are taken of each specimen. Assoc Prof Nga then edits each image with the Photoshop software, while another team member combines these 24 images into a single file. The end result is a clear 360-degree view of the specimen in its container. It is a laborious process that takes about 45 minutes per specimen.

"It's a labour of love. Clinical work, teaching, research, and administrative work continue. It can be a struggle to find time and energy to do this. But there are some fantastic rewards as well," Assoc Prof Nga said.

### **Moving online**

Seeing the potential in going digital, Assoc Prof Nga took these digitised materials one step further. In 2015, she uploaded these materials online, enabling her students to access them for their own learning.

"I believe physical pots are wonderful. I use both (physical and virtual pots) in my classes, and they complement each other. Obviously, the digital pots give much more flexibility in terms of their use; for example, students can study them any time they want to," she explained.

The updated web resource is called Pathweb (<https://pathweb.nus.edu.sg/>), and has two main sections.

In one section called '**Virtual Pathology Museum**', students can find both virtual microscopy slides and pots categorised into both general pathology and systemic pathology, according to their curriculum. Another section named '**Pathology Demystified**' features mind maps, live videos, talking slides and quizzes, all hand-written, drawn or produced by Assoc Prof Nga. These materials provide students with an approach to studying pathology, and allow them to engage in self-directed learning.

Creating the digitised content online was not an easy feat for Assoc Prof Nga, who picked up a lot of new skills along the way, such as using new applications on her iPad to scribble notes, and voice video clips to help her students understand pathology better.



*Photographing specimens for digitisation.*

There were moments when she wondered if the digital resources would be as useful as she had believed.

"I spent days just coming up with one mind map, and I was not sure how useful people will find it. It is always a worry. You do something and invest so much time in it, and then potentially nobody might find it useful," she said.

But the push to go digital for medical education is necessary. In the last decade, pathology labs the world over have also been digitising their slides and Assoc Prof Nga is constantly on the lookout for better ways to teach pathology.

"I am still very old-school. I use a pen and a white board to write during my class. But I think that we should explore all the means by which students learn. Tutorial classes are interactive, but online learning is another way of study. Students learn in different ways, and digital methodologies are a very huge aspect of how they learn. So we have to jump on the bandwagon."

### **International fans**

Since the launch of the pathology website, Assoc Prof Nga has received a fair bit of positive feedback from students and colleagues alike. Even students and academic staff from Italy and Egypt are registering for access to the site.

"I find the work very rewarding when people tell me they find (the resources) useful. A couple of times they write me an email, or in the feedback form. When I share this at overseas pathology conferences, some faculty members

come to me and say that this is something very useful, and that they would like to use it," she said.

So should users pay? "I don't really want to make it into something people must pay for, even though it may make sense at a different level. It is like teaching – you teach and you don't expect to get a big paycheck out of it, you do it because you want to pass on knowledge that is helpful or that will make a difference. If these resources can play a role in helping students understand pathology better and hence become more confident practitioners in the field of medicine, then, for my part, that would have made this endeavour hugely meaningful," she said.

Phase IV Medicine student Teo Jun Hao used the Pathology Demystified website when he was learning General and Systemic Pathology in Phase II. He also used the online resource as a supplement to his textbooks and lecture notes when he needed more guidance on the topics.

"The website was really helpful in providing me a more holistic picture of what I was learning in Pathology, through the real life cases and sections on clinical-pathological correlations provided in almost every topic there. The online quizzes were also really helpful in allowing me to learn about and correct the many misconceptions I had about Pathology!" Jun Hao said.

"I think the resources on the website are very comprehensive and are a great learning tool that all medical students should explore and utilize when learning Pathology!"



Assoc Prof Suresh Pillai giving a demonstration on how the Virtual Interactive Human Anatomy (VIHA) works.

## A WHOLE NEW WAY OF SEEING THE HUMAN BODY

### *Getting real and virtual in the study of human anatomy*

The study of human anatomy is a cornerstone of medical and nursing education and at the National University of Singapore Yong Loo Lin School of Medicine (NUS Medicine), students attending classes in the subject embark on an enthralling sensory experience - they first gain hands-on experience working with human cadavers and then manipulate finely detailed, computer-generated, three-dimensional renditions of the human body and its parts in a special laboratory.

Moving from studying actual physical specimens to examining virtually simulated versions in an interactive lab, and switching again to human cadavers (dubbed Silent Mentors) allows students to gain a deeper and fuller understanding of the intricate relationships among the various body structures.

The computer-simulated human anatomy system was launched recently by the Centre for Healthcare Simulation at NUS Medicine to enhance the teaching and learning of human anatomy, said Centre director Associate Professor Suresh Pillai. Called Virtual Interactive Human Anatomy or VIHA, the system supplements and complements the traditional anatomy classes that are so essential and fundamental to medical studies. VIHA “improves the three-dimensional spatial orientation of anatomical structures as students get to interact with the virtual human body, such as removing body parts and viewing them from multiple angles. VIHA bridges the gap between textbook learning and dissection in an anatomy hall,” he explained.

In addition to prosection classes, where they study and work with cadavers that have already been dissected by experts, many students (especially those who have an interest in surgery) also attend the elective whole body dissection course. This provides opportunities for students to gain hands-on experience in cadaveric dissection.

This hands-on learning is enhanced when the students experience the cutting-edge virtual simulation technology of the VIHA system. Using Virtual Reality headsets and hand-held controllers, they are transported to a virtual dissection hall where they can perform localised or regional



*A student using the Virtual Interactive Human Anatomy (VIHA).*

dissection on a virtual human cadaver to reveal underlying structures, layer by layer. Thanks to the system's software, students are able to manipulate and mobilise joints and muscles, peel back layers of skin and tissue and peer into deeper structures like organs, blood vessels, nerves and bones. Each move can be reversed and repeated until students gain a good grasp of the relationships among the various body structures - an achievement that is not possible with a real cadaver.

"VIHA allows students to navigate the human anatomy at their own pace, reviewing and reinforcing complex spatial relationships of anatomical structures like muscles, bones, nerves, arteries, veins and organs. Animation of joint movements has also been incorporated to highlight muscle actions in producing certain movements. This helps students with visualisation and gives them a better understanding of the connection between the various structures," said Assoc Prof Pillai, Director of the Centre for Healthcare Simulation at NUS Medicine and also Senior Consultant at the Department of Emergency Medicine, National University Hospital.

The combination of hands-on training and virtual reality experience takes the teaching of Human Anatomy to a whole new level. Said Associate Professor S.T. Dheen, Head of Anatomy, "Traditionally, human anatomy is taught through cadaveric dissection and use of anatomical models and prosected specimens in medical education. In addition to prosection classes, where students study and work with cadavers that have already been dissected by experts, many students (especially those who have an interest in surgery) also attend the elective whole body dissection course. This provides opportunities for students to gain hands-on experience in cadaveric dissection. Although there is no substitute for cadaveric dissection in learning human anatomy, incorporating recent technological advancements

like VIHA in pedagogy certainly enhances the learning process and transforms the learning environment. NUS Medicine offers the best of both worlds to Gen Z students who are generally tech savvy!"

Phase I Medicine student, Sheikh Izzat B Z-A Bahajjaj, agreed. "I find the VIHA experience very effective and practical in my learning of anatomy as it is easy to use and provides a clear, 3D visual representation of anatomical structures that are hard to visualise in the textbook. Furthermore, VIHA separates itself from the Anatomy Hall as it allows the user to freely manipulate and isolate various structures which may be difficult to appreciate, such as the courses of arteries, veins and nerves, which are difficult to observe and appreciate when using a specimen in the anatomy hall," he said.

"While first and second year Medicine students are the first to be put through VIHA training in addition to the standard, traditional anatomy classes, the system will be progressively introduced to Phase III, IV and V medical students. This will feature more advanced features including more interactive animation, clinical pathology and self-directed questions," added Assoc Prof Pillai. There are also plans to extend VIHA to Nursing and postgraduate students, and potentially surgical residents for pre-operative surgery planning and rehearsal of procedures.

