

MediCine

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AN ANATOMIST'S
GUIDE TO
**BIRD
SPOTTING**



DEAN'S MESSAGE



Dear Reader,

As we usher in the Year of the Earth Pig, I would like to sincerely thank three groups of people chiefly responsible for the success of the NUS medical school – our alumni, our staff, and our students. In our quest to inspire health for everyone, the support and encouragement of our alumni is invaluable. Their generous contributions enable the School to enhance its mission of educating tomorrow's healthcare professionals and to finding better ways of tackling disease.

Take Dr Oon Chiew Seng, for example. The centenarian's abiding interest and compassion for the aged has seen her undertake a number of roles and responsibilities dedicated to advancing the cause of dementia patients. It has also spurred her to actively fund research into ageing-related illnesses here at NUS Medicine.

Our staff and students form the other two pillars of the School. Consider the work of our researchers, such as the team comprising Department of Microbiology and Immunology Assistant Professor John Chen, graduate students Ms Chiang Yin Ning and Ms Melissa Su and their collaborators from the University of Glasgow. In their report in *Science* magazine, they described a new way in which bacteria evolve, one that is a thousand times more efficient than any currently known mechanisms. Their insights will help scientists to better understand how bacteria can rapidly develop increasing virulence and antibiotic resistance.

And thanks to Associate Professor Justin Chu and his team from the Department of Microbiology and Immunology, non-invasive diagnosis of human diseases is now a reality. Following a study on using salivary micro RNA as a diagnostic marker for Hand, Foot, and Mouth Disease

(HFMD) in paediatric patients, they developed a rapid test for detecting HFMD using miRNA in saliva. This was done in collaboration with the Institute of Molecular and Cell Biology (IMCB) A*STAR, KK Women's and Children's Hospital, and Taiwan's Chang Gung University. The team has accurately distinguished HFMD patients from healthy persons by around 90% in the Singapore cohort, and 80% in the Taiwanese cohort. And in case you think that NUS Medicine academics only live for their work, check out what Professor Rajendran K. from the Department of Anatomy does when he has time on his hands.

I have always been deeply impressed by the abilities of our students, in the classroom, on the sports field, and in the community. They shoulder heavy study loads, yet still find time to participate at the highest levels in sports competitions and serve in the community. Succeeding generations of our students have planned and run the Neighbourhood Health Service and Public Health Service since 2008. Both community service programmes cater to HDB residents and were entirely initiated by our students to help improve the health of Singaporeans. Similarly, other programmes like Project Happy Apples and the Tri-Generational Homecare initiatives seek to improve the well-being of important segments of the community. These are all truly heart-warming efforts that speak volumes about our students.

I trust you will enjoy reading all about our wonderful alumni, staff and students.

With my very best wishes for a healthy and happy Lunar New Year.

Yap Seng

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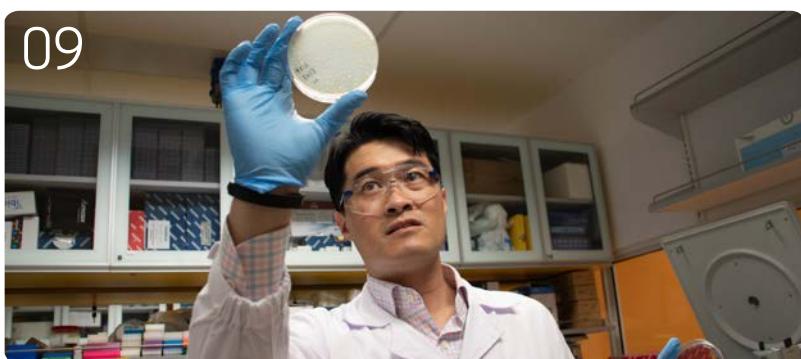
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Please address comments to:

The Editor, MediCine

Yong Loo Lin School of Medicine, Dean's Office

1E Kent Ridge Road, NUHS Tower Block, Level 11, Singapore 119228

Tel: 6772 3737 | Fax: 6778 5743

Email: medmedia@nus.edu.sg | Website: nusmedicine.nus.edu.sg



Professor Chong Yap Seng, Dean, NUS Medicine giving the opening address

ASIA PACIFIC MEDICAL EDUCATION CONFERENCE (APMEC) 2019

By Professor Matthew Gwee,
Centre for Medical Education

Soon after heralding in 2019, the Centre for Medical Education (CenMED), NUS Yong Loo Lin School of Medicine, hosted APMEC 2019 (now in its 16th year) after months of dedicated preparation for the event. More than 1,420 delegates from 39 countries registered for the conference.

Why is there so much enthusiasm for the APMEC series?

The primary aim of APMEC is to provide a conducive forum for a community of educational scholars from around the globe to share and learn together, especially from the insightful and authoritative reviews of current Trends, Issues, Priorities, Strategies (TIPS) now strongly advocated for the two interdependent sub-systems (education and practice) within the overall healthcare delivery system. Hopefully, the reviews will enhance and help many teachers in educating, training and

transforming students to become 21st century healthcare practitioners. In this context, the organisers wish to express their deep appreciation and gratitude to all presenters at the conference – especially to the invited speakers, who so readily shared their expertise, wisdom and rich experience with everyone. Not only did the speakers stimulate the educational curiosity of delegates, they also set the tone for APMEC 2019!

CenMED also takes pride in contributing to the aim of establishing the NUS Yong Loo Lin School of Medicine (NUS Medicine) as a Centre of Excellence for Medical Education. CenMED is now well-poised to undertake this role, as the leadership has developed and established strong bonds and global networks with many leaders in education and healthcare and with many leading institutions and organisations around the globe. APMEC 2019 provides clear evidence of such global connections!

As always, pre-conference workshops (on 9th and 10th January) preceded the main conference. They are similar to faculty development programmes conducted in many institutions. Delegates who attended the workshops benefited educationally through skills enhancement and went away better prepared as teachers in the 21st century.

Moving away from tradition, the opening ceremony for APMEC 2019 was held on the evening of 10th January

DOSSIER



APMEC 2019 participants

at the University Cultural Centre, followed by a small reception for invited guests. Professor Chong Yap Seng, Dean of NUS Medicine was the Guest of Honour.

The main conference continued over the next two days (11th and 12th January) with much food for thought for delegates to chew on. Many delegates also renewed friendships established in the past and opportunities abounded for them to make new friends. The closing

ceremony was held at the end of the formal sessions on 12th January. Some workshops were scheduled as post-conference workshops on 13th January, due to overwhelming constraints to accommodate all workshop offerings.

A total 270 abstracts were presented during APMEC 2019 and the winner and runner-up for the Free Communication Presentation were as follows:

Award	Name	Abstract Title	Institution, Country
Free Communication			
Winner	Nigel Tan Choon Kiat	Standard-Setting in Undergraduate Medical Education: Comparing Three Methods for Summative MCQ Tests	Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore
Runner-up	Cheung-Ting Hsiao	The Development of the Emergency Medicine Milestones in Taiwan: A Validation Study	Department of Emergency Medicine, Centre for Faculty Development, Chang Gung Memorial Hospital, Taiwan

Last, but certainly not least, the leadership in CenMED wishes to thank NUS Medicine staff led by Ms Lee Su Mei, Senior Associate Director, CenMED for their efficiency and ever gracious manner in extending a warm welcome to the delegates.

Let's all look forward to the 17th APMEC in 2020!



PUBLIC HEALTH SERVICE

Towards a Healthier Nation,
One Community at a Time

By Ryan Lim Mao Heng, Goh Ying Xian
and Drusilla Tan Kai Yan
Committee Members, Public Health Service 2018
Phase III Medicine Students

In 2004, a group of medical students from NUS Yong Loo Lin School of Medicine (NUS Medicine) spotted a gap in Singapore's healthcare landscape – health screenings were not readily available for the general population. After months of hard work, planning and dedication, the students gathered enough funds and resources to organise the School's first student-led population health screening project. It offered four basic screening modalities at no cost to residents of HDB apartments where the screening was held.

Since then, the annual event has come to be known as the Public Health Service. It has grown from strength to strength. The latest edition, PHS 2018, featured 10 screening modalities, complete with a health exhibition and an inaugural health carnival run by students from secondary schools and junior colleges, mentored by the PHS committee. Over the years, PHS has diversified from being primarily a health screening to a health service with three distinctive approaches – primary prevention (health education), secondary prevention (health screening), and follow-up. PHS has also become a community service programme that all NUS Medicine students are expected to participate in. It has become a flagship project that stands at the crossroads of medical education, inter-professional collaboration and community service.

Through the years, PHS has always stayed true to its motto of "Promoting Health, Spreading Awareness". Ultimately, PHS aims to promote positive health seeking behaviour and healthy lifestyles in the general public, as well as to



provide resources to link participants to established health organisations for follow-up for any abnormalities picked up during the health screening. In a bid to reach out to various communities in Singapore, PHS has served more than 18,000 residents in Ang Mo Kio, Toa Payoh, Clementi and Jurong.

While the core aims have remained unchanged, PHS has evolved in response to developments in Singapore's healthcare landscape. Over the last few years, the government has been increasingly providing low-cost and comprehensive public health screenings to the public. In 2017, the Screen for Life (SFL) programme was rolled out. Singapore citizens can get a health screening done for as low as \$5, \$2 for those with a CHAS card, while it is free for the Pioneer Generation.

Heartened by this, PHS organisers reviewed its objectives and programmes. Were our efforts now replicated by the increased frequency of other health screenings? How could PHS remain relevant to the community and continue to promote health effectively?

The Young Health Ambassadors' Programme (YHAP) was thus established in 2015 to provide health education to secondary school students, who would then act as health ambassadors to pass on healthy living messages to their parents and seniors at home. We hoped that by addressing the youth, we would be empowering them to make a difference to those in their families, friends, and communities.

Fast-forward to 2018, and the YHAP has successfully provided health talks to over 4,000 students and mentored over 150 students, providing all our youth participants with health knowledge and skills to positively influence those around them. PHS has plans to expand our primary prevention efforts to increasingly involve the community as a whole, going beyond the youth.

The PHS flagship annual health screening also has much to offer above and beyond other regular health screenings. Recognising the need to address mental health issues that are becoming more prevalent in the population, mood and cognitive screening for the elderly was introduced



in 2017. PHS doctors' consultation service during the health screenings has also given participants valuable personalised health advice and helped them to take charge of their own health. In 2018, PHS managed to partner the Health Promotion Board (HPB) and the Agency for Integrated Care (AIC) to offer geriatric participants with a comprehensive functional screening encompassing vision, hearing and oral checks.

Apart from a wide range of screening modalities, PHS has always maintained the practice of providing a robust follow-up for all participants. In 2018, eligible participants received a free GP consultation in addition

to their screening reports. Participants with screening abnormalities picked up during functional screening are being followed-up through more specific screenings and consultations with specialists as required.

In the coming years, it is our sincere and fervent hope that PHS will continue to evolve in response to the healthcare challenges faced by Singaporeans, so as to continue to meet existing healthcare gaps in the community. We are confident that each generation of NUS Medicine students will build on the efforts of their predecessors and bring PHS to greater heights, and help to make Singapore a healthier nation, one community at a time.

A close-up photograph of a scientist wearing a white lab coat and blue nitrile gloves. The scientist is holding a petri dish containing a culture of small, yellowish bacterial colonies. The dish is labeled with handwritten numbers: '953', '2632', and '13'. The scientist is wearing safety glasses and a white lab coat. The background is blurred, suggesting a laboratory setting.