More complex interactive training scenarios will also be introduced in the coming months: the Centre is developing the Virtual Interactive Simulation Environment (VISE), a 3D virtual environment platform that will create life-like scenarios, such as a hospital ward emergency or a mass casualty incident. These scenarios will immerse students in challenging virtual environments, where they will learn to work as teams to manage patients, applying clinical knowledge and skills that they have learned.



## FROM PERSPECTIVES TO POLICIES ON ETHICAL ISSUES IN GENETIC TESTING

By Dr Owen Schaefer,  
Mr Markus Labude & Dr Vicki Xafis,  
Centre for Biomedical Ethics

As basic and translational research into genetic testing and precision medicine receives increasing attention, funding and public support, there has been substantial international interest in addressing the Ethical, Legal and Social Implications (ELSI) of such novel interventions. There is general recognition that it is not enough to show that genetic information can improve clinical care; we must also be cognisant of the ramifications such testing may have on patients' rights, familial circumstances, social position and economic situation. To this end, the Centre for Biomedical Ethics has recently been engaged in a series of empirical bioethics projects to better understand local stakeholder perspectives on key ethical issues on the ELSI of genetics. These projects not only increase our knowledge of public attitudes, but also can help shape best practices and sound policies as precision medicine moves forward.

### Two key issues

The ELSI of genetics covers a wide variety of issues, but

in our research we focused on two that have drawn considerable attention internationally: incidental findings and data sharing.

Incidental findings, as defined in local legislation, are findings potentially relevant to the patient or subject, but which are outside the purpose for which a given test was conducted. In genetics, incidental findings are primarily an issue for whole genome or exome sequencing, where researchers or clinicians generate information that pertains to far more biological functions and processes than the disease or condition that prompted the sequencing. Recent research suggests a rate of approximately 1.6% for clinically actionable genetic findings amongst Singaporeans. While this may appear low, the number becomes significant for ambitious projects to sequence thousands of genomes.

Returns of incidental findings have the potential to benefit those undergoing genomic sequencing. This may be through clinical action such as preventative medicine, aiding reproductive decision-making, or helping patients get a better understanding of their likely life outcomes so they can plan accordingly. But there are also risks. Some findings may be poorly understood and cause undue confusion and anxiety. Findings of propensity for disease in asymptomatic individuals with no family history may lead to false positives and overtreatment. And findings may have implications on insurance premiums, employment or other services: Singapore currently lacks the sort of genetic anti-discrimination protections present in other countries.

The second issue we are studying relates to data sharing. The advancement of precision medicine relies on large

and diverse genetic datasets, linked with clinical and other data that can be used to derive insights on how genetics may affect disease outcome and treatment response. This has led to the creation of a variety of genetic data-sharing consortiums internationally, allowing researchers globally access to valuable data that no individual project could generate on its own.

But it is important to remember that genetic data pertains to people, whose privacy, interests and rights may be threatened by sloppy data management practices. Sharing with certain parties like insurers or data breaches where sensitive information is publicly released could cause undue harm to data subjects. Anonymisation has for many years been seen as a means to protect subjects, but re-identification is becoming increasingly feasible as data becomes richer and more interlinked. Data subjects have some interest in ensuring their information, which typically is provided without compensation, is used for public benefit and not private gain. Consent, however, for each instance of data sharing is impracticable, and so alternatives to consent may need to be developed.

### **The utility of stakeholder perspectives**

Formulating ethical recommendations concerning incidental findings and data sharing is not merely a matter of sitting in an armchair and philosophising about the issues. Policies must be sensitive to the actual interests and priorities of the stakeholders involved – patients, subjects, clinicians, researchers and others.

This does not mean doing a poll and enacting policies based on whatever a majority says. Analysis and formulation of best practices requires a degree of expertise, time and energy that will not be possible in a 15-minute survey or 1.5-hour focus group.

Nevertheless, such understanding of stakeholder perspectives is a crucial component to inform that analysis and formulation. When a doctor considers, for instance, whether to report an incidental finding of increased propensity to develop an untreatable but life-threatening disease, it will be important to understand whether this is the sort of finding that patients and subjects would find valuable. If no one wants to hear about that sort of finding, this will be a good reason to withhold it. And when assessing data-sharing policies, an appreciation of the expectations of data subjects will help assess what sort of scope of data use is reasonable, given individual consent is not possible.

For this reason, we have conducted a series of focus groups and surveys of Singaporeans on their perspectives on incidental findings and data sharing. The results, while still under analysis, reveal a set of attitudes mostly in line with what stakeholders report in other countries, though with some differences emerging based on unique local contextual features such as the lack of genetic anti-discrimination protection mentioned above.

It is important for policies that are developed not to be purely derived from the parochial and idiosyncratic concerns of individual researchers or IRBs. The evidence we produce will enable those formulating policies to rely on the values and concerns that are held by the individuals most affected by those decisions.

### **Future research**

While we are in the midst of producing preliminary recommendations based on our findings, work continues on further understanding and exploring stakeholder perspectives, which can in turn further inform and help refine policy approaches. The next phase of our research, funded by the Social Science Research Council, involves going beyond surveys and focus groups, to a deep-dive investigation into ethical data-sharing using Citizens' Juries. Whereas focus groups are limited by time and how much one can expect stakeholders to understand complex issues, Citizens' Juries are convened over several days and allow deeper, more informed and extensive reflection on the ethical questions at hand. Jury members will hear evidence, deliberate internally and ultimately produce a concrete response to a particular question prompt. As with the above, actual policies should not simply defer to whatever jurors produce. But the outputs will be more informative and useful in determining how stakeholders would assess an issue when they are well-informed and have time to carefully consider the issues.

These investigations are part of a bigger picture goal of formulating governance policies that will earn the trust of stakeholders. Lack of trust can torpedo even scientifically robust projects with substantial government backing, as happened in the UK with the now-defunct care.data project. If precision medicine is to be successful in Singapore, it will need to earn public trust by developing governance structures that the public can have confidence in. Our project will shed further light on what stakeholders want out of such structures, and how they can best be designed to protect and promote the things they value most.

LOOKING THROUGH  
THE SILVER MIRROR



# STORIES OF SENIORS OFFER GLIMPSES INTO OUR PAST AND FUTURE

*Phase III Medicine student Gabriel Wong led his peers from various faculties of the National University of Singapore (NUS) to interview 20 seniors from nursing homes and activity centres, and put together a book detailing their life stories and experiences with the healthcare system.*



*At the book launch on 2 June 2018 at Canopy @ JLink in Jurong East: Gabriel Wong (centre) and team, advisors from various NUS faculties, Member of Parliament Denise Phua (3rd from left) and Group Chief Executive Officer of National Healthcare Group Professor Philip Choo (2nd from right, back row).*

It has been two years since we embarked on this project to promote inter-professional learning and inter-generational bonding. It has been an honour to have been able to shape the project from its initial stages to its fruition. The idea was borne out of a few simple questions: Given an ageing population, how can we improve care from a person-centric point-of-view? How do we encourage a humanistic view of patient care? Can we realise the objectives of inter-professional education to achieve a truly inter-disciplinary, cross-faculty project?

We are deeply grateful for the support of our academic advisors, especially Assistant Professor Calvin Ho from NUS Medicine's Centre for Biomedical Ethics and Associate Professor Chow Yeow Leng from the Alice Lee Centre for Nursing Studies, for their advice throughout the entire writing process, and our literary advisor Ms Eleanor Yap, for shepherding what were basically a bunch of clueless students through the interviewing, writing and publishing process. I am confident that we have sowed the seeds of something truly revolutionary: the idea of an intermingling of the medical and humanistic disciplines through a writing project. The people who came on board have truly exceeded my expectations: the Yale-NUS College students as reviewers, the NUS School of Design and Environment students who designed the cover page and book, the Engineering and Medicine students who helped to plan the launch. We have been touched by their generosity and fervent support.

This book is a confluence of many influences: the healthcare policy angle, the literary angle (we got the seniors to share interesting life stories about themselves) and an artistic angle (our writers took photographs of the seniors and they also got the seniors to snap pictures of items that they hold dear, empowering them to tell their own stories).

Throughout the entire process, we were constantly amazed by the vivid experiences, tenacity of spirit, generosity and effervescence of our interviewees. Every writer faced challenges interacting with these seniors: some struggled with the generation gap, others were a tad reserved and suspicious. However, all rose to the challenge to tell compelling stories and share about their healthcare challenges.

This process, while exhilarating, also exposed many shortcomings.

The multiple revisions – errors in grammar, content, style – which our reviewers and academic advisors were so kind enough to point out, and which we were still fervidly amending till the days before the book was released; the difficulties in coordinating across faculties that did not have prior experience collaborating together; the lack of foresight, struggles in getting buy-in from schools and partners, who struggled to distinguish our outreach efforts from the many other healthcare outreach projects.



*A young girl experiences how it is like to live with cataracts by wearing a pair of special glasses during the book launch.*

We also faced budget constraints, last minute edits, and reprints, and the inevitable recriminations that these issues exposed. There were times I wondered, and perhaps the key committee members too, whether the idea was just a beautiful dream that was hard to realise. We lacked the benefit of precedence, and everyone had a slightly different idea of what the project entailed – the difficulty of trying to bring everything together made the effort akin to sewing a tapestry fraying at the seams.

I do not claim particular intelligence, foresight, tenacity or wisdom in pushing this project through to its conclusion. Much of it is due to the inevitable momentum that 20 writers and an almost published book, as well as more than eight thousand dollars in gracious funding, can achieve.

I am, however, confident that this project offers a case study in the challenges of starting a new, ambitious, unprecedented project. How to reconcile vision with reality? How to achieve buy-in and support without a track record and simply a proposal? How to adjust well-laid plans to rapidly changing scenarios and changing circumstances? How to stake out a common vision for a project that at times could be construed as meaning “all things to all men”? How to rally support without a solid end-game in mind?

Surprisingly, despite both scars and smiles, I don't find myself much wiser. In fact, I believe everyone took away something different, and has a slightly different answer to this pertinent question. As this project continues to evolve, I am sure the answers that we will derive will change.

We did have some impact, though. We have touched the lives of more than 20 seniors, offering repeated visits and companionship. We reached out to more than 100 students from three schools, giving them insights into lesser known healthcare specialisations. We have had a launch attended

by about 300 people over four hours, with performances by youths and seniors to celebrate the spirit of agelessness, and carnival games to promote empathy for the healthcare struggles of seniors.

Most importantly, though, I am hopeful we are promoting a humanistic spirit of medicine. I have long believed in the power of the written word, to teach and touch, to inspire and empower, to change the world, one idea a time.

Getting healthcare workers-in-training to write is to celebrate a hallowed tradition that hawks back to St Luke, and which was immortalised by Sir Arthur Conan Doyle, Robert Louis Stevenson and Chekhov, and is practised today by the likes of Atul Gawande and Abraham Verghese – the inter-mingling of the suture and the pen, the idea that healthcare practice is a microcosm of the problems that weigh upon the world.

And through this spirit we celebrate the little and forgotten people in our midst, the seniors who once bore the burden of our nation, who played a role in shaping the Singaporean culture. They may not be famous, or great, or influential. Yet in many other ways, our senior citizens are swarm of ants – in their multitudes, they can carry the great weight of history.

As George Elliot writes in the book ‘Middlemarch’: “For the growing good of the world is partly dependent on unhistoric acts; and that things are not so ill with you and me as they might have been is half owing to the number who lived faithfully a hidden life, and rest in unvisited tombs.”

We owe a lot to this forgotten and unvisited people, our seniors. Their indomitable striving spirit was and still is the zeitgeist of the times. If we could offer nothing more, perhaps this book be a paeon to both their sorrows and smiles, a peek into their former lives, and a reflection of our current world and what is to come.

*A section of the Camino, Spain.*

# Life is a Journey... Travel Well

By Dr Noreen Chan  
Head & Senior Consultant, Division of Palliative Care  
National University Cancer Institute, Singapore (NCIS)





*One of the courtyards of Hostal dos Reis Catolicos.*

This issue's topic was originally meant to be "The Good Death", but along the way I realised that it does not make sense to talk about a good death, without first exploring what it means to live a good life. Few things shake up one's perspective like the diagnosis of a serious illness, or that death is approaching faster than one thought. I will explore the Good Death theme in a future essay, but for now let us consider what comes before.

On a recent trip in northern Spain, I had two insights that gave me a fresh perspective on my work in Palliative Medicine. We had ended our trip in Santiago de Compostela (literally, St James of the Field of Stars), a small town which grew up around the account of the apostle St James the Greater, whose relics are interred in the cathedral. For over a thousand years, pilgrims have made their way to Santiago along the Camino (literally, the Road or the Way), one of the most important pilgrimage routes in Europe.

In the last 10-15 years, the Camino has grown hugely in popularity – last year there were some 300,000 pilgrims – and nowadays people do it for many reasons, not only spiritual, but also cultural. Regardless of age, faith or social station, people make their way through France, Portugal, southern Spain or any number of starting points along a network, following routes that have been trodden for a millennium.

Our hotel right on the cathedral square, was a good place to see these determined individuals arriving on foot or bicycle, cheering, hugging one another, or crying. It is impossible not to be moved by these open displays of emotion, and even though official pilgrims (or peregrino as they are known locally) form less than 15% of the total number of visitors to Santiago, they are the lifeblood of this town.

**Insight #1: We Need to Reclaim our Roots of Holistic Care**  
The Hostal dos Reis Catolicos or Hospital of the Catholic

monarchs, is named for King Ferdinand and Queen Isabella, who ordered this grand building constructed in 1501. It started out as more of a hostel, providing food and lodging for pilgrims who had completed the Way of St James. But since the arrivals were often sick, or simply battered and exhausted, the monks and other staff cared for their ailments as well.

Over time, it evolved various functions including an orphanage, and finally included a hospital. Although initially only pilgrims could receive treatment there, local townspeople were later allowed to be admitted. Finally, a modern hospital was built farther from the old town, and the Hostal became a luxury hotel.

The words hospice, hospital, hotel, hostel and hospitality share the same Latin root, *hospes*. The early hospitals of the Middle Ages in France, for example, were known as *Hotel Dieu* or *hostel of God*. The monks did not distinguish between providing protection and shelter, and what we know as "healthcare". Neither did they distinguish between care of the mind and body, and care of the spirit. Those wayfarers who could move on would do so, those who were destined to end their journey there, would be cared for until they died. At the Hostal, there is a room called "Observatory of the Dying" where those at the very close of life could have peace and privacy, much like the "Quiet Rooms" we nowadays have in some hospitals and hospices.

When the modern hospice concept evolved, it was in a way trying to reclaim this holistic approach to care, which we call person-centred or the bio-psycho-social-spiritual model, recognising that when we "hurt", we do so in all aspects of our being.

**Insight #2: We Are All On A Journey**

A pilgrimage can be defined as a journey of deep personal significance, undertaken with specific goals. Most of us

“All pilgrimages are ultimately journeys of the mind, heart and spirit.



The front entrance of Hostal dos Reis Catolicos, Spain.

understand pilgrimages in the religious sense – to fulfil an obligation or for penitence – but there are also journeys made to pay homage. For example many in Palliative Medicine want to visit St Christopher’s Hospice (which the late Dame Cicely Saunders built), soccer fans may wish to visit Old Trafford... it does not matter except this act, this journey, means something to you.

And so it is with our life’s journey. Most of us “travel” with certain expectations of what we would like to happen, but things do not always go our way. Sometimes people feel it is ending too soon, for others it is taking too long, but whatever it is, that is our journey to make. If the end of our lives is a continuation of how we have lived our lives, then it should not come as a surprise that old habits die hard. The avoidant personalities tend to remain avoidant, the pragmatists are pragmatic, those who use humour to cope will crack jokes. The romantics may wish for an epiphany, where everything falls into place; sometimes it happens, but not often.