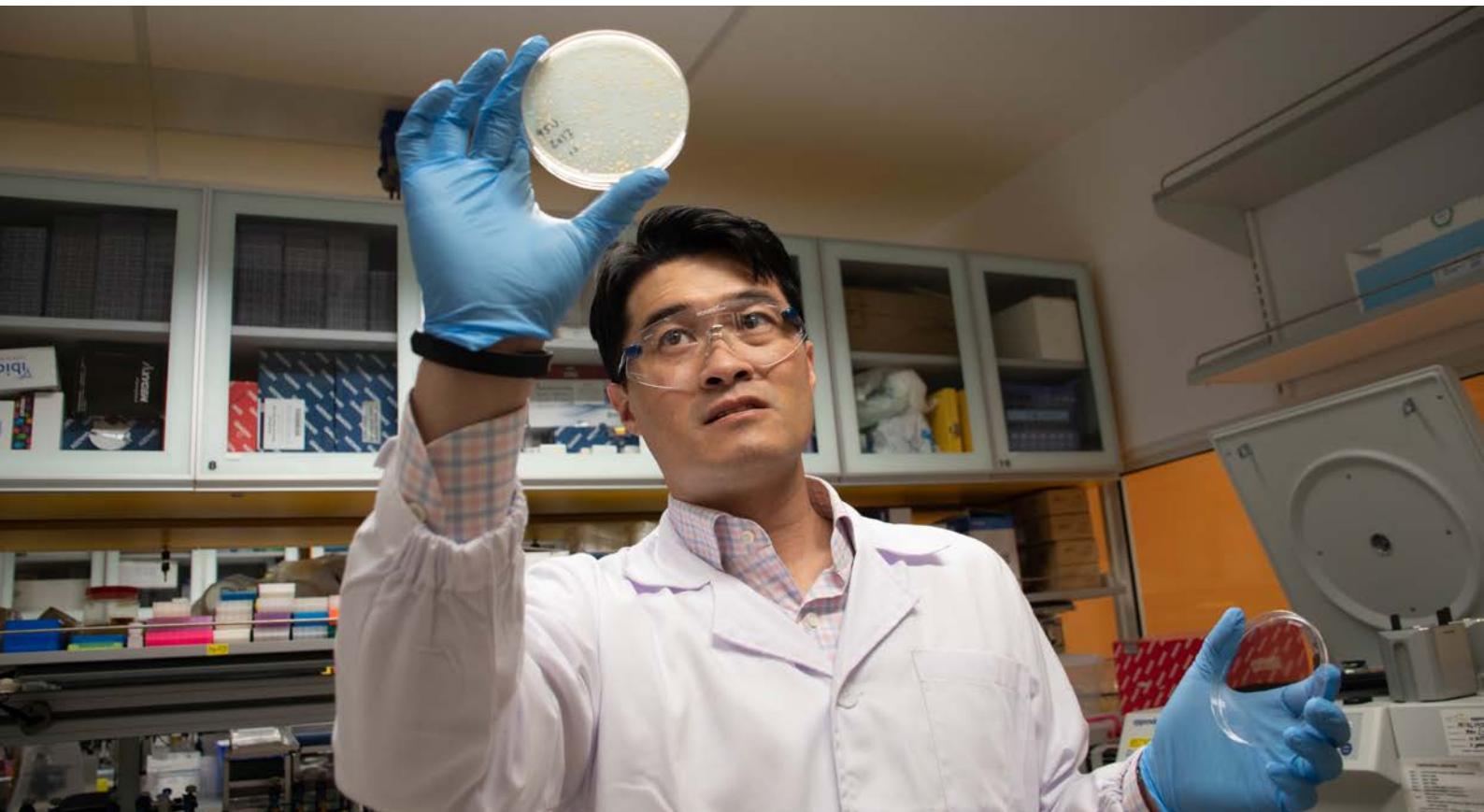
THE DATA WHISPERER

By Dr Khor Ing Wei,
Dean's Office

“

*I listen to the stillness of you,
My dear, among it all;
I feel your silence touch my words as I talk,
And take them in thrall.*

– D.H. Lawrence



The ability to notice the odd and unusual, then tease and pry secrets from seemingly innocuous bits and bytes of information is a hallmark of a good researcher.

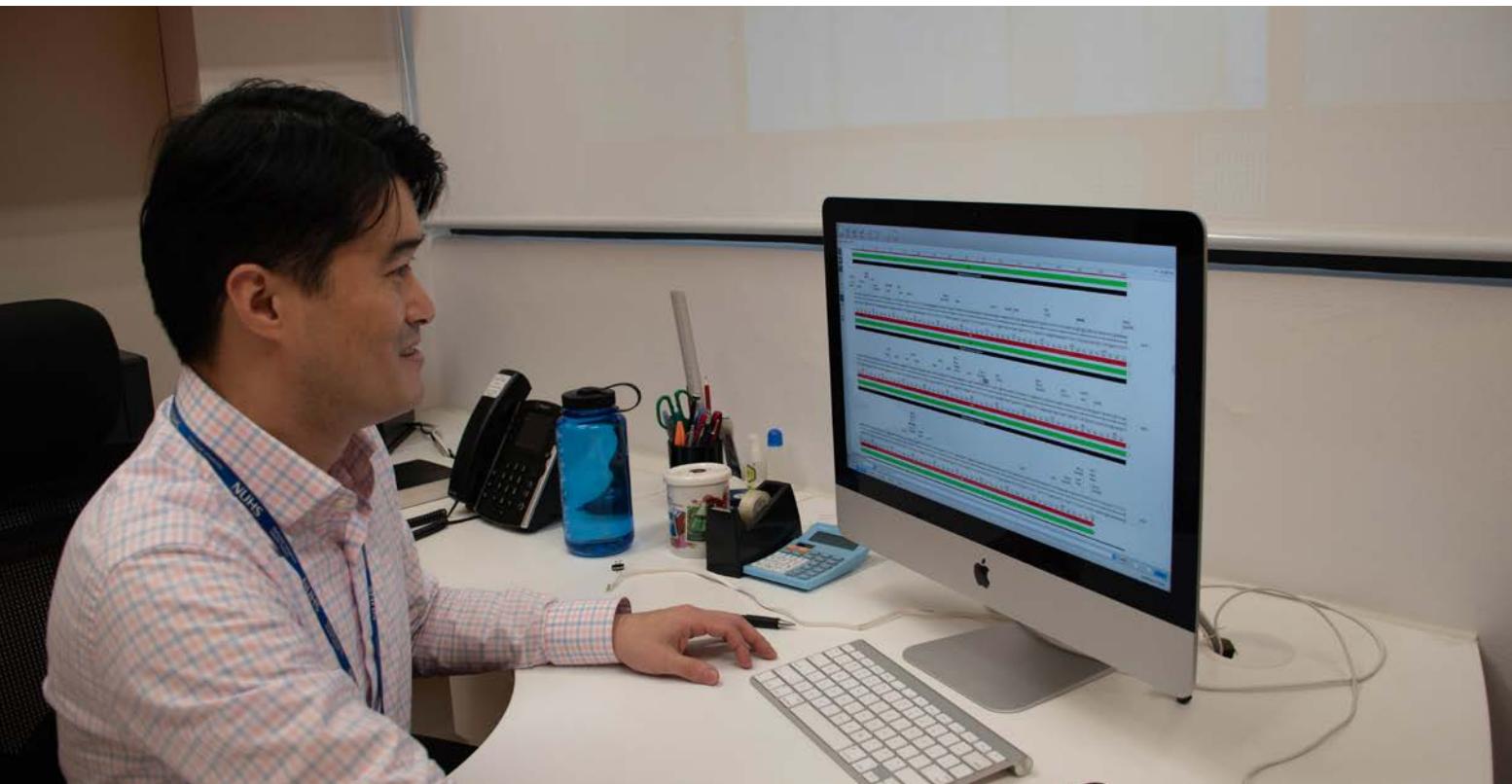
Assistant Professor John Chen Yu-Shen doesn't just review data. He listens to them and hears their whispers. While many scientists scan and peruse the reams of information mined and gleaned from their research, Asst Prof Chen goes further, paying close attention to data that is often deemed irregular or irrelevant and which may then be disregarded. His belief in keeping ears and eyes tuned for the unusual and the odd have paid off time and again. It also appears to run counter to scientific modus operandi: in the pursuit of new knowledge, scientific investigators have their hypotheses and grant's aims firmly fixed in their minds and are focused on the results that are relevant to these objectives. While this can be a good strategy for funding renewal, it can also result in important discoveries being missed.

For Asst Prof Chen, embracing rather than avoiding data that does not make sense (at least initially) is the "secret sauce" that has led to three first-author (one corresponding) publications in *Science*. However, chasing after anomalies also leads to findings that upend long-held beliefs. His most recent paper in the premier journal, which was published online on 12 October 2018, elicited strong opinion, including one from an expert in the field. He dismissed Asst Prof Chen's paper as an "artefact".

The study generated such controversy because it overturned the conventional wisdom surrounding a process called genetic transduction, which refers to the transfer of genetic information between bacteria by bacteriophages (viruses that infect the bacteria). From the 1950s until now, genetic transduction was thought to involve just two mechanisms: generalised and specialised. Now, 60 years later, Asst Prof Chen showed that a third mechanism, which he called lateral transduction, is also at play in *Staphylococcus aureus* (*S. aureus*) bacteria¹. What is even more stunning, this third mechanism appears to be at least 1000 times more powerful than the other two. Essentially, lateral transduction acts like a "broadband" Internet for bacterial genetic information, transmitting large sections of bacterial genes quickly, as opposed to the "dial-up" connections represented by generalised and specialised transduction.

Asst Prof Chen and his colleagues discovered this new mechanism by noticing that some phages displayed an abnormal life cycle. Specifically, a crucial protein that was usually required early in the life cycle was instead being produced much later in these phages. Intrigued, they investigated further and found that this abnormal life cycle allowed phages to transfer large sections of bacterial genes between bacteria at extremely high frequencies.

This revolutionary new mechanism could explain the incredible pace of adaptation of which *S. aureus* is capable. In fact, the genes of different *S. aureus* strains often differ by as much as 20%, which is much greater than the difference between the genes of humans and mice². As Asst Prof



Chen puts it, "As master infective agents, bacteria have evolved very specialised sets of genes (involved in virulence or antibiotic resistance) by a slow-drip vertical inheritance process over the course of hundreds of thousands, or even millions of years. Lateral transduction allows bacteria to bypass this slow process, literally in a matter of minutes, by acquiring genetic elements from other bacteria." It is this mass exchange of genes that generates the endless variety of bacterial strains that are ready to adapt to new and evolving environments. What was mere scary science fiction is now empirical reality.

Another of Asst Prof Chen's Science papers, published in 2009, had similarly challenged the commonly accepted understanding of how phages transferred genetic information between bacteria. That paper showed that phages could transfer disease-causing ("pathogenicity") genes between different genera of bacteria, rather than being limited to closely related bacteria, as previously thought³. When Asst Prof Chen first brought the idea for the project to his postdoctoral advisor, he was told it was a dead end and discouraged from pursuing it. Which is exactly what Asst Prof Chen did and succeeded eventually in demonstrating the concept.

A third paper in Science identified the first effector proteins involved in the reproduction of *Legionella* bacteria in protozoan hosts such as amoebae⁴. Standard approaches by every lab in the field had failed to identify the effector genes required for virulence in human macrophages. To Asst Prof Chen, this failure was the irregularity, because it seemed highly unlikely that so many labs would fail at an approach that had been so historically reliable for other pathogens.

This prompted him to think that either the effectors were redundant in function or different host cells were needed. As it turned out, both hypothesis were spot on.

"An element of luck is always involved, but in truth, these are just the very few successes out of hundreds of failures," Asst Prof Chen says. He adds, "You have to be very thick skinned about failure in research." Although he obviously knows how to stick with an idea and keep working at it, he thinks that researchers must also be "willing to cut your losses" and bring a project to a halt, if necessary, because "when you follow a mysterious data trail, you never know where it will lead to, but you can almost be certain that it will stray from your grant objectives, so you take a risk each and every time."

Although these may appear to be contradictory skills, at their essence they are about letting the data be the guide, regardless of self-imposed or external pressures and the opinions of others. Are you listening?

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A NEW APPROACH TO IDENTIFYING HFMD

By Associate Professor Justin Jang Hann Chu, Parveen Kaur and Nyo Min

Hand, foot and mouth disease (HFMD) is an illness commonly reported in children and endemic to many parts of Asia. Symptoms include fever and blisters or rashes on the hands and legs, as well as ulcers in the mouth. HFMD is caused by a group of viruses from the genus Enterovirus, the most common of which, are coxsackievirus A16 (CV-A16), coxsackievirus A6 (CV-A6) and enterovirus 71 (EV-A71). While most cases of HFMD are often mild and self-limiting, neurological complications and fatalities have been associated with EV-A71 infections in particular¹. Viruses causing HFMD are transmitted via direct contact with body fluids including saliva, nasal discharge, fluid from blisters, as well as faeces of an infected patient.

There is currently no antiviral treatment or vaccine against HFMD. Treatment is limited to supportive care and medications to alleviate symptoms. HFMD became a legally

notifiable disease in Singapore following an outbreak in 2000 when several deaths were reported among children with EV-A71 infections. This allows monitoring of HFMD cases over time and this information is used to determine the implementation of control measures in an effort to limit the spread of HFMD. Many schools and childcare facilities conduct daily checks for HFMD symptoms in children, encourage frequent hand-washing and perform regular cleaning of shared items like toys with bleach-based disinfectants. A comprehensive public education programme also ensures that parents and caregivers are able to play their part in mitigating risks associated with HFMD.

Symptomatic diagnosis and lab tests

To diagnose HFMD, clinicians rely primarily on physical symptoms². Diagnosing based on symptoms is often tricky and carries risks of misdiagnosis, since the symptoms of HFMD overlap with many other illnesses, including chicken pox, oral herpes (cold sores) and eczema². This may lead to patients being administered incorrect treatment and further delays in recovery. It may also increase the likelihood of transmission to uninfected individuals when HFMD cases are mistaken for another infection and patients are not promptly isolated².