For most of us, we will press forward, doing the best we can through the ups and downs. Some of us will have companions, others prefer to go it alone. We may have some idea of what journey’s end will look like, although we can never be sure until we actually get there. People I know who have walked the Camino acknowledge the physical exertions, but they also speak of having to wrestle with their thoughts, emotions and memories, deal with their fears and doubts.

Perhaps that is the greatest insight of all. That the physicality of this journey is but an outer expression of the inner paths that we tread. All pilgrimages are ultimately journeys of the mind, heart and spirit. Those of us who have had the privilege of walking beside patients and families approaching the end of life, have borne witness to the struggles and despair, but also the joy and love. I see palliative care professionals as guides, offering support and guidance: we cannot walk the journey for our patients; neither can we judge the kind of path they have chosen to travel. This life journey started long before we met them, we are only companions for this part. I can share my expertise and experience with you, but the journey is yours to make.

We all are on a pilgrimage, whether we know it or not. No one person’s Way will be the same as another, each person will trace their own route. Whatever it is, we all hope it will be a good journey, and an authentic one. That is why pilgrims and well-wishers use the greeting “Buen Camino” (Good Way), because every life journey is special. What will yours look like?



*Caminante, son tus huellas  
el camino y nada más;  
caminante, no hay camino,  
se hace camino al andar.  
Al andar se hace camino,  
y al volver la vista atrás  
se ve la senda que nunca  
se ha de volver a pisar.  
Caminante, no hay camino,  
sino estelas en la mar.*

Wanderer, your footsteps are  
the road and nothing more;  
wanderer, there is no road,  
the road is made by walking.  
Walking makes the road,  
and turning to look behind  
you see the path that you  
will never tread again.  
Wanderer, there is no road,  
only foam trails on the sea.

from "Proverbios y cantares"  
in Campos de Castilla, 1912  
By Antonio Machado (1875–1939)



*The writer (right) with Dr Sharon Salmon and Professor Dale Fisher.*

## FIGHTING THE EBOLA PANDEMIC AND BREAKING BARRIERS THROUGH SERVICE

By Dr Mo Yin  
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Division of Infectious Diseases  
University Medicine Cluster  
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After a 36-hour journey, I landed in Monrovia, the capital of Liberia. Instead of joining the queue for immigration and customs clearance, we were directed by health officers in gloves and masks to a dispenser filled with homemade bleach. Almost as if rehearsed, we washed our hands with no questions asked. It was February 2015. Liberia was in the midst of the toughest fight against an Ebola outbreak of unprecedented scale.

I had the unique opportunity to join the Global Outbreak Alert and Response Network (GOARN), a programme by the World Health Organisation (WHO), during this 2014-2016 West Africa Ebola outbreak. My mentors during the deployment, Professor Dale Fisher and Dr Sharon Salmon, are both infection prevention and control experts, and had already been on two successful missions to Liberia when I volunteered to join them. With advice and support from the National University Hospital, residency committees and my department, my application was approved as part of my infectious disease senior residency training.

### **Tackling the last clusters of Ebola virus disease**

We arrived just as a new cluster of Ebola virus disease (EVD) cases in one of the most populated sectors in Monrovia emerged. The WHO team worked closely with the Centres for Disease Control and Prevention (CDC), Médecins Sans Frontières (MSF) and more than 40 other non-governmental organisations (NGOs) to bring the cluster under control. We adopted a 'ring-fence' approach, focusing on triage of patients presenting with symptoms of EVD, training of healthcare workers and providing supplies in high priority healthcare facilities in the sector.



*Dr Mo Yin with colleagues.*

Tackling an outbreak of this massive scale took multiple teams working side by side, including case management, epidemiology and contact tracing, burials and community engagement. The teams were made up of experts from various fields, from clinical medicine, to anthropology, to cartography. A seemingly straightforward issue of contacting primary care clinics took weeks because finding their locations proved to be a mammoth task as Liberia does not have street addresses and postal codes. Having diverse expertise from a wide range of backgrounds brought about strengths as well as inefficiencies and other challenges. These situations called for patience to listen, tact in communications and building effective teams, as well as speaking up and defending the facts. To consolidate efforts from the various NGOs and improve accountability, our team advocated for 50 minimum standards in infection prevention and control for all healthcare facilities across the country. I designed a web-based tool that allowed 'live' tracking of assessments performed on the needs and progress of each facility. This helped the team and local ministries to allocate and prioritise resources.

Our efforts were rewarded as this cluster of cases ended after four generations, with successively improved case mortality marking each generation.

### **Prevention of reintroduction of cases**

With the number of EVD cases decreasing in Monrovia, we shifted our focus to the prevention of new clusters reintroducing from the Guinea-Sierra Leone-Liberian

borders, where the outbreak first started. These areas are vulnerable as the borders are highly porous, and surrounding healthcare facilities are ill-equipped.

Given the limited period of time we had in these areas, we had to be innovative with our interventions. Six months after the Ebola outbreak was declared a Public Health Emergency of International Concern by WHO, infection prevention and control training had already been widely disseminated in the nation. How can we ensure our messages are delivered impactfully with a sustainable effect? To bridge the gap between classroom theoretical teaching and real-life practice, we decided to use simulation scenarios to assess local capacity and identify areas of improvement. Employing our drivers as potential EVD patients and 'cooking' vomitus out of biscuits and water, we put the healthcare workers and their systems to test. The experience exceeded all of our expectations. The healthcare workers were highly engaged and took initiatives in critiquing themselves and coming up with improvement plans. At the same time, we also came to appreciate the daily struggles of limited resources. A case in point: how do we expect compliance with hand hygiene when there is no water source nearby?

### **Breaking barriers**

Inevitably, there were many barriers in volunteering for the West Africa Ebola outbreak. Concerns included fear of contracting and importing the disease, violating residency requirements, scheduling conflicts, family obligations, and lack of experience and maturity. There



*Out in the field with fellow healthcare professionals.*

was a twinge of doubt over whether the effort and risks justified benefits for a first-year infectious disease trainee and the overall outbreak response. Together with my mentors, we built a case for an elective posting aligned to the WHO's reform agenda of developing a global health emergency workforce. We designed a programme fulfilling all residency requirements in accordance to the Accreditation Council for Graduate Medical Education-International (ACGME-I) guidelines. Throughout the month, there was continuous supervision and mentoring with time allocated for reflection. The final evaluation was based on the concluding presentation of the team's achievements to the WHO Representative for Liberia.

The volatile outbreak situation constantly posed challenges, both technical and interpersonal. An example was the need to negotiate with local health managers and partners to align everyone's efforts and work with the inefficiencies inherent in resource-limited settings. However, these seemingly uncomfortable circumstances strengthened the experience gained in providing a holistic perspective in problem solving.

Many questioned the value that an inexperienced resident could bring to the task of helping to deal with an international outbreak. I found that a youthful outlook added diversity to an outbreak response team, along with fresh eyes, new perspectives and skills in information technology, social networking capacities and other web-based platforms. These provide practical solutions to challenges in communications, data sharing, and maintenance of key indicators especially in resource-poor settings. Trainees may also better connect with ground staff, and they can help in the implementation of policies and soliciting feedback.

The team's work received commendations from both the WHO Country Office, Liberia and local leaderships. Upon return, the experience was shared with audiences including medical students, residents and senior doctors, nurses, and staff of the Singapore Ministry of Health. Stories from the field were widely deemed to add value to the Singaporean preparedness efforts.

### **Contribute with an impact**

Aside from Liberia, I have been on short-term trips to China, Indonesia, Malaysia and served in local heavily subsidised clinics for foreign workers. A common theme drawn from these experiences is that making meaningful contributions is hard work. 'Helping others' is synonymous with breaking barriers and challenging the status quo. Add a dose of humility and willingness to observe, perseverance to excel, wit to spot an opportunity and a little luck to pull everything together. And perhaps the most powerful tool of all is the determination to serve.

### **About the author**

Dr Mo Yin is an infectious disease associate consultant at National University Hospital, Singapore. She has been active in education, hospital administration as well as clinical research. Dr Mo Yin has an interest in multi-centre clinical trials, especially in antimicrobial resistance (AMR), and hopes to help build Singapore to be a regional leader in AMR research. She is currently based in Thailand, pursuing a PhD with the University of Oxford.

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Photo: Regional Health System Planning Office, NUHS

# TRAINING THE NEXT GENERATION OF FAMILY MEDICINE DOCTORS FOR SINGAPORE

By Professor Doris Young  
Department of Family Medicine  
NUHS

In most developed countries, the discipline of Family Medicine (FM) or General Practice (GP) is well established. Many people have a GP or their own family doctor who looks after them and their families. They live near the neighborhood and serve as their local doctor, counsellor and trusted friend. They provide health screening, diagnose their problems, manage them and co-ordinate their care. In other words these GPs act as their advocates to navigate the complex health care pathways for them. International studies show that a well-developed primary care system with GPs or family doctors and basic health care providers deliver more cost efficient care.

### **The case for a different model of care in Singapore**

It is not uncommon for some people here to go straight to hospitals when they feel unwell. Others seek health care from their familiar neighborhood doctors, though some choose to go from one doctor to another. They may even get medicines from one and then see another for other problems. Of greater concern is the phenomenon of some people taking medicines, going for expensive tests that they don't need, and consulting multiple sub-specialists for chronic diseases – all without any co-ordination or continuity of care. Is this type of health services sustainable in a country like Singapore, which is grappling with an increase in chronic diseases like diabetes, high blood pressure, heart diseases and cancer even as the population is also ageing and requiring more health care and services?

### **The role of family doctors**

So what kind of health care professionals can meet the projected needs of Singapore in the next few decades? The country needs to train and produce more family doctors who can provide patient-centred, comprehensive continuity care to the community.

Most people require basic health care services, screening and assessments, reassurance and help with minor non-life threatening conditions. If they develop chronic illnesses,

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Photo: Regional Health System Planning Office, NUHS

they require Family Primary Care professionals to treat, monitor progress to prevent complications, keep them in the community and leaving only the very complex patients to be managed by sub-specialists. People need to monitor their own conditions with the support of a well-trained and well integrated team of health care professionals. Older people need to be screened early to detect illnesses and frailty so that interventions can be initiated early to keep them healthy and living in the community with their family and friends.

I believe it is the responsibility of the entire Singaporean community, and the effort should include the medical schools, the postgraduate residency training programmes, the specialist Colleges (College of Family Medicine and the Academy of Medicine) supported by the Ministries of Education and Health. Last but not least, the community needs to embrace and value the concept of having a family doctor to care for them.

### **The role of the medical schools**

To begin with, medical schools need to select the right mix of students from a diverse background. In addition to academic grades, we need to select people who like to work with people, who are problem solvers, good listeners and communicators, good advocates for the needy and disadvantaged, can deal with uncertainties and have a holistic view of health care delivery.

Next, the medical undergraduate curriculum should feature early and continuous exposure to Family Medicine and primary care, so that students can learn about the various types of clinical presentations and how problems are solved and managed at the community level. They should appreciate that many people do NOT need to go to a hospital to receive care and if they do, they can return to the family doctors to continue their care at home. Candidates for admission to medical school must also evince genuine interest in providing comprehensive care to the population assigned to their locality. They must be interested to work in a team to solve health problems together.

Finally, the postgraduate training of family doctors ought to be integrated with the undergraduate training programme in terms of curriculum, teachers and setting. There can exist different training providers BUT the end point of assessment should be standardised in order to ensure that we are training quality family doctors.

### **Bringing it all together**

This vertical Integration of Family Medicine training programmes ensure education about general practice from medical students through vocational training to continuing medical education. A truly vertically integrated FM training programme has to integrate the learners, the curriculum, the teachers and the settings.

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To integrate learners, we have to know who they are. The demographics of our learners – medical students and future residents – are different from the demographics of their GP teachers. Placing medical students and residents together in a shared learning environment creates opportunities for mutual learning, supported by the GP teachers. Together they undertake continuing medical education.

Another task associated with the vertical integration of GP training involves the curriculum. Residents can build on what they have learnt in medical school through to hospital work and then to general family practice.

With the new problem-team based curriculum adopted by many universities, graduates have a different learning style and the GP training programme must be modified regularly to reflect what is being taught in medical school and to deliver information in the most accessible way. Students are now taught critical appraisal skills, research

settings, undergraduate students and postgraduate residents learn together and interact with each other under the preceptorship of their GP teachers. They would then also have the opportunity to work together with an inter-professional team of nurses, allied health and community workers.

## **NUS Medicine's approach**

We will be embracing this approach and aim to encourage more medical students to undertake Family Medicine as a career. We will expand and extend students' exposure to FM both in terms of content and length of the FM curriculum. Students will be placed in Family Medicine and primary care settings from Phase 1 through to Phase 4 and perhaps even 5 so that they can appreciate the ability and role of the FM practitioner to deliver comprehensive, continuing and home care. They will learn together with nurses and other allied health professionals to care for people in the community.



**It will take time, but the day is coming when family doctors will be the primary caregivers for Singaporeans.**

methods, rational prescription of medicines and the use of evidence-based medicine. They can share some of these skills with their GP teachers.

Integrating the teachers will also enhance GP education. At present, teachers come from different backgrounds - from the polyclinics, private practice, academia. These groups overlap in their roles and yet the employment conditions and qualifications are different. We need appraisals and quality assurance to be put in place. Integrating the teachers means bringing them together in training seminars, offering university-affiliated appointments or, better still, fractional appointments with university departments so they can build a career structure for themselves.

The teachers can also benefit from the universities' teaching and learning quality assurance programmes as well as involvement in the development or delivery of CME/postgraduate diploma/certificate/masters courses to enhance their skills as educators. Some may choose to do a higher research degree such as a PhD. This choice will result in an increase in quality teachers and researchers in general practice. It will raise the status of Family Medicine as an academic discipline.

Finally, there needs to be an integration of settings where we teach our GP learners. Just like the hospital

We also plan to integrate undergraduate and postgraduate Family Medicine training more closely in terms of curriculum, teachers and the settings. As the practice of Family Medicine and general practice is diverse in Singapore and ranges from one-person to group practice to polyclinics, we will ensure that teachers are trained to the same standards so that our students and residents are exposed to mentors and trainers of high quality.

## **Family doctors as mentors and role models**

They need to be good mentors and role models for young students and residents by practicing quality care, using best evidence to treat their patients, prescribing affordable medicines and following up their patients judiciously. Another opportunity is to work with neighbouring doctors to share care and provide continuity of care so that patients don't default to emergency rooms and hospitals because of inaccessibility. They need to be part of the primary care networks and raise the standards and status of Family Medicine so young doctors can aspire to join the profession.

To conclude, the future of Family Medicine in Singapore is bright as both the Ministries of Education and Health are working together to ensure that the training of family doctors can meet the emerging needs of the ageing population, both in terms of preventive care and treatment. It will take time, but the day is coming when family doctors will be the primary caregivers for Singaporeans.



Photo: Regional Health System Planning Office, NUHS

## ADVANCING ACADEMIC FAMILY MEDICINE IN NUHS AND BEYOND

### Interview with Prof Doris Young

By Fok Wai Yee Rose, MCFP (S)

*This interview was first published in the March issue of College Mirror.*

Prof Doris Young (MBBS [Melb], MD [Melb], FRACGP) graduated from Faculty of Medicine, University of Melbourne, and completed family medicine (FM) training in Australia. Over the last 35 years, Doris has been involved extensively in educating and training medical students, registrars, GPs and other health professionals in adolescent medicine, general practice and primary care research. In the last ten years, she has also been actively building general practice/FM education and research capacity in Hong Kong and in China.

Doris has published widely in the area of general practice integration models with the wider healthcare system, and her research focuses on trialling innovative models of care

in the primary care setting to improve health outcomes for people with chronic diseases in culturally and linguistically diverse and disadvantaged communities.

Doris moved to Singapore in January 2015 and in 2016 took up a part-time role as research advisor to National Healthcare Group Polyclinics. She joined National University of Singapore in January 2017 as a professor in the Division of Family Medicine. On 1 February 2018, she was appointed the inaugural Head of a new Department of Family Medicine at National University Health System (NUHS).