Laboratory-based confirmation of infection with HFMD-causing viruses can be carried out by reverse-transcription polymerase-chain reaction (RT-PCR), which detects for the presence of the viral RNA in throat swabs, blood and stool samples². There are, however, several limitations of this method. Detection via RT-PCR requires laboratory facilities, expensive equipment and specific technical expertise, which means that patients have to wait several days after the sample is collected before results are known. Waiting for test results before making a diagnosis would increase the risk of patients spreading HFMD to others, especially if they continue attending school or their childcare centres. Due to the wide number of viruses causing HFMD, there remain risks of false negative and false positive results². Using RT-PCR for diagnosis during a major epidemic is also not feasible, since the large number of samples collected might lead to an even longer turnaround time. As a result, the examination of physical symptoms continues to be the most widely-practised method of diagnosis for HFMD, while laboratory testing is considered unnecessary for mild cases^{2,3}.

Point of care testing

The limitations of the current methods of diagnosis underlie the necessity for more effective diagnostics. An ideal diagnostic method would be reliable, affordable and allow rapid retrieval of results without the need for specialised facilities or expertise. In addition, having a diagnostic method that can be utilised in GP clinics (point-of-care testing, or POCT) or even in childcare centres and schools is likely to reduce delays in diagnosis, resulting in quicker management of symptoms and more effective control of disease spread.

Several approaches to POCT have been explored in preliminary studies involving direct detection of HFMD-

causing viruses in patient samples. For instance, a surface-enhanced Raman spectroscopy (SERS)-based technique involving colloidal gold nanostars conjugated to the EV-A71 cellular receptor has been recently reported⁴. In the absence of EV-A71, the nanostars were observed to aggregate, while the presence of EV-A71 disrupted the aggregation. A similar approach using magnetic nanobeads with EV-A71 or coxsackievirus B3 (CV-B3) receptors, which emit fluorescence in the presence of these two viruses, has also been explored and validated with a small number of clinical throat swab samples from HFMD patients⁵. A limitation of these methods is that they detect only for specific HFMD-causing viruses and require additional technology (e.g. portable Raman device or fluorescence spectrometer) for detection, a necessity that may be logistically problematic in some instances^{4,5}. Simplifying the detection process, a separate group of researchers has also proposed a POC test using strips coated with antibodies against EV-A71 and CV-A16. Due to the presence of colloidal gold attached to the antibodies in the assay strips, a dark band can be visually observed when the strips are incubated with samples containing EV-A71 and CV-A16⁶. This proposed POC test has been evaluated using blood samples from children with HFMD⁶.

And Biomarker detection

Aside from direct detection of viruses, the use of biomarkers is another strategy that can be explored for POCT. As HFMD patients present with similar symptoms regardless of the virus they are infected with, it is possible that a universal biomarker exists for all HFMD-causing viruses. Biomarkers may also be utilised as predictors of more severe disease (e.g. neurological complications following HFMD), to allow earlier intervention. For instance, severe HFMD induced by EV-A71 infection has been associated with increased

levels of HMGB1 (high mobility group box 1), clusterin A and serum amyloid A, all of which are proteins which play important roles in the immune response during infection or injury^{7,8}. In addition, elevated N-terminal pro-B-type natriuretic peptide (NT-proBNP) levels in patients with severe EV-A71-associated HFMD has been reported to be a predictor for many HFMD-associated complications, including cardiopulmonary failure, pulmonary edema, pulmonary haemorrhage and death⁹. Most of the research on HFMD-associated biomarkers has been performed with blood samples from patients. Since most patients of HFMD are young children, having a biomarker kit which requires blood collection may not be entirely suitable. Furthermore, the studies reported above focused on EV-71-associated severe HFMD, and may not be suitable for the testing of mild cases of HFMD caused by other enteroviruses.

Enable testing for MicroRNA in saliva

In our recent study, we have identified several microRNAs that were differentially regulated in the saliva of HFMD patients³. To collect saliva samples, we utilised a saliva-collection kit which was simple enough to be used by caregivers, teachers and parents. Having a collection kit which does not need to be administered by a trained healthcare professional is likely to reduce the distress of saliva collection from young HFMD patients, who may be more comfortable around people they recognise. We developed a diagnostic model which tested for the expression levels of 6 microRNAs in saliva collection samples. In a blinded test comprising 69 saliva samples from HFMD patients and healthy children, this model was able to detect HFMD with an accuracy of 85-93%. The successful detection of HFMD-associated salivary biomarkers is an important step forward towards the development of a less invasive POC test kit which can detect HFMD regardless of the enterovirus causing it.

As a paediatric illness, HFMD causes a significant socio-economic burden in the many areas where it is endemic. Current diagnostic methods which rely on physical symptoms are unreliable, and may result in unnecessary distress to affected parties, as well as higher transmission rates in the event of a misdiagnosis. Moving forward, research into HFMD diagnostic strategies, along with innovative technologies are essential in order to develop reliable and affordable POC test kits, as well as identify predictors for severe disease. It is hoped that these diagnostic strategies will aid in better disease management and reduce the socio-economic burdens posed by HFMD.

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About the authors

Justin Chu is currently the Director of NUS Medicine BSL3 Laboratory and Associate Professor in the Department of Microbiology and Immunology, Yong Loo Lin School of Medicine, NUS. He is also a Joint Principal Investigator in IMCB A*STAR.

Parveen is a Research Fellow and Nyo Min is a Research Assistant in the Department of Microbiology and Immunology, Yong Loo Lin School of Medicine, NUS.



A DOSE OF JAPANESE MEDICINE

By Nelson Teo Ming Hao, Lim Zhe Zheng Clyde, Cassandra Ang Yang Xuan and Melissa Yeo Eng Min, Phase V Medicine Students

The trip

In November 2018, we visited Yokohama City University (YCU) along with Associate Professor Suresh Pillai (Director, Centre for Healthcare Simulation). Having had the pleasure of hosting YCU medical students when they visited us back in August 2018, we were excited to meet old friends and make new ones on this outbound trip.

YCU education workshop

On the first day, our hosts from YCU put together an education workshop with Assoc Prof Pillai as the keynote speaker. Attended by more than 100 faculty members and students, it was a well-received session. Assoc Prof Pillai shared NUS's approach and experience in medical education using simulation tools and concepts. We also had our minute of fame as we introduced NUS Medicine to our new friends – from our curriculum overview to the unique Student Internship Program we undergo in our final year of training.

Hearing Hisho Kawamura, a final-year medical student from YCU, speak about his experience attending the Advanced Cardiac Life Support and Healthcare Simulation programme in NUS was both nostalgic and inspiring as we learned about how he has been organising informal teaching sessions amongst his peers to share his knowledge from the programme. To end off the workshop, we performed a live demonstration of Advanced Cardiac Life Support to resuscitate a middle-age Japanese gentleman who suffered a cardiac arrest. As stressful as it was to be under the spotlight, we were happy to know that our demonstration was well-received by our hosts and piqued the interest of many YCU students who expressed interest in coming over to join our programme!

Experiencing the YCU simulation centre

Japan is well-known as a leader in technology and innovation, and we caught a glimpse of this at the YCU simulation centre. Tucked away in one of the faculty buildings was a modest and unassuming room filled with a wide array of simulation machines which was open for use 24/7. We were honoured to have senior surgeons from YCU demonstrate the use of oesophagogastroduodenoscopy (OGD) simulators as well as laparoscopic surgery simulators before giving us one-on-one tutorials. Given how medical students typically have little experience, simulators are extremely useful in providing early exposure without compromising



Laparoscopic Simulator at YCU Simulation Centre

patient safety! On the medical side of things, we had the opportunity to experience realistic heart- and lung-sound simulators from different brands and models. Despite the many similarities between our Centres, there were many new tools that we were introduced to and it was a fulfilling afternoon of learning.

Touring YCU medical facilities

We were also invited to visit the two hospitals affiliated with YCU. Starting from the Emergency Department, we witnessed how there is a strong emphasis on multi-disciplinary care as different specialties work together in the ED to manage patients. The easy availability of imaging and the preference towards MRI use was also an obvious difference in the way our systems work. Interestingly, many of the hospital's facilities were 'convertibles', with scan rooms designed for conversion to a minor operating theatre or angiography suite when needed! Perhaps such versatility would also be useful back in Singapore where space is often limited. We ended off the hospital tour by visiting their helicopter landing pad, which we later learned is sometimes used to evacuate distressed hikers from nearby Mount Fuji. As a grand finale, Assoc Prof Pillai also had the chance to give directions and help guide a helicopter (sans the actual helicopter).

Japanese culture

Polite, formal and humble – these are some of the words that we normally associate with Japanese culture. But above and beyond these was their impeccable hospitality that defined Japanese culture during our short stay. Senior faculty members from YCU personally welcomed us and hosted us to a delightful traditional Japanese dinner at a restaurant that overlooks the captivating Yokohama skyline. Despite being busy with clinical duties, our hosts made it a point to ensure that we were always accompanied. Even on their day off, they brought us around their beautiful city and introduced us to many interesting aspects about Japanese culture and its rich heritage. Their kindness and warm hospitality are certainly things we can learn from!

Conclusion

Being part of the YCU International Education Workshop was indeed an eye-opener for us. We strongly believe that both parties - YCU and NUS - have learnt much from each other through the inbound and outbound trips. Yet, there is more that we can help each other with and we hope this partnership will continue for years to come. We would like to thank our hosts from YCU for their kind hospitality and the faculty in NUS for their support, without which this exchange would not have been possible.

A PASSAGE TO INDIA

Students on Overseas Elective
Experience at Christian Medical
College and Hospital, Vellore





NUS students with another elective student at RUHSA, a rural medicine initiative

By Deepanraj, Phase IV Medicine Student

Why Christian Medical College?

In a chapter of his book titled 'Better', renowned surgeon and writer Atul Gawande recollects his time in a simple district hospital in India. He mentions how, being an 'American-trained surgeon', he started off expecting to teach a thing or two to the doctors there.

Dr Gawande had many reservations about the hospital, especially the fact that with just nine general surgeons, it served a population of around two million. Seeing the austere conditions of the hospital – hundreds of patients waiting in queues and a lack of critical supplies – the whole situation seemed yet more untenable through his First World eyes.

During his time there, however, he saw those very same doctors he had initially expected to teach besting their circumstances time and again. Examples include a surgeon who, in the span of three hours, saw 36 patients, diagnosing everything from incarcerated hernias to eroding breast cancer accurately and mostly on the spot, with minimal investigations. Another surgeon treated a child with hydrocephalus by using a makeshift tube costing US\$30 to

make a ventriculo-peritoneal shunt. By using astute clinical acumen garnered over seeing tens of thousands of patients and innovative solutions born of necessity, these doctors were able to deliver effective, efficient and economical care to their patients, he concluded.

The indomitable spirit and ingenuity of the doctors reflected in Dr Gawande's account truly intrigued my friends and I. We wanted to put ourselves in the midst of such a milieu, where we could learn from these seasoned clinicians. And hence, our decision to head to Christian Medical College in Vellore was formed.

Before school

My friends, Andrea, Hongyun, Nicholas and I packed our bags and reached Chennai, the capital of the state, the weekend before our elective period was due to start. We stayed at a friend's house and went sightseeing at some truly interesting locations. First stop was Marina beach, the second longest beach in the world. Sun and sea aside, the minor attractions on the beach itself were entertainment enough. We tried our hands at the different funfair games, roadside delicacies and even astrology, getting a parrot to pick up cards presumably showing our future. We also caught a movie and enjoyed a proper South Indian 'thaali'



NUS students with friends from other universities at Mahabalipuram, an UNESCO World Heritage Site

meal with rice and an assortment of curries and sides. A museum visit and a few sumptuous meals later, it was time to head to Vellore, a two to three-hour ride from Chennai.

At school

There are two main hostels available for students, Modale and Community Health Training Centre (CHTC). Both were quite suitable for Singaporean students with all essential amenities. Each morning, most of us elective students had breakfast at the charming college canteen with Indian mainstays like 'dosa' and 'idly' and washed it down with filtered coffee.

After that, we took a chartered bus to the hospital, a good twenty minutes away from the hostels. The hospital itself has several specialties and the 40 or so NUS students at CMC were distributed across multiple departments based on our choice and availability. I, being interested in Paediatrics, embedded myself in that department for the next week or so. A good number were attached to the surgery, rheumatology, cardiology and pulmonology departments.

First on the schedule each day was morning rounds. During my time in the paediatric wards, I observed the care and management of both cardinal paediatric conditions such

as bronchiolitis and gastroenteritis and things seen much more rarely in Singapore, such as congenital heart defects and malnourishment.

In the afternoon, we usually went for clinics with our team doctors. As CMC is a tertiary referral centre for hospitals across India, we saw dozens of patients presenting with conditions which would otherwise be rarely seen in the wards, like celiac disease and cystic fibrosis. The doctors had very limited time with each patient (about six to eight minutes each) and still, they would build rapport by conversing with them while examining fluidly and purposefully. They also translated for us and highlighted pertinent signs. One other thing we learnt from the doctors was the way they would take into consideration the patient's economic profile and order investigations judiciously.