*Can you share on the development of FM in other countries and “what works” and “what doesn’t”?*

#### **What works?**

From my experience, countries that have good health outcomes, good accessibility and good equity have strong primary care systems. This means that their patients’ first port of call is the GP, who is properly remunerated to provide evidence-based care to the community. These countries invest money in primary care, and the community values their family doctor and trusts their GPs to provide value-added care. In addition, their FM academic fraternity is a strong discipline that works together to strategically deliver care that is well aligned and this may take quite a lot of time to develop.

The most cost-effective healthcare system is where the majority of care is delivered in the community that is coordinated by well-trained family doctors/GPs working with a multidisciplinary team, and where the primary care system is well integrated with secondary and tertiary hospital care.

#### **What does not work?**

This is when family doctors don't look after a family population, providing only episodic care that is not well integrated with the rest of the healthcare system. This encourages "doctor-shopping" behaviour, resulting in fragmented care. FM development also doesn't work in countries where FM is not perceived as a specialty in its own right and not valued by their community, including their government.

#### *What is the funding model of primary care in Australia?*

##### **i. Paying GPs to manage patients**

Currently, most primary care services like GP visits are funded through Medicare. GPs receive most of their remuneration through fee-for-service (FFS) payments, which is where the GP bills an amount for the provision of an individual service. Around 82% of GP services are bulk billed, meaning the GP directly bills Medicare for the patient visit rather than bill the patient.

But not all GP services are paid for in this way. A growing number involve "blended payments", where as well as FFS, the GP receives an incentive payment as a "reward" for providing an improved level of service. Practice incentive payments (PIP) are currently being paid for a wide range of enhanced services such as the provision of after-hours care and teaching medical students to manage patients with chronic conditions such as asthma or diabetes.

FFS and incentive payments make up the bulk of GP remuneration in Australia. But the rise of chronic diseases like diabetes has led to calls to reform this blended payment system in order to support more multidisciplinary team care, with alternative models such as capitation.<sup>1</sup>

##### **ii. Paying GPs to train students**

It took a ten-year journey from an honorary system of "begging GPs to teach" to the current system whereby GPs receive remuneration for teaching students. It is never about money- making but to compensate them for time



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and income lost. In return, these designated “teaching-GP clinics” have to undergo training and meet accreditation guidelines which raise the status of the GP clinic as a quality practice involved in student teaching.

Thus, “teaching money” must follow the “teachers and the learners” and now in Australia, there are many very passionate GP teachers who are good role models and provide competent training for our residents and students.

## *How does the College of Family Physicians play a role to advance FM?*

We need to see the “end product” then work backwards. The end product is to have highly regarded GPs who are respected by the community and recognised as specialists in their own right, who receive proper remuneration and have good work-life balance. The respect from the public is very important, and every person or family should have a family doctor. In Australia, 90% of the people have a GP. In the UK, it is 100%.<sup>2</sup> Everyone should have a good GP who looks after them and their family members.

## **What is different?**

Breadth, and not depth, of scope of practice is the focus of FM. In order to acquire skill sets in various disciplines across multiple settings (eg, GP clinics, polyclinics, home care), FM doctors need to receive relevant training for their practice needs. The core curriculum cannot be too diffused, but has to set the standard of what is required to train family doctors to provide safe and unsupervised medical practice in the community.

## *Can you share your experiences in teaching FM to undergraduates and postgraduates?*

From my experience working at University of Melbourne for the past 30 years teaching general practice to medical students and residents, we need to expose undergraduates to general practice early and also throughout the medical course so that they have an understanding of the role of GPs in the healthcare system. We need a defined curriculum to develop knowledge, skills and attitudes unique to general practice, and these must then continue into residency training.



**In Australia, 90% of the people have a GP. In the UK, it is 100%. Everyone should have a good GP who looks after them and their family members.**

In order to produce high-quality GPs/ family practitioners, we need to expose the students early to FM, provide good role models and mentors, and craft an interesting curriculum which will make FM residency attractive. We need every player to play their part to encourage more quality residents to choose FM as a specialty. The College of Family Physicians has a big role to raise the status and standards of FM as a specialist discipline, make it financially attractive and have a strong voice in the relevant healthcare decision-making bodies to promote the value of having a robust primary care system in Singapore.

## *Is there any fundamental similarity and difference between FM and specialist training and education?*

### **What is similar?**

FM is a specialty in its own right, just like cardiology or neurology. We also have our own core curriculum and skill sets that require training to reach competencies. Continuing medical education (CME) is also crucial to maintain knowledge and skills, and adopt evidence-based practices to improve health outcomes.

## *How can FM in NUHS develop as an academic clinical programme?*

It is very exciting for NUHS to have a stand-alone department of FM, whose mission is to raise the academic standing of FM. To do this well, we need to have more FM curriculum time throughout the five years of the course and recruit passionate teachers to deliver education using innovative technologies. We will also need to integrate undergraduates with postgraduate residency training and develop CME so that everything we do has an evidence base to them.

The academic standing of FM is also measured by its success in research. I plan to set up a primary care research unit and bring together collaborators to develop research themes and answer research questions that arise from primary care perspectives. I hope to instil a research culture among the staff, medical students, residents and GPs, and provide training for them to engage in research. Finally, in order to move towards delivering world-class research, I want to link up our GP researchers with FM/GP colleagues internationally as well as expose our younger



Photo: Frontier Family Medicine Clinic

doctors to other primary care research experts.

### *What roles can FM play in a specialist-centric restructured hospital?*

In Singapore, some FM doctors already provide high-quality clinical services in the areas of aged care and rehabilitation, especially in community hospitals. However, I see the added value of FM doctors in hospitals to focus on providing ambulatory care and establish a unique role in facilitating transitional and home care from hospital to the community. Ultimately, FM doctors can also help to navigate care back to the patient's GP.

*We are now at an exciting time for the development of FM in Singapore. Our Minister for Health, Mr Gan Kim Yong, explained that in the Healthcare 2020 Master Plan, we need to: (i) move beyond hospital to the community; (ii) move beyond quality to value; and (iii) move beyond healthcare to health. These three moves are critical in preparing us to meet our long-term healthcare needs in a sustainable manner. What do you think of these Singapore initiatives?*

I think the move is timely, in particular the move from hospital care to the community.

#### **Hospital to community**

The most important criteria for the successful implementation is to select the right type of patients that can be appropriately shifted to the community. Many people, after receiving acute and subacute care in hospitals and are now stable, can go back to the

community to receive care. These can be shared medical care or social and community support care.

#### **Quality to value**

When a government invests so much money into the healthcare system, they want to know whether there is "value for money". I think this is important to quantify to avoid too much spending to get "quality" and yet not get the value of the dollars spent. Measuring this is important for an effective and affordable healthcare system.

#### **Healthcare to health**

Finally, this is obvious that we should not treat the sick too late or when they develop multiple advanced complications. We need to emphasise the importance of health promotion, self-management and staying healthy. This shifts the mindset of the community to be more self-reliant and responsible to maintain their own health rather than merely depend on doctors and nurses to fix their problems. This revamped healthcare, with a broad base in the community, will then truly be good value for money!

*(c) Singapore Medical Association. This article was originally published in SMA News 2018 April issue.*

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Dr Goh Wei Leong in his clinic at HealthServe.

## CARING FOR THE POOR AND MARGINALISED

Right in the heart of Geylang on 1, Lorong 23 lies HealthServe, a sanctuary for migrant workers. It is a place where they can seek treatment for illnesses and find comfort in the camaraderie of counterparts from foreign lands.

The premises are painted in the soothing colours of white and blue, feature zinc roofs distinctive of old kampong houses in Singapore decades ago and pots of plants line the corridor. The buildings ring a quadrangle, essentially a field with coconut trees on the fringes, and where various activities take place on different days of the week.

A room nearest the entrance has the scent of traditional Chinese medicine and is occupied by various migrant workers taking a rest. The room next to it is a classroom for medical students. Other rooms are administrative offices, and more importantly, a clinic.