Back in the wards in the evenings, we students spent a good amount of time talking to the patients ourselves too. Although there was a language barrier initially, we were somehow able to come through with a combination of smiles, sign language and help from the nearby staff. Learning to overcome obstacles was part of our education each day.

IN VIVO



A crowded paediatric clinic with patient, family, the registrar and house officer as well as our NUS medical student.

Each of the patients had a story to tell, and these interactions elevated our elective from being a mere observation of various assortments of human maladies to something that offered all-rounded development for us. One example is the conversation we had with the mother of a child with HIV. We felt her pain, as she recounted shuttling between home and hospital whenever her child fell ill. The intricate social dynamics involved in her schooling and the protection of her peers were some other insights she offered which allowed us to view the world through the patient's eyes.

There was also our interaction with a farmer, who broke down in front of us as he recalled his family and the crops he had left behind in his hometown. Although patients in Singapore will rarely have the same troubles as him, it still served as a reminder that our patients back home too do not exist in a vacuum and have considerations invisible to us.

Lastly, I also got to experience a change from the aseptic hospital environment as I took part in the week-long rural health programme that CMC offered. In the villages

on the peripheries of Vellore, the doctors exemplified resourcefulness, for instance teaching a post-stroke patient to perform his physiotherapy regimen with just furniture and other household items. Another intriguing move was the utilisation of all-women teams to go door-to-door and engage women on menstrual health and sanitation. This, I realised, was in keeping with the conservative values of the people in the region. By adapting to that, the doctors were able to reach more women. All these valuable takeaways will guide how we treat our future patients, caringly and wisely.

After school

Every evening, my friends and I would then take a ride on the ubiquitous auto-rickshaws to the city center. Truth be told, what Vellore lacks in terms of the glitz and glamor of the big metropolises, it makes up for with its rich cuisine. Our favourite gastronomic haunts were Darling, Vellore Kitchen and Namma Veedu. Though they specialised in South Indian cuisine, they offered a veritable feast in terms of North Indian, Chinese and Western cuisines as well. Darling went a step further with its rooftop restaurant providing a panoramic view of the whole of Vellore to go



Students from all the countries after catching a movie in town

with the dishes. Another thing to note is that Vellore is right smack in the 'biriyani belt' of Tamil Nadu and offers some of the most authentic biriyani around. The food was truly great to the extent that it would not be an exaggeration to say I came back with my clothes feeling significantly tighter.

After dinner, we would usually return to our respective hostels, only to come back down for sports and games. One can easily find people on campus playing basketball, tennis or cricket and join them. There were medical and allied health students of various nationalities who were on exchange to CMC as well and we got to know them over time as they joined us in our games. Later in the evening, we would meet in one of our rooms each day to play card games, watch movies and chat.

There were also two other local attractions that were truly delightful. One is the College Hill, which offers a challenging 30-minute climb but a truly breathtaking view at the peak. Students thinking of climbing it must however take care to start way before dusk as it can be slightly dangerous to descend in pitch black darkness. The other attraction was one that we stumbled upon. On our last week there, I opted to join the CMC fifth year medical students for their surgery rotation and the guys brought us to their boys' hostel on one of the evenings. Lo and behold, the garden inside the hostel, named the Garden of Eden, offered one of the best sights of the trip.

All these aside, the weekends were the time when we truly hit the road and had fun. Major cities like Bangalore and Chennai were just a couple of hours away and provided a quick getaway (and a vibrant night life). We also went on tours to Pondicherry with its quaint roadside cafes and charming beaches. Mahabalipuram and Dakshina Chitra were nearby as well, the former being an UNESCO world heritage site and the other offering microcosms of the five distinct cultures of South India.

Big picture takeaways

The elective to CMC Vellore was packed with learning and fun. Learning came in many forms, in terms of exposure to a wide range of conditions, direct interaction with veteran clinicians who taught us the nuances of making a clinical diagnosis, as well as providing low cost effective care, quite akin to Dr Gawande's experience. Beyond our teachers, we learned from the patients as well. Although some of their situations were disheartening, they served to remind us of the sobering reality that there is yet a lot to be done to alleviate suffering and improve health. Not only did the experience make us better students, it also paved the way for us to be better doctors in future.



GENETICS WORLD IN UPROAR OVER CHINESE SCIENTIST'S MOVE

The idea of scientists tinkering with the genes of babies was once the realm of science fiction. On 26 November, Chinese scientist He Jiankui reported the historic live births of twin girls whose genes he had edited. The goal may have been noble: to use CRISPR to alter their genes to include a variant protective against transmission of HIV. But the announcement – yet to be verified – has quickly become mired in a deluge of scientific and ethical criticism of He as a reckless researcher who overstepped well-established boundaries, writes Dr Owen Schafer of the Centre for Biomedical Ethics in the 28 November 2018 issue of *The Conversation*.

Professional outcry

The reaction from the professional community of scientists and ethicists was swift and essentially universal in its condemnation, including over 100 of He's colleagues in China.

A central objection is that the study was simply too risky. Researchers have stressed that the risk of off-target effects (unintentionally changing other genes) and mosaicism (only altering the target gene in some of the child's cells rather than all of them) could lead to unexpected and harmful health effects such as cancer later in life. There is general agreement that at present these risks outweigh any potential benefits, and more basic research is needed before proceeding.

These concerns have led to bans or other restrictions on experiments like He's in many countries around the world. While there is no statutory prohibition on gene editing in Singapore, any such research or clinical application would have to be approved by the Ministry of Health. In light of the Bioethics Advisory Committee (BAC) of Singapore's 2005 guidance against reproductive gene editing, it is highly unlikely such research would be permitted in this country until the BAC revisits the issue.

Interestingly, some of the strongest ethical objections to the experiment came from ethicists who have in other venues defended gene editing. Julian Savulescu, for example, has gone so far as to argue that, if it were safe and not too costly, we would even have an obligation to edit our children's genes. Yet he called the reported experiment "monstrous," in light of the serious risks and lack of necessity. The twins were never in danger of inheriting a deadly genetic disorder, and there are far less risky ways to prevent HIV transmission.

Public perception

This backlash may have caught He by surprise. According to one report, He commissioned a large-scale public opinion survey in China a few months prior to the announcement. The survey found that over 70 percent of the Chinese public was supportive of using gene editing for HIV prevention. This is roughly in line with a recent Pew poll in the United States that found 60 percent of Americans support using gene editing on babies to reduce lifetime risk of contracting certain diseases.

But polling tells only part of the story. The same Chinese poll also found very low levels of public understanding of gene editing and did not mention the details of He's study. Abstract polling questions ignore the risks and state of the science, which were crucial to most objections to He's experiment. It also obscures the involvement of embryos in gene editing. In the American Pew poll, despite overall support for gene editing, 65 percent opposed embryonic testing – a necessary step in the process of gene editing to address disease.

Moreover, polling is a crude and simplistic way to engage in public debate and deliberation over the controversial issue of gene editing. Various bodies, such as the National Academies of Sciences, Medicine and Engineering in the U.S. and the Nuffield Council on Bioethics in the U.K., have emphasised that, for gene editing to proceed to human trials, a robust public discussion is first needed to establish its legitimacy.

Yet He decided to proceed in the least transparent way possible, hiding his study from public view, colleagues and his institution, and even going so far as to ban participants from sharing with anyone their participation in the trial, on pain of financial penalty.

He's recklessness, then, was not limited to risk but also failing to earn public trust and buy-in before.

Consent and inducement

A further failing of He's experiment was the consent process. The study recruited couples with an HIV-positive husband and HIV-negative wife. Ostensibly, the couples had a particular interest in ensuring their children never contracted HIV, in light of the intended father's experience. But looking a little closer reveals other, more problematic motivations.

For such couples, it is possible to safely conceive an HIV-negative child using robust IVF procedures. Such therapy is expensive, prohibitively so for many couples. But He's study offered a particularly enticing carrot – free IVF treatment and supportive care, along with a daily allowance and insurance coverage during the treatment and pregnancy. According to the consent form, the total value of treatments and payments was approximately US\$40,000 – over four times the average annual wage in urban China.

This raises a serious concern of undue inducement: paying research participants such a large sum that it distorts their assessment of the risks and benefits. In this gene editing context, where the risks are incredibly uncertain and there is substantially limited general understanding of genetics and gene editing, society should be especially concerned about the distorting effect of such a large reward on the participants' provision of free and informed consent.

Aftermath

In a video announcing the birth of the twins, He announced he was willing to take on all personal responsibility for the conduct and outcomes of the experiment. And indeed, the consequences of this unethical experiment are already piling up. His own university has disavowed him, having previously suspended him, while multiple investigations are being launched into He, his American collaborator and the hospital ethics committee that approved the experiment. Since appearing at a late November conference to defend his actions, He himself has not been seen, with unconfirmed reports that he has been put under house arrest.

The outcome of those investigations remains to be seen, but it is part of a disturbing pattern in reproduction: rogue scientists bucking international norms to engage in ethically and scientifically dubious reproductive research. Indeed, just within the last two years, another set of renegade scientists flaunted established norms to bring about the first "three-parent IVF" babies; there was tremendous outcry, but the procedure now seems to be continuing in the relatively lax regulatory environment of Ukraine.

Hard work is now needed by scientists, ethicists, policymakers and the public at large to figure out how to reverse this trend and return reproductive medicine to a path of responsible research and innovation.



A “GOOD DEATH” – WHAT’S YOUR GAME PLAN?

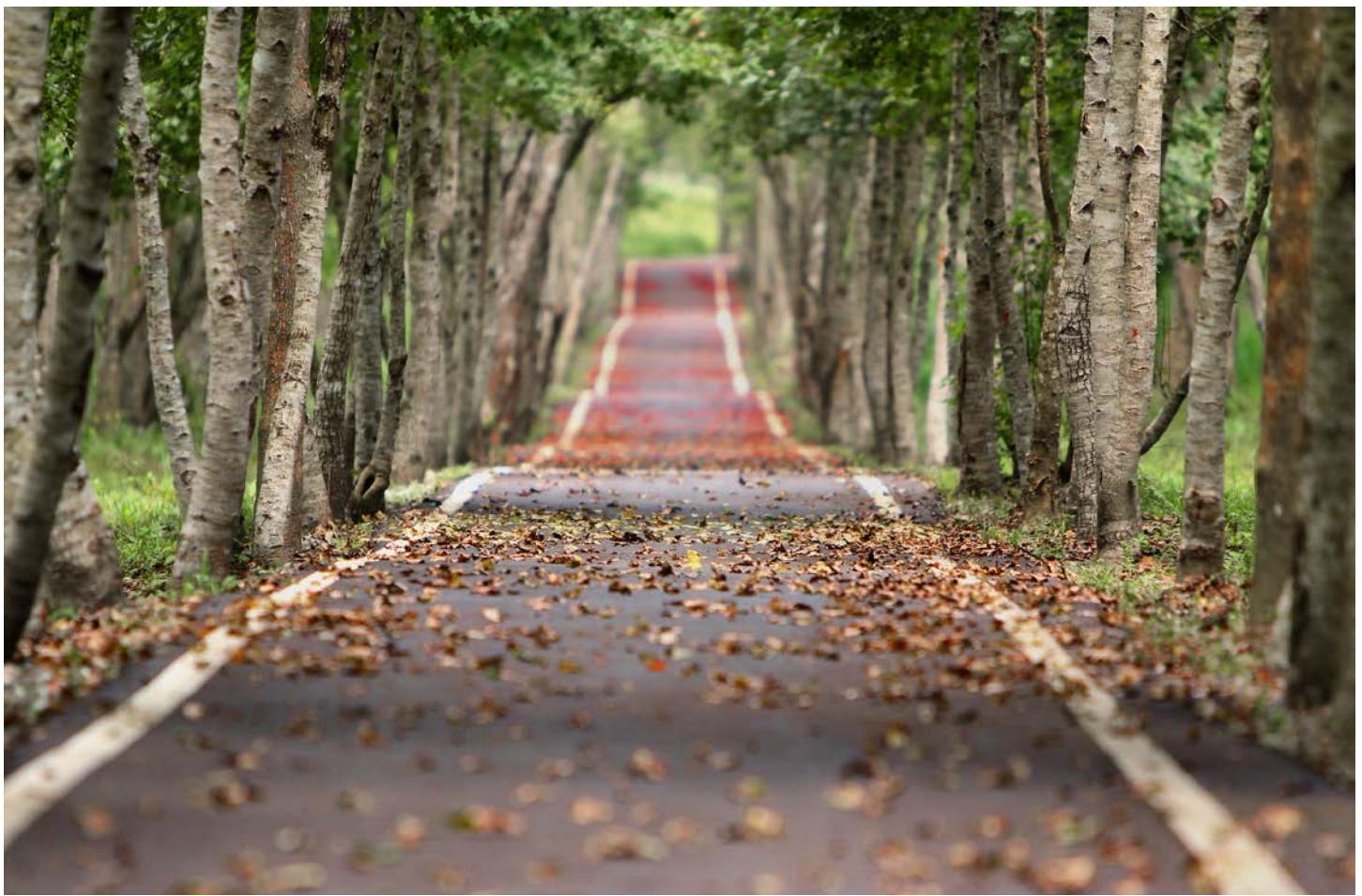
By Dr Noreen Chan,
Head & Senior Consultant,
Division of Palliative Care,
National University Cancer Institute,
Singapore (NCIS)

At the end of October, I attended an exhibition by Project Happy Apples, a medical student group which I mentor. The event, called END GAME: What’s Your Game Plan?” aimed to encourage people to think about what their wishes might be towards the end of their life, and to demystify palliative care.

In preparing for the exhibition, the students had surveyed 500 households around the venue in Punggol, and found that there was a low level of awareness about palliative care, and related concepts like Advance Care Planning.

It is ironic that we put more effort into planning our holidays, than we do preparing for our old age, retirement or death. So it should not surprise anyone that few people have considered what a good death means to them. For example, many might impulsively reply that they would like to die suddenly, but we all know that those bereaved by a sudden unexpected death can be traumatised for years. Good for you, perhaps, but awful for those you leave behind.

A Google search using terms like “Good Death” and “Dying Well” will unearth rafts of websites, articles, blogs and talks, so there is plenty “out there”. I will however, mention an article written in 1998 by Drs Ezekiel “Zeke” and Linda Emanuel in the Lancet, called [The Promise of a Good Death](#)



The authors suggested that a good dying experience could be conceptualised around six domains:

- 1) Physical symptoms
- 2) Psychological and cognitive symptoms
- 3) Economic and caregiving needs
- 4) Social relationships and support
- 5) Spiritual and existential beliefs
- 6) Hopes and expectations

They also had four pieces of advice for clinicians caring for dying patients, which I summarise as the need to:

- Perform a comprehensive needs assessment;
- Develop the requisite knowledge and skills in palliative care;
- Work with other disciplines;
- Attend to the family and other loved ones.

Twenty years later, the article is still as relevant, and while things have improved, we still have a long way to go.

The job of helping a person to die well is not something that should be left to healthcare staff or the healthcare system: we as a society need to be proactive about it. A good death, like a good birth, needs some planning and support, it is not something that can be handled by one individual. Dying is not a medical issue, it is a social,

psychological, emotional and spiritual phenomenon. And since we only die once, there is only one chance to get it right.

So how can we “Live Well before Leaving Well”? From my years of walking this journey with hundreds of patients and families, my personal advice would be:

- Talk about it – what you want, what you don’t want;
- Get your affairs in order – your will, CPF nominations, LPA (Lasting Power of Attorney) etc.;
- Make an Advance Care Plan and nominate your spokesperson;
- Attend to your emotional and spiritual needs – our heart and soul need as much nourishment as our mind and body;
- Attend to your relationships – with your family, friends, faith, yourself;
- Do not be afraid to get help and support if you need it.

Maybe you are very clear about what matters, like a patient who told me “it’s very simple doc – be happy, be comfortable, the rest is bulls*#t”. Or perhaps you have decided you will go out in a blaze of glory, “rage, rage against the dying of the light”. If you are not so sure, it’s best to start thinking about it, and discuss with your loved ones, so that when it’s time for the End Game, your Game Plan is truly your own.

LET ME DIE A YOUNGMAN'S DEATH by Roger McGough

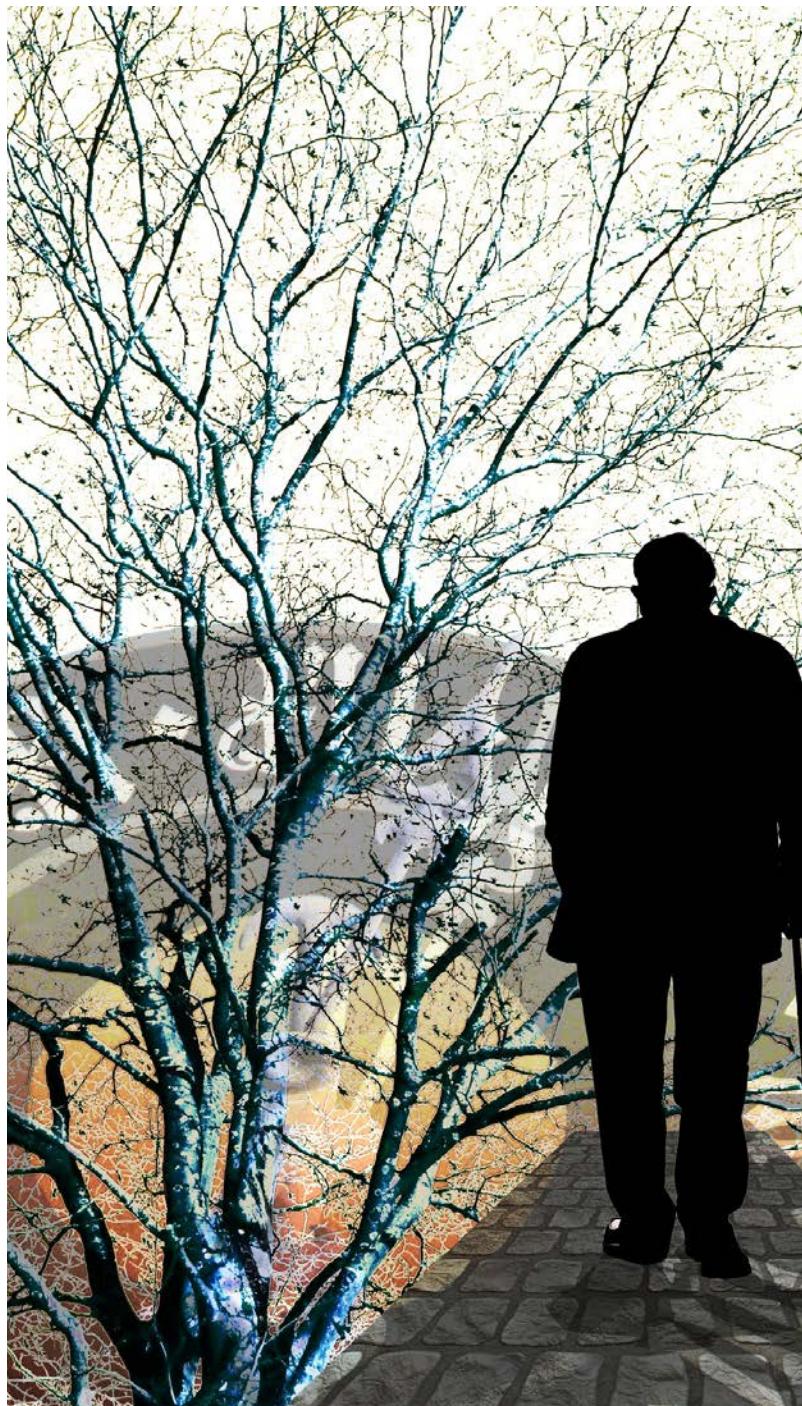
Let me die a youngman's death
not a clean and inbetween
the sheets holywater death
not a famous-last-words
peaceful out of breath death

When I'm 73
and in constant good tumour
may I be mown down at dawn
by a bright red sports car
on my way home
from an allnight party

Or when I'm 91
with silver hair
and sitting in a barber's chair
may rival gangsters
with hamfisted tommyguns burst in
and give me a short back and insides

Or when I'm 104
and banned from the Cavern
may my mistress
catching me in bed with her daughter
and fearing for her son
cut me up into little pieces
and throw away every piece but one

Let me die a youngman's death
not a free from sin tiptoe in
candle wax and waning death
not a curtains drawn by angels borne
'what a nice way to go' death



Paradigm shifts in medical education

The 3½-year Japanese Occupation had brought medical education practically to a standstill in Singapore. Ironically, it sparked a paradigm shift in the thinking of the local medical community that would help shape the future of medical training here.

Dr Chew Chin Hin, Past Master of the Academy of Medicine, gave an insightful account of this when he delivered the 18th Gordon Arthur Ransome Oration on 19 July 2007. With the expatriate doctors interned by the Japanese during the war, local doctors and staff had assumed full responsibility in running the Tan Tock Seng and Kandang Kerbau hospitals, the two that were left to serve the locals.

He recounted that this had led to the local doctors and staff being drawn much closer to each other. In addition to discussing their patients, teaching and learning, they talked about "practical policies which they felt deeply about well before and during the war; for example, the imperative need for a unified service with equal treatment of local and colonial doctors", said Dr Chew.

Time for a
hair
wash

Nurses used this stainless steel jug and basin combination to wash patients' hair in bed up to the 1970s. The basin held warm water and the jug was used to pour some onto the patient's head which was tilted over the side of the bed. Soap was then applied and rinsed off. How did the nurses prevent a watery mess? They draped a plastic sheet under the patient's head and shoulders to channel the water into a pail. Nowadays, hospitals have shower facilities adapted for bed-bound patients.

When the war ended, the colonial government agreed to unify the medical service but took three years to implement the scheme. As for postgraduate specialist training, limited numbers of doctors were sent to Britain on scholarships to attend courses but they received little training, observed Dr Chew in his speech. It is noteworthy that before 1960, there were fewer than 50 doctors who had higher specialist qualifications to serve the population of two million.

Dr Benjamin Henry Sheares, an eminent obstetrician and gynaecologist who later became Singapore's second President, wrote that "the Japanese invasion caused a general awakening of the people of Malaya. In no small measure did the local graduates contribute to this awakening, for they were able to show that, despite having been deliberately excluded from the higher echelons of the medical service, they were able, by making full use of their talents and by sheer grit, to run the hospital services as efficiently as possible under those unfavourable conditions".

These were heady times for Dr Sheares and his medical peers, like Benjamin Chew, Ernest Monteiro, K. Shanmugaratnam, B.R. Sreenivasan, Wong Hock Boon and Yeoh Ghim Seng. There was no turning back the clock. The founding of the Academy of Medicine in 1957 was an important milestone, with founder members like Professor Gordon Arthur Ransome, Dr Sheares and Dr Yeoh. In 1961, the Academy formed the Committee of Postgraduate Medical Studies which later became the School of Postgraduate Medical Studies, which in turn became the Division of Graduate Medical Studies in the National University of Singapore.



By the mid-1960s, local specialists had begun to make their impact felt. In the general hospitals, they led the way in pioneering procedures for treating complex medical problems in Singapore.

The nation's first open heart surgery procedure, on 28 January 1965, was performed by a team led by Dr N.K. Yong. As part of the preparation for this surgery, he had trained for a year from mid-1962 in the United States (US) and then spent another year training the surgical team. Under the supervision of Dr Dwight McGoon from the Mayo Clinic in the US, Dr Yong and his team sealed two holes in the heart of Miss Chua Ah Moi, then 23, with the help of an artificial heart lung machine.

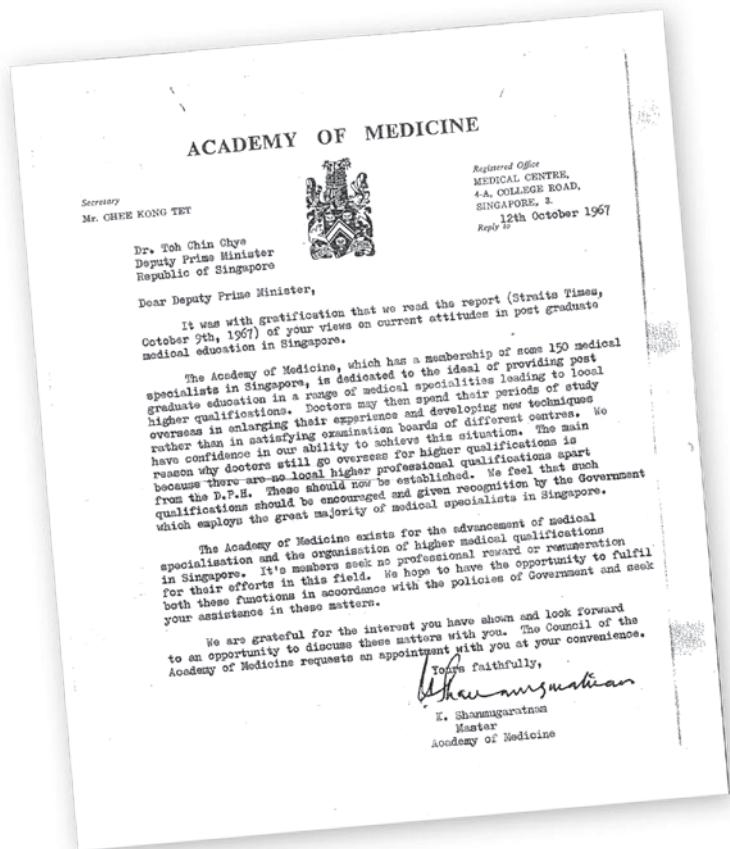
Two other operations followed quickly, both on children with the same condition, in February and March 1965. Following this success, SGH set up its coronary care unit in 1967. These services would be transferred in 1994 to the Singapore Heart Centre, renamed the National Heart Centre Singapore in 1998.