HealthServe was founded by NUS Medicine alumnus Dr Goh Wei Leong (Class of 1985) and businessman Mr Tang Shin Yong in late 2006 to provide medical care for migrant workers in Singapore. These workers, who are largely men aged between 18 to 50 years old, hail from Bangladesh, India and China.

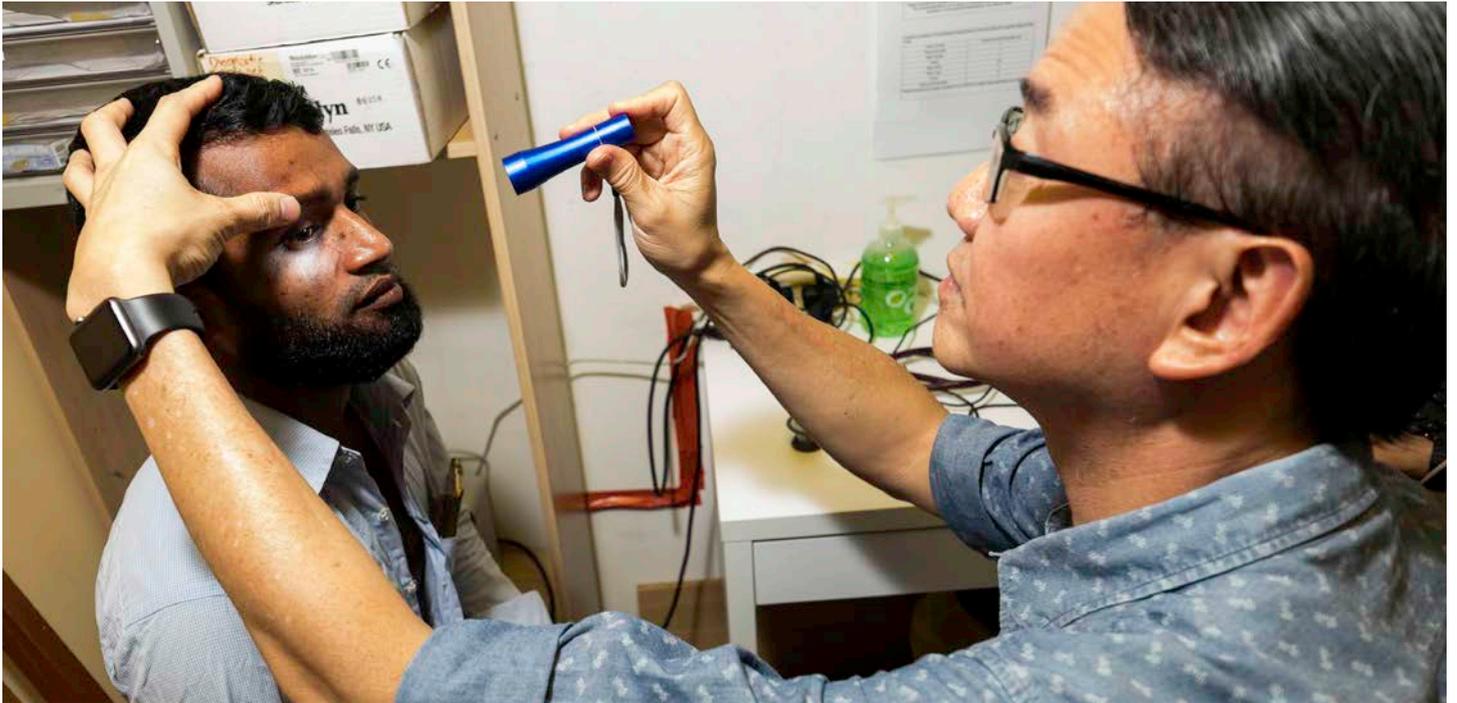
“Migration was a big problem but very few people are looking into it. As a doctor, I felt there was a need to serve this community,” Dr Goh said. Singapore has about one million low-wage migrant workers from the developing world, making up about 30 per cent of the workforce. There were many schemes to help the local poor, but not enough for migrant workers, some of whose companies choose not to pay for their medical bills even though they are ill.

Dr Goh started a clinic in Geylang Lorong 23 with a small team of six doctors, and ran it on Saturday afternoons, charging \$5 per consultation. However, patient turnout was not what they expected and they were discouraged.

“When you are doing service, you must go to the side of those you are serving. We were in our own ivory tower of an NGO (non-governmental organisation), our little clinic. So we realised that we better get to know the community and the patients we want to serve,” recalled Dr Goh.

With the help of a social worker in the area, Dr Goh and his team crossed the road to the side of the vulnerable population.

“That was a turning point. We crossed the road and we met a community that’s very different from us – migrant workers, sex workers, pimps, gamblers. Our eyes were opened. We started making friends with all the people there, and they started coming over and this clinic started to thrive.”



*Dr Goh Wei Leong attending to a patient at the HealthServe clinic.*

Initially, it was not easy for Dr Goh to strike a conversation with this community. He began talking to a pimp, a man in his 40s who shared that he was working to provide for a mother diagnosed with diabetes and his three children. He once tried a job as a fishmonger, but it just could not pay the bills.

"I realised at that point that being a doctor or professional is a privilege, and our dreams are the same as this guy," Dr Goh said. He still stays in touch with this man, who has left to become a driver. Dr Goh believes that the HealthServe community had a part to play in influencing this man to change his job.

"For most of us, we follow clinical guidelines, and we sometimes forget that someone is human. So I think the humanity is often lost in the practice of medicine. How to keep the science and not lose the art? We need to do it in a very relational space. Here at HealthServe, we keep it very relational," Dr Goh said.

### **Expansion of HealthServe's role**

A couple of years after its inception, HealthServe expanded its services to offer social support and legal advice to migrant workers.

"Even teaching them (the migrant workers) how to eat healthy is not so simple. Have they got the means to eat healthy? Is it culturally appropriate? For medical people, we are very simplistic. We learnt all these by trial and error," Dr Goh said.

It all started when a worker from China who came to see Dr Goh told him that he wanted to kill himself. He had hurt his head at work falling two storeys, fell into a coma

and upon discharge from the hospital, had a very severe headache. To worsen the situation, he had no one to care for him at his dormitory.

A volunteer who works as a forensic psychiatrist referred the Chinese worker to HealthServe and told Dr Goh, "What he needs is people around him, a community, not more Panadol."

"At that point I realised that real medicine is not just giving Panadol or painkillers, but it is actually providing this guy with friends, social, emotional and spiritual support, and also giving him a sense of community significance, with his dignity restored," Dr Goh added.

Shortly after the encounter with this worker, HealthServe added counselling services and food provision. The worker could not take Panadol because he did not have food to eat.

Today, the organisation operates three medical and dental centres in Geylang, Mandai and Jurong. It is run by 10 full-time staff, 70 volunteer doctors, 20 dentists, and 547 active volunteers who are nurses, pharmacists, housewives, students, counsellors and administrative officers. Last year, HealthServe provided 10,618 consultations, helped 601 workers with work injury and salary-related cases, served 26,478 free meals and housed 30 workers in two emergency shelters.

Dr Goh does not intend to expand HealthServe beyond its current size.

"At the moment, we are thinking how we can promote impactful volunteerism, a culture of sharing and generosity. We want to be the space or a catalyst for more people to

## ALUMNI VOICES



*With medical students at HealthServe.*

experiment with new ideas in engagement with the Ministry of Health, migrant workers, and help bring people at the margins closer together. We don't want to be for ourselves," Dr Goh said. "It is easy to serve people, but it is harder to engage and empower."

Dr Goh believes that Singaporeans have become more mature, aware, compassionate and gracious towards migrant workers over the last 10 years. He is confident that many of these acts of kindness are genuine, and not driven by "KPIs".

"It is going to take time, but we are on the road there. Sometimes doing less may be more. If people can be nice, change their attitudes and be friendlier, be able to accept and give generosity, create common space in arts and music for people to join, and also go down and serve, that would help" Dr Goh said. "You will only bring about real change if you start having a migrant worker as a friend, and not a patient."