The Government too had a vision of Singapore as a medical training centre for the region. In the words of Dr Toh Chin Chye (then Deputy Prime Minister), the aim was to have medical services which were "second to none". In his 8 October 1967 speech at the 62nd anniversary of the Faculty of Medicine of the University of Singapore, he censured the school for having "grown older but not wiser". He questioned the wisdom of doctors preferring to go to London, Edinburgh, Glasgow or Dublin for their specialist training, adding "it was time to consider seriously how Singapore could offer postgraduate studies to students with the necessary facilities".

His criticism drew an immediate response from the Academy of Medicine. The Council, led by its Master Dr Shanmugaratnam, wrote to Dr Toh declaring its commitment to the "advancement of medical specialisation and the organisation of higher medical qualifications in Singapore".

A morning coffee meeting on 4 November 1967 between Dr Toh and the Academy's council members resulted in a letter being sent to Health Minister Yong. The letter suggested that "higher professional qualifications in various clinical specialisations be awarded by the University and that the School of Postgraduate Medical Studies be reconstituted to enable the Academy to participate as equal partners in the training programmes and examinations".

Things moved quickly after that. Dr Toh became vice-chancellor of the University of Singapore in April 1968 and pushed through significant changes in the statute of the medical school, chairing the new medical school board himself. In 1970, Health Minister Chua appointed a Committee on Medical Specialisation to recommend a programme of medical specialisation that would "meet Singapore's needs, and to make the republic an internationally pre-eminent centre for treatment, training and research".



▲ For the record... when Deputy Prime Minister Toh Chin Chye asked the Academy of Medicine in 1967 why they were not making any progress in the field of higher professional education, they sent him a letter (above) requesting a meeting with him. That meeting led to the Committee on Medical Specialisation being set up.

INSIGHTS

Mr Chua said the Government had to take the lead because "the private sector will not for a very long time be able to develop the very sophisticated specialities such as radiotherapy, neurosurgery and cardiac surgery which involved extremely high capital cost".

The committee's report was accepted and the specialities recommended were quickly introduced – neurosurgery, cardiothoracic surgery, plastic and reconstructive surgery, nephrology and paediatric surgery. These were in addition to ongoing sub-specialisation within the general specialities, including urology, hand surgery, microvascular surgery, gastroenterology, endocrinology, oncology, respiratory medicine and reproductive medicine.

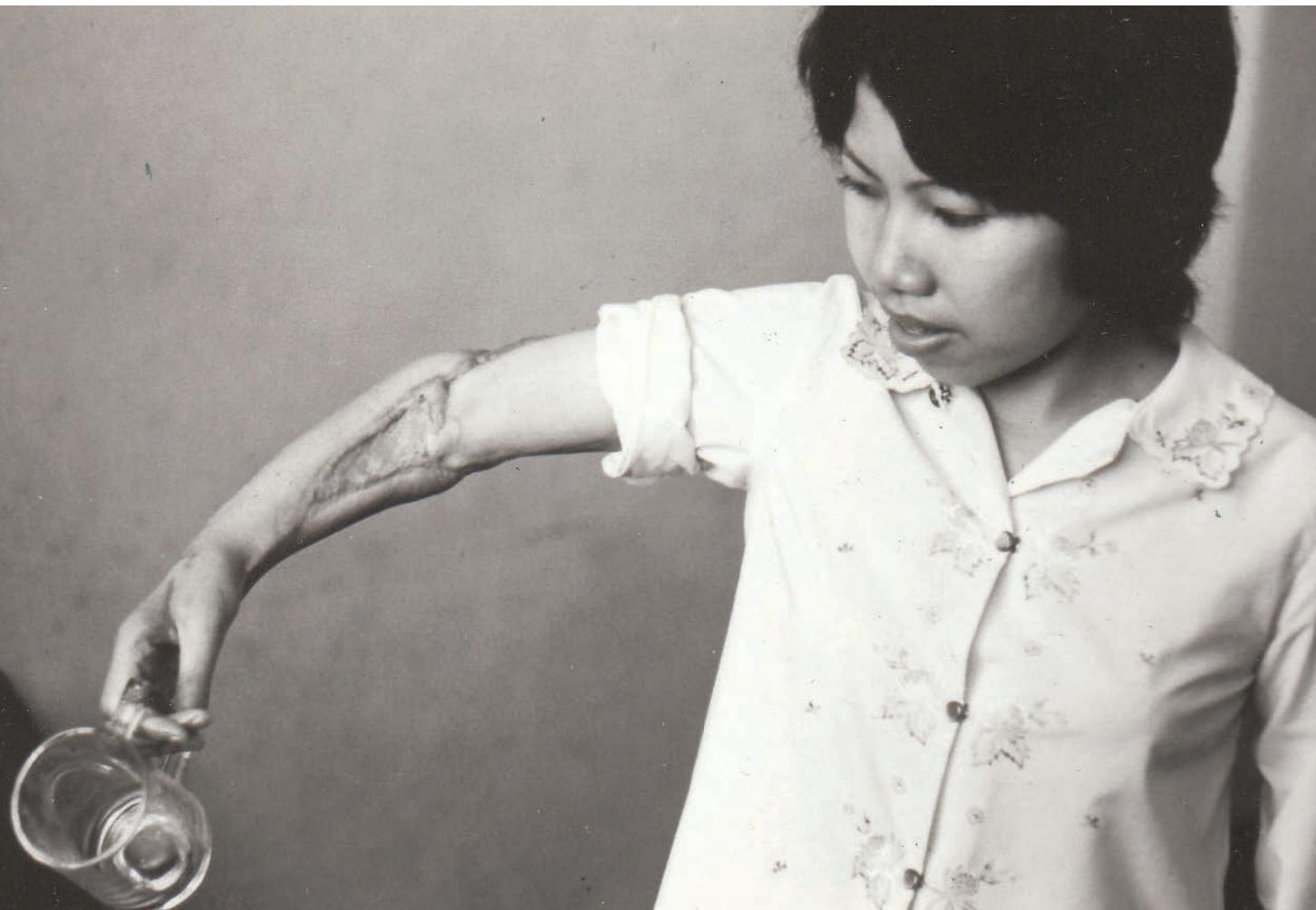
Through much effort, the acquisition of specialities and sub-specialities gained brisk momentum. For example, patients with chronic renal failure were offered new hope in 1968 when the first two patients started regular haemodialysis in SGH. Two years later, SGH carried out Singapore's first renal transplant and, in 1977, the first two living-related

▼ Handy work.... in what was Singapore's first limb reattachment surgery, doctors at Alexandra Hospital successfully re-attached 17-year-old Wong Yoke Lin's arm after it was torn off in an industrial accident in 1975.

renal transplants were performed, making the living-related donor transplant programme a success.

Limb reattachment surgery also made its mark when Alexandra Hospital, by now serving civilians after it was handed over by the British military, conducted the first such procedure of its kind in Singapore in 1975. Surgeons successfully re-attached 17-year-old Wong Yoke Lin's arm after it was torn off at the elbow when she tried to remove a jammed piece of wood from a machine she was tending at a plywood factory. Doctors at Alexandra Hospital used their medical skills and a bit of improvisation, which eventually allowed the Ipoh girl to regain the use of her arm – the reattached arm had grown cold and turned white and various attempts to resuscitate it failed until one doctor hit on the idea of soaking it in a pail of warm water to encourage blood flow.

Change was also underway in the philosophy behind provision of care for mental health patients. Prior to the 1970s, such patients could only look towards custodial care. However, the introduction of tranquillisers in the previous decade had helped to stabilise many patients, allowing them to be discharged. It also allowed the hitherto forbidding – in the eyes of the public at least – hospital to gradually remove the metal bars on many of its doors and windows.



As the years passed, there was growing recognition in the medical community that many mental patients could be rehabilitated and reintegrated into normal social life. This, coupled with better public understanding of mental health issues and hence lessening prejudice, would eventually lead to the creation of the Institute of Mental Health.

Hospital infrastructure and its adequacy to provide modern medical care also came under scrutiny and revamp. In 1971, a firm of consultant planners was hired to ascertain the requirements for hospital services over the next 20 years, to plan for these needs and to redevelop SGH. The report was completed in April 1972 and approval was given in November of the same year for construction of a new hospital in the Outram Road area.

The foundation stone of the new SGH was laid in 1975 and its doors were opened on 12 September 1981 by Prime Minister Lee.

► Mission possible... set up in 1923, St. Andrew's Mission Hospital had 60 beds exclusively for women and children.



Kwong Wai Shiu Hospital, Mt Alvernia Hospital, Muslim Missionary Society of Singapore (Jamiyah)

Caring for the community in different ways

A century of care



Dr Ow Chee Chung,
CEO, Kwong Wai Shiu Hospital

A GROUP of Cantonese immigrants founded Kwong Wai Shiu Hospital (KWSH) 105 years ago to look after the poor and needy in their community. When Tan Tock Seng Hospital relocated to Moulmein in 1909, the land was sold to KWSH via the Kwong Wai Shiu Free Hospital Ordinance by the colonial government for 99 years at a nominal price... and we have been here at Serangoon Road since.

Over the years, more buildings were constructed thanks to funds raised by the Cantonese community. Around the 1950s, a garden pavilion was added for patients to relax in. Using mainly traditional Chinese medicine, we provided outpatient and in-patient treatments for tuberculosis patients as it used to be a chronic ailment among immigrants. We also had maternity services from the moment we started this hospital.

During the Second World War, we were lucky that the Japanese forces did not take over the hospital and we could continue to serve the community. After the war ended, we tried out a lot of new services. By the 1970s, we had both Western and Chinese medical services. Since 2006, we have had a special tie-up with the National Cancer Centre Singapore to look after cancer patients too.

Nowadays, we serve the whole community regardless of ethnicity and we're going into the next phase of medical services by building a 12-storey nursing home which will be ready by the end of 2017.



Sisters of substance



Sister Agnes Tan,

Former nurse and midwife at Mt Alvernia Hospital and Regional Superior of Franciscan Missionaries of Divine Motherhood (Malaysia/Singapore)

OUR pioneer Sisters, the British and Irish Sisters of the Franciscan Missionaries of the Divine Motherhood, were part of Tan Tock Seng Hospital when they came to Singapore in the 1930s. When I started working alongside the Sisters in the Mandalay Road Hospital in 1948, I knew right away that I wanted to join them.

In 1950, I was among the second group of nurses recruited by the Sisters and went to England for training. We were very poor. The Sisters received expat salaries for their work in Tan Tock Seng and all those salaries went into a kitty that was used to build Mount Alvernia Hospital. Once the hospital was built – it opened on March 4, 1961 – the kitty was empty. The Sisters lived on the top floor and we only charged the patients \$10 a day. Whether you were rich or poor, anyone could come; quite a number of people who came to the hospital had no money.



One of these patients was a very pregnant lady who took our wood meant for the construction of one of the hospital's extensions. She told the Mother Superior at the time that her husband was a drunkard, she had eight children at home, about to give birth to the ninth child and there was no money. The Mother Superior told her to have her baby at the hospital and we wouldn't charge her. We put her in one of our small single rooms and, because she didn't have enough breast milk and was so poor, we also provided baby formula. When she was going home, we gave her milk powder and told her to come to us when she was short of milk. Every time she came, she would pick flowers and bring a bunch to us. She was grateful for what we did for her.

That was part of our start as a hospital and even though it was hard, we just did it. I am very proud of Mount Alvernia and how far we have come.

Serving the society



Dr H.M. Saleem,

Vice President I, Muslim Missionary Society of Singapore (Jamiyah)

WHEN Jamiyah was founded in 1932, our mission was to support the Muslim community in spiritual, educational and welfare matters. We were known then as the All-Malaya Muslim Missionary Society with branches in the various states of Malaysia. After the separation from Malaysia, we changed our name to the Muslim Missionary Society Singapore but we remained cordial with our former Malaysian branches.

Our real push to serve the community better began in the 1970s when Haji Abu Bakar Maidin took over as president of Jamiyah. Then we had 190 members and about \$5.60 in our fund. Now we have over 30,000 members and we have more about \$17 million a year to fund our projects. In 1975 we started our free medical clinic in Geylang, staffed by volunteer doctors and nurses. We felt we needed to help the very poor and needy members of the community. We also started a whole range of welfare homes and residential services like the Jamiyah Children's Home for orphans, Jamiyah Home for the Aged, Jamiyah Nursing Home for those needing long-term nursing care and Jamiyah Halfway House for recovering addicts. Our home for the aged is open to all Singaporeans.

Now we are embarking on expanding and upgrading our services to meet the needs of the ageing population. We are planning another nursing home and renovating our current residential medical nursing home, Darul Syifaa. Thanks to the support from the community and the Government, Jamiyah has overcome many challenges in its quest to help Singapore be a better society.





Ms Koh Shu Hua at the Lions Befrienders Senior Activity Centre.

THE NURSE NEXT DOOR

Based in the heartlands, the NUHS Community Care Team consists of nurses and care coordinators who work together with partners to deliver care to residents in the community. The Team provides services in transitional care, primary care, as well as health promotion & prevention care. They are a healthcare resource that is part of the Ministry of Health's Beyond Hospital to Community efforts.

Hoping to be more closely involved in improving the health of people, SSN Koh Shu Hua, from the NUS Nursing Class of 2012, made the switch from general ward nurse to become a community nurse after five years at NUH. She shares about what a community nurse does.

How is the job of a community nurse different from that of a ward nurse?

A community nurse provides healthcare services within the community or neighbourhood. Other than the different

daily external environment, we also have vastly different job scopes as community nurses, and must go beyond looking at medical care to also consider social factors.

A ward nurse follows a fixed schedule that includes serving medication, making rounds with the team to check on patients, and educating patients and families. As the hospitalised cases are usually severe and complex, we deal with medical emergencies as a team; most of the time there will be someone around if the patient takes a turn for the worse.

Out in the community and in homes, however, there are no routines, and anything can happen. We plan our time around patients who need our care the most. This includes assessing their health, providing the care plan, and educating them. In the home, there are no ECG machines, x-rays, nor scans. When the patient's health status deteriorates, we exercise independent clinical judgement based on experience, to assess if their condition warrants urgent medical attention. Beyond providing quality care, we also need to look into non-medical factors such as family dynamics and financial status, and link these patients up with the appropriate services or support to ensure care can continue.



Ms Koh interacting with a resident during a home visit.

I guess you could say that in the community, we are the one-stop health knowledge resource persons for residents, the 'nurse-next-door', and are there to support them regardless of their health status.

What is a typical day at work for you like?

I am involved in several targeted services to keep people healthy in the community, through early detection and management.

I start my day by first following up on messages and phone calls from patients to answer questions about their health status, and schedule home visits if required. I split the remainder of my time between visiting homes of patients, as well as providing counselling and other nursing services in the community.

Patients discharged from the hospital with complex care needs are followed up on at home, and I visit these patients to identify factors that could affect care at home, as well as provide training to their caregivers.

I also work closely with community partners such as Community Network for Seniors, who refer elderly who are at risk of developing frailty. This is part of the nationwide effort to provide care for the increasingly aged population at home. During the home visit, I identify ways to overcome their barriers in attending health screenings or appointments, and provide suggestions on how the elderly's safety at home can be improved.

For the healthy population, nursing services are

provided through a Community Health Post, set up in a Senior Activity Centre or Residents' Committee premises manned by community nurses like me. Residents can drop by to obtain health advice, counselling and monitoring of vitals.

GPs on the NUHS Primary Care Network also refer patients with chronic diseases like hypertension, hyperlipidaemia and diabetes to our team for counselling on disease and medication education, and lifestyle modifications. I then work with the GP and patient on a care plan, and set care goals to help patients care for themselves better.

What has made an impact on you (as a healthcare provider and a person)?

Community nursing exposed me to a very different patient population than what I was used to seeing. The clients in the community can be on any part of the health spectrum, from those who are healthy-looking and active, to the frail and elderly who have suffered multiple falls at home, or those who have disastrous vitals as a result of not following-up on their chronic diseases.

One client who left an impression was referred to me by a befriendee, who noticed that she had looked progressively weaker over the course of a few weeks. The client had been visually impaired for 30 years and relied on her grandson to take her outdoors. Since starting school however, he had less time, and so she stopped going for her doctor's appointments and had not left her home since. Through the home visit, we noticed that she had sustained burns while cooking for herself, and would also sometimes injure herself while putting out her laundry. Despite our



Nurses stationed at the Senior Activity Centre attending to residents.

suggestions and cajoling to have a doctor visit, or obtain visually-impaired support, she rejected all interventions. Her main goal in life, she shared, was to wait for her grandson, her only pillar of support, to enter national service.

Her case made me realise that the perception of health is different for everyone, and our interventions depended very much on her own priorities in life. I came to accept that we have to respect her decisions, until she is ready for our intervention. We continue to check on her from time to time to ensure she is supported within the community.

What motivates you in your journey as a community nurse?

In the ward I saw many patients with heart and chronic diseases which could potentially have been avoided had they been more aware and made lifestyle changes early. While I could help educate warded patients and guide them back to health, I could not do as much for their family members and children, whom I felt would benefit even more from education and preventive measures. This would stop them from going down the same path of the patients. Hence I found my calling in community nursing, to help people get and stay healthy.

I am motivated when the client is motivated to make changes. I celebrate small wins together with the client, for example when the client reports increased steps on the step tracker, or achieves better controlled blood pressure.

Through being stationed at our Community Health Post, I have met clients who came to us to learn how to better manage their own chronic diseases and health. Some residents drop by with their neighbours to understand more about diet or clarify medications. I find it heart-warming to be closely involved in empowering individuals

and the community to better manage their own health. Nothing rewards me more than celebrating their successes towards better health together, knowing that my journey was also their journey, and we walked it together.

Where do you see yourself in future?

I hope to gain more skills and health knowledge, as there is so much to learn about managing the health of a community. In becoming a better nurse, I hope to contribute to healthier communities.

A word of advice for anyone looking to be a community nurse?

Passion, compassion, patience, and the will to learn. These count as some of the most important requirements. As community nurses, we may not always see the results of our work immediately, but keep an open mind and be adaptable.

Training is available to guide community nurses in their provision of care, including health coaching, motivation and engagement techniques, other than the clinical aspects of the job.

Community nursing is dynamic as our job depends on responding to the needs on the ground, which differs for each client based on their needs, health and social situation. A lot of the time, we need to be resourceful in finding ways to help people achieve better health, within their home environment and community.

With the shift from healthcare to health, community care is definitely the future.

The NUHS community nurses are part of the integrated health and care delivery system working towards a healthy and engaged population in western Singapore.

COLLABORATIVE RESEARCH FOR THE BETTERMENT OF HUMAN HEALTH

By Associate Professor Lim Kah Leong,
Head, Department of Physiology

Some two decades ago, I was in a large academic audience gathered at a neuroscience meeting in Boston waiting eagerly to hear the latest developments in the field. As anticipated, the talks lived up to our expectations. However, the one that had left the deepest impression were the opening remarks by a Huntington's disease (HD) activist, who told the audience boldly, "Please remember that the funds you have received for your research is for the betterment of human health and not for the betterment of your individual careers".

Simple yet profound words. Joining the activist on stage was a man in a wheelchair. He was in his early 30s and had HD, a devastating brain disorder that robs sufferers of their movement control and cognitive abilities. HD patients exhibit characteristic dance-like movements known as "chorea" (etymology for the word "choreography"). Imagine trying to get around activities of daily living (e.g. drinking a cup of water, buttoning our shirt) while our limbs are seized by uncontrollable dance-like motions and we would be able to appreciate what HD patients go through every day.

The man was a pharmacy graduate who was happily married prior to his disease onset. Sadly, his wife divorced him shortly afterwards. But what was more wrenching was the man's revelation that his 8-year old child had started exhibiting signs of the disease. It was not surprising to his audience, as we know that HD is an inheritable brain disorder that will hit subsequent generations progressively earlier in a phenomenon known as "anticipation".

Nonetheless, the words of the HD activist (who spoke after the HD patient's testimony) must have resonated with the audience. It was certainly a powerful message and in a way, a cry for help to biomedical researchers to focus on finding ways to mitigate the disease rather than finding ways to elevate their own academic reputations.

Research for new knowledge, or a search for answers?

Fast forward to the present – in a recent speech at the Leaders of Science Forum, Mr. Chan Chun Sing, Minister for Trade and Industry, asked, "How do we define success for all of us in this hall?". He then suggested an answer: "Many people will judge our success from many different dimensions. Some look at input, some look at output, but I hope you will look at outcomes."¹ Among the several outcome measures that Minister Chan has alluded to is the translation of scientific results into clinical and therapeutic solutions that would help to improve the quality of life of people. This is consistent with Singapore's recent rapid and aggressive move into translational biomedical research.

But what is translational research? To different people, it may mean different things. Notwithstanding the ensuing

debate on the meaning of translational research, I suspect that most if not all biomedical researchers would appreciate that the end point of translational research, at least within the realm of medicine, is the development of a promising new treatment that could be applied in the clinical setting. I also believe that many basic scientists working on human diseases have this end point in mind, notwithstanding that their research is generally regarded as more upstream and at times, esoteric.

To help bridge bench to bedside research, it is noteworthy that the Government had aimed to generate 160 clinician-scientists (CS) by 2015². By virtue of their clinical and research training, clinician-scientists are well positioned to formulate and address scientific questions in the laboratory that are of direct relevance to the problems that they have encountered in the clinic. However, this would require doctors to spend a significant amount of time and effort in the laboratory, while fulfilling their typically demanding clinical duties. This is particularly challenging for young clinicians, who also need to chalk up enough clinical experience to sit for their specialist examinations.

Yet this is the very group that we need to aggressively target to refresh and replenish the pool of clinician-scientists in Singapore. The willingness to get out of their comfort zones, whether spending substantial amounts of time in research would help in their career development and promotion, the bonus that they would earn at the end of the year – these are pragmatic considerations that will influence the decision of clinicians considering careers in research. The numbers are telling. By 2016, only two thirds of the projected number of clinician scientists to be recruited had been achieved³.

Translational research the be-all and end-all?

The push for translational research is a global phenomenon. In Singapore, the game has changed in a fast and furious manner in a mere few years that followed (Research, Innovation, Enterprise) – RIE 2015. During this period, the biomedical scientific community has witnessed the transformation of the research landscape from a curiosity-driven one to an environment emphasising the need for “Return on Investments (ROI)”. Under the RIE2020 Human Biomedical Science framework, the Ministry of Health identified five research areas of national priority, namely Cancers, Cardiovascular diseases, Diabetes Mellitus and other Metabolic/endocrine disorders, Infectious diseases, and Neurological and Sense Disorders.

These areas were chosen based primarily on the impact of the disease on our healthcare system and the availability of a critical mass of locally-based scientific talent who have the potential to find meaningful solutions to these health challenges. A task force for each of these disease areas was established to help determine specific problem statements and to develop research roadmaps toward solving the problems identified.

Each panel comprised a multidisciplinary group of experts in different domains. I was a member of the Neurological and Sense Disorders Taskforce Panel that includes clinician-scientists, basic scientists, a health service expert and an engineer. I also chaired its subpanel on Age-related diseases and complications. All in all, it took us nearly a year of discussions that included several panel meetings and a couple of “townhall-like” sessions with the neuroscience community at large to come up with our recommendations to the HBMS EXCO. We have articulated to the committee our collective strategic research roadmap to tackle the major neurological and sense disorders that Singapore is facing, in view of the increasing numbers of ageing people here. These recommendations include pathways to translate research discoveries into healthcare solutions, innovative medicines or medical devices for value creation and capture. Likewise, the various other taskforces also took similar lengths of time over their deliberations and proposals. All the materials from various taskforces are available online and I often encourage my colleagues to read them to get a better understanding on what are the research areas of strategic priority to this country.

Whither basic science research?

It is well known that biomedical science research requires a long gestational period for results to be seen. It is also well known that pragmatism is an active gene in the DNA of Singapore. To drive translational research, we have seen in recent years that the National Medical Research Council (NMRC), a staple grant funding agency for academic biomedical researchers, has tweaked their criteria significantly to better support research that is more downstream. Meanwhile, extra-mural funding from the Biomedical Research Council (BMRC) that traditionally supports Basic Science Research had disappeared altogether (It is now consolidated with the NMRC to support translational research).

I still remember the shock and disbelief felt by the Basic Science Community on learning the news of the BMRC removing its extramural funding for researchers in public institutions. One visiting senior investigator from the UK had even suggested to me to hold a demonstration to rally for support for basic science research funding. He told me the efforts of the Science is Vital group in the UK, a grassroots campaigning organisation formed in 2010 by a group of concerned scientists and supporters to combat threats to the public R&D budget⁴.

I thought that it was a preposterous proposition and immediately laughed it off, telling him politely that this is not how things are done in Singapore. However, it is evident that Basic Science research is progressively being circumscribed by current funding criteria. Even universities, which theoretically should represent safe havens for esoteric research, are not spared. Whilst the academic leadership appreciates the importance of what I refer to as the “sanctity of knowledge” that universities must protect,

a very senior member has advised me to be pragmatic, saying that "without money, you cannot do research".