### **Beyond HealthServe**

Besides HealthServe, where he now functions as a "standby doctor", the 57-year-old spends three days a week at his own clinic at Manhattan Medical Centre seeing mainly low-income patients, and another three days meeting people from all walks of life – from ministers, students, businessmen to one-room flatters. He believes it is the best way to get ideas and inspiration. Dr Goh also supports medical student projects, and has a keen interest in global and regional social justice issues such as the plight of the Rohingyas.

On weekends, the bachelor spends time with his family and dedicates time for rest and reflection. His is a fulfilled life, he says.

"Through my faith lens, I feel that it gives me a framework with meaning and purpose. That's why I enjoy living, doctoring, learning and everything in between. I enjoy people too," he said.

The man who founded HealthServe now visits the organisation twice a week for meetings with donors, board members and interns. He intends to exit HealthServe one day so that it can scale to even greater heights. His co-founder Mr Tang, who served as HealthServe's volunteer executive director for seven years, left the organisation in 2015.

"I see myself more promoting the ideas and ethos of HealthServe, as it is already running. I see myself as a champion for the cause and for the people at the fringe, not just HealthServe. My new season is to encourage more of such enterprises in different forms. My dream is to see fresh expressions of work for the poor and marginalised communities in Singapore, and also regionally," he said.

Being named The Straits Times Singaporean of the Year for 2017 helped to raise the public's awareness of their cause, and increased interest, profile and visibility for their work and brought migrant workers' issues to the fore.

Dr Goh also said there is good leadership in place now, with new board members and younger staff on board the team, and he is confident that HealthServe would continue its role smoothly.

"I try not to be around too much, to give the new leaders space to grow. But nevertheless, HealthServe's aim is still to work ourselves out of a job. The expansion of HealthServe is not necessarily a good thing, it means there are more migrant workers being exploited. I hope that there will be a culture shift, and people will be more compassionate," he said.

# The Tai-Chi Teacher

It is 8am on a Monday and on Level 13 of the NUH Medical Centre, a trim figure is leading a small group of people in what appears to be a slowed-down form of martial art, pivoting and swirling through a series of slow, graceful and fluid movements.



## PEOPLE OF NUS MEDICINE

Meet Associate Professor Lau Tang Ching, Vice-Dean of Education at NUS Medicine and tai-chi teacher to the dozen or so NUHS staff who turn up enthusiastically each Monday morning to go through their paces with him. “It is not just a physical exercise. You have to be mindful and slow as you go through the movements, and that helps to reduce stress and anxiety,” he said.

### **An early introduction**

The man knows what he’s talking about. When he was nine, his father, a tai-chi enthusiast, took him to learn the martial art at the Kallang Community Centre. That not only sparked his interest in tai-chi, but also awakened his interest in other martial art forms, such as shaolin kung-fu and tán-tuǐ. He went on to practice the various martial arts till he turned 18, when he took a hiatus to serve his national service obligations and pursue medical studies.

It was not until 2007 when Assoc Prof Lau’s fondness for tai chi took on professional relevance. As a member of the National Arthritis Foundation, the rheumatologist realised that there was progressively more evidence proving that tai-chi can be beneficial for patients with joint pains, and could prevent falls too. What originated as a martial art could provide a relaxing, low-intensity form of exercise that could be practised by people of all age groups for health benefits.

### **It’s good for health**

Specifically, tai-chi helps in the strengthening of muscles, improve one’s sense of balance and flexibility, he said. As a rheumatologist specialising in knee osteoarthritis and fracture prevention, these benefits resonated closely with his medical specialties and led him to join the Tai Chi for Health Institute, founded in 2010 with the purpose of empowering people to improve their health and wellness through tai-chi. Assoc Prof Lau is the current chairman of this non-profit organisation.

Subsequently, he worked with TCHI’s founder, Dr Paul Lam, a family physician, to train hundreds of tai-chi instructors in Singapore. These teachers are trained to promote and teach simplified forms of sūn-style tai-chi (one of five main tai-chi styles). Forget bone-crunching, tissue-rending moves: compared to other styles, sūn-style tai-chi is better suited to people with joint problems, because movements are smooth and controlled and do not strain joints and ligaments.

Exercise benefits apart, tai-chi also calms the mind and helps to release mental tension.

### **And good for life**

“Learning Tai-chi can also help one in approaching life,” Assoc Prof Lau added. How’s that? “The magic of tai-chi lies in its principles. Practice tai-chi without giving heed to its principles and it will look like any random dance or exercise,” he explained. For example, the slow, continuous,



*Assoc Prof Lau teaches tai-chi at Bishan Park every Sunday at 4.30pm.*



Some of the participants who learn tai-chi from Assoc Prof Lau are his patients.

flowing movements against imagined forms of resistance can be translated to perseverance in life – to make slow but steady progress. And when a practitioner is in full flow, his posture is upright and there is proper weight transfer. This expresses the belief in the principle of righteousness in life, demonstrated by the tai chi practitioner’s adoption of a stance that provides centeredness and surefootedness.

The sūn-style of tai chi that Assoc Prof teaches is a condensed version that is taught over 10 lessons. Students who want to learn more of the sūn-style are welcome to stay back after lessons. “Different people have different skillsets but just like other things in life, practice makes perfect. As long as the student is keen to learn, attends classes and practices regularly, there should be no major difficulty in picking up the movements, so beginners need not worry too much.”

While his lessons are usually held in the early mornings, there is no best time to learn tai-chi. But since people who practice tai-chi tend to be older, they wake up earlier, and start the routine when the sun is not high in the sky.

### Seeing the big picture

So what does being a vice-dean, doctor and tai chi teacher mean in the bigger scheme of things for the father of three, whose wife is a fellow clinician at the NUHS, and who is also known to be handy with a camera at School events? “I live my life in eight-year cycles, with my objective changing slightly every cycle,” he says. “We should learn something new for the first two years and become good at it. The new set of knowledge or skills can then be integrated with pre-existing ones to create new approaches to problem-solving. This will take another four to five years. Finally, for the next one to two years, it is important to find a successor to carry

on with the project. This frees up time for a new project.”

That new project is educating the next generation of doctors and nurses, to improve the healthcare system so that the patients can benefit. The Ministry of Health (MOH) recently introduced the three “Beyonds” to keep healthcare in Singapore good and affordable as demand rises.

Assoc Prof Lau has his own take on the three “Beyonds”, which he is inculcating in students, to help them achieve those established by the Ministry of Health. They are: Beyond Self to Others (thinking not only of yourself, but also what is good for others), Beyond Competency to Mastery (moving beyond just being good at what you are doing, to achieving mastery in order to create new knowledge by integrating current forms and fields of knowledge), and Beyond Patient to System (healing the healthcare system, while treating the patient).

He is also actively working in osteoporosis and fracture prevention research, all of which is related to his specialty, rheumatology. All a part of doing his bit to help in meeting the challenges of caring for an ageing population through increasing healthspan and lifespan. This, he says, means that the elderly are living healthy and active, happy lives.

And that pleases him immensely. “When you see people smile while looking at your photos, you feel happy too. This is also the reason why I love cooking. The joy is in cooking for others and watching them enjoy your food. And the same goes for tai-chi: the results may not be immediate, but having people with the same passion coming together and getting healthier together, it makes me happy.”

# AUGUST

# SEPTEMBER

# OCTOBER

**06** August  
Flag Day

**11** August  
Rag Day  
University Town, NUS

**16** August  
White Coat Ceremony  
University Cultural Centre, NUS

**08-09** September  
Neighbourhood Health Service  
Kampong Glam Community Club

**18** September  
Keynote Address  
Level 1, Auditorium, NUHS Tower Block

**06-07** October  
Neighbourhood Health Service  
Leng Kee Community Club (Queenstown-Bukit Merah)

**13-14** October  
Public Health Service  
Canopy @ J Link, Jurong East

**25** October  
Medical Sciences Cluster Infectious Disease Symposium  
Clinical Research Centre, MD11, NUS

**25** October  
Awards and Appreciation Nite  
University Cultural Centre, NUS

*Details are subject to change.*

Inspiring Health For All



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Yong Loo Lin  
School of Medicine