The twain must meet

So, in our quest for translational research and outcomes, is there room for basic research? I often say that Basic-Translational-Clinical Research is a continuum. Without basic research, I wonder whose research discoveries would we be translating. However, given its unpredictability and long gestational period, many would argue that public funds should be better spent on research that is more downstream and which could directly impact human health.

Interestingly, in a recent blog entitled "Basic Research: Building a Firm Foundation for Biomedicine", National Institute of Health (NIH) Director Francis Collins highlighted that "In an analysis of more than 28 million papers in the PubMed.gov database, researchers found NIH contributed to published research that was associated with every single one of the 210 new drugs approved by the Food and Drug Administration from 2010 through 2016"⁵. He concluded by saying that "All in all, the findings show that the contribution of publicly supported basic science to the development of the most promising recent new therapeutic advances has been even greater than had been appreciated. As we look ahead to the future, the biomedical advances needed to protect and improve our health—and the health of generations to come—will continue to depend on a firm foundation of knowledge built on basic research."⁵

Indeed, basic science research represents the bedrock of Medicine. The recent advancement in CRISPR/Cas9 genome editing technology that holds tremendous promise for correcting genetic mutations in humans (think HD) would not have been possible without its initial and rather accidental discovery in microbes. It was certainly not a purposeful translational-type research that led to the discovery of this revolutionary genome editing method.

The same could be said of PCR, which is now routinely used in the clinic for diagnostic applications. In developing novel therapeutics for incurable diseases like HD, it is pertinent to first understand the disease mechanism before a therapeutic roadmap could be conceived. To allow the lay reader to appreciate this, consider what it takes to repair an analog watch that is broken, then think how the watchsmith so easily fixes that broken watch.

Ditto the car mechanic who repairs a vehicle. The mechanism is key to fixing anything that is broken, be it an inanimate machine or the human body. However, knowing how each molecular player works in the body and how they are all interwoven in a tapestry of pathogenic pathways during disease states could appear to be complicated, esoteric and irrelevant as they are seemingly so far removed from downstream clinical applications. This is where

mindsets have to change. This is also where basic scientists need to make more effort to engage clinicians, as well as the powers that be and the public, to help them understand the nature and promise of Basic Science research.

To move translational research forward, it is first important to recognise that we need both the upstream (i.e. Basic) and downstream (i.e. Clinical) engines. Whilst CS are pivotal in this equation, they alone will not be able to solve the problem. To put it colloquially, it would take a whole "kampong" to find solutions to seemingly insolvable clinical problems. For a start, we need to develop a common vocabulary for the two communities to understand each other, as it is well known that Basic Scientists and Clinicians tend to speak different languages.

A meeting of minds and equals

We also need to develop equitable partnerships between the two groups in scientific collaborations. I am aware that there are scientists who view their clinical partners as "cash-cows" and clinicians who view their basic science collaborators as "workhorses". Unless and until we treat each other as equals, little could be achieved. Obviously, finding time to shadow each other's profession would be an excellent way to promote mutual respect, understanding and trust. It would also be good to weave into the medical curriculum, topics that emphasise the importance of basic science research in clinical practice so that medical students who would eventually populate our hospitals could gain an appreciation of this aspect of biomedical work at the beginning of their careers.

Finally, it is important for all of us to recognise that Singapore is a small country with limited resources. Collaboration, not competition, is therefore the way to go. Developing partnerships across different institutions is important to establishing national resources to deal with diseases that we urgently need to combat. This will help maximise research productivity and minimise duplication of efforts.

Nearly twenty years later, the words of the HD activist that I listened to in Boston still reverberate in my head. I often remind myself that there is no place for ego in the search for solutions to human health problems. Since then, my philosophy of doing science has been simple: "Winning prizes is motivational, understanding the science of life is fundamental, but improving human lives as a result is monumental."

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PRIMARY CARE RESEARCH: NOW MORE THAN EVER

By Professor Doris Young,
Head, Department of Family Medicine,
National University Health System

Primary Care Research Gap

As I write this, many of Singapore's General Practitioners/ Family Physicians will be engaging with people seeking primary or first contact medical care. This will be happening in the consultation room, over the phone, on home visits and in many varied locations. People will also be seeking primary care services from nurses, pharmacists, traditional Chinese medicine and other health practitioners.

However, many of the clinical decisions these health practitioners make will be taken on the basis of unsubstantiated evidence. There is concern all around the world, that there is simply not enough research conducted in primary care, to deliver the necessary evidence.

Why is this so, when so much health care takes place in primary care settings? And yet, the majority of research funding supports research into one specific disease, organ system and molecular or biochemical processes – rather than being spent on family /general practice or primary care. Very little is known about important topics such as how primary care services are best organised, how to maximise and prioritise care, how to introduce and disseminate new discoveries so they work in real life, and how patients can best decide how and when to seek care and learn to manage their own care.

Research in primary care in Singapore – Why it's needed

Most public and population health researchers would argue that research in primary care is essential in order to test and improve clinical practice and question population data. We also have to improve the organisation and delivery of primary care services in order to provide value and quality of care to the community we serve. Furthermore, we must question the beliefs and behaviour of our patients and engage and empower them to work together to improve the quality of their care and to improve health outcomes. The recent Singapore health policy stipulated the Three Beyonds: beyond hospital to the community, health care to health and quality to value. This vision needs to be delivered by establishing new innovative models



Primary care research translates science into the practice of medicine and caring for patients. It provides further understanding of how to better organise health care to meet patient and population needs. It develops and evaluates innovations to provide the best health care to patients by engaging patients, communities, and practices to improve Health Research Sciences.

of care and alongside the new services, requires rigorous research methodologies to engage primary care providers and users of the care.

Types of research in family practice and primary care

At the outset, it is important to point out that Family Medicine and Primary Care research is different from public/ population health research. We collaborate with Public Health and other clinical specialist colleagues, but we primarily generate research questions aiming to improve care delivery to our patients at the Primary Care interface involving nursing and other allied health professionals. It is often known as implementation and translational research, influences practice and policy using mixed research methods. The gold standard is conducting pragmatic complex intervention clinical trials to improve health outcomes in the primary care setting, linking closely to the community.

Primary care research translates science into the practice of medicine and caring for patients. It provides further understanding of how to better organise healthcare to meet patient and population needs. It develops and evaluates innovations to provide the best healthcare to patients by engaging patients, communities, and practices to improve Health Research Sciences.

Some examples of primary care research trends

As the population ages and chronic diseases and multiple morbidities increase, primary care researchers respond by developing new innovative models of care through empowering and engaging with their patient communities using new digital technologies. As primary care doctors have more patient encounters than any other medical specialists, they have a vital role to play in the screening and assessment of patients for chronic diseases as well as follow up using evidence based guidelines. Therefore, interventions to address the barriers to and facilitators of bowel cancer, cervical and breast screenings are best performed in the primary care settings.

We need to screen and manage the high prevalence of mental health conditions such as depression and anxiety presented to primary care, often as co-morbidities of chronic disease. The pre-frail and frail elderly should also be screened and managed when they present to the family physicians. So the research questions are: What are the best ways to do this? How much funding do we need and what training do doctors need to do this well? How do we engage the doctors and the patients? How do we measure successes and failures?

Some research trends in primary care include the following:

- Type 2 diabetes: prevention, detection and management, Continuous Glucose Monitoring (CGM)
- Trial innovative models of care for people with chronic diseases in the primary care settings
- Ageing and aged care research: screening for falls prevention, detection of dementia
- Mental health: anxiety and depression as singular or co-morbidity
- Modify patterns of care for population groups (chronic disease management, preventative health, mental health, aged care)
- Effectiveness of health services delivery using digitalisation in primary care
- Interest in health outcomes measures (quality of life scales) and burden of diseases
- Amalgamation of large datasets to study populations (AI)
- Health inequalities and disadvantaged populations – need to target high risk group as they present to primary care health professionals

ALL IN THE FAMILY



Growing primary care researchers

In order to build primary care research, we need a critical mass. There are not enough well-trained researchers in primary care, because most primary care health professionals such as family doctors and nurses are focused on service delivery.

We need specific funding for primary care-based health services research, such as the UK NHS-funded National Institute for Health Research (NIHR), which has a School for primary care research as well as social care and public health. To date in Singapore and in other parts of the world, most research funding goes to laboratory and hospital-based research and little investment is made in academic Family Medicine and primary care research. It is also evident that academic primary care is strong in countries where substantial levels of research funding are available for general practice/family medicine and primary care research and researchers. However, this amount of funding still lags behind those engaged in biomedical sciences research.

Training for Family Doctors, Nurses, Allied Health professionals to pursue research has to be enhanced. We need to increase the number of clinical staff in primary care with research and development expertise. We need to achieve an evidence-based culture in primary care. In order

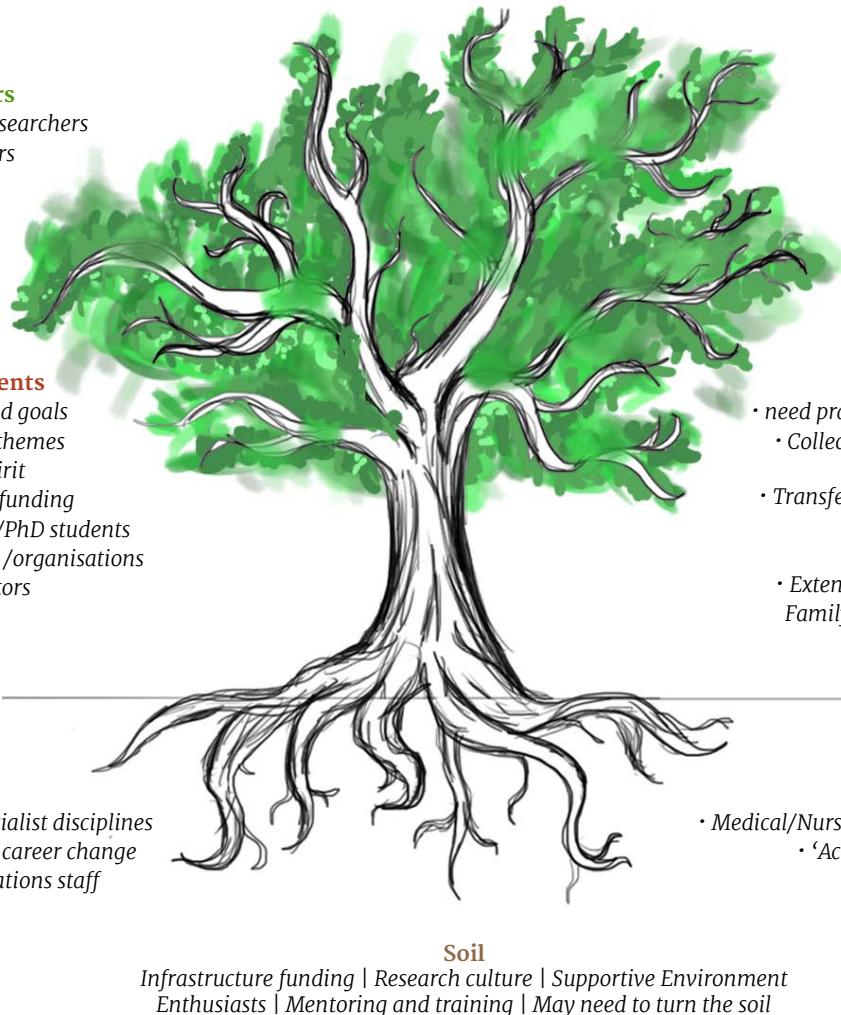
to do this well, we need to give those conducting research protected time for research and development, through flexible appointments with linked clinical and protected academic sessions. Universities need to develop research training courses and offer higher degrees such as Masters/ PhDs in primary care research with coursework modules that are relevant to general/ family practice. Finally, there must be a clinical academic career pathway for those who wish to combine clinical work and research.

Ways forward for primary care research

- All patients attending primary care services be given opportunity to participate in research
- Primary care research community need to provide more rapid response to new and emerging infectious diseases in the community
- Primary care community need to gain better understanding of the impact of environment, population and individual risk factors on the health of their patients eg domestic violence, genetic predisposition, health literacy, poverty etc
- Utilisation of new technologies to conduct and disseminate research eg mobile devices, internet-based interventions

ALL IN THE FAMILY

To grow Primary care researchers is akin to growing a tree.
The essentials are soil, seeds, growth factors (environment).



- Primary care researchers be more active in engaging in social and political debates to influence policy makers and funding bodies.

The primary care strategy that is established includes a framework and support for regional primary care research networks (PCRNs) Table*

Such networks be linked to academic departments of Family Medicine and Primary Care with links to nursing and other primary care clinical professional groups. Should include structures for community education, engagement and representation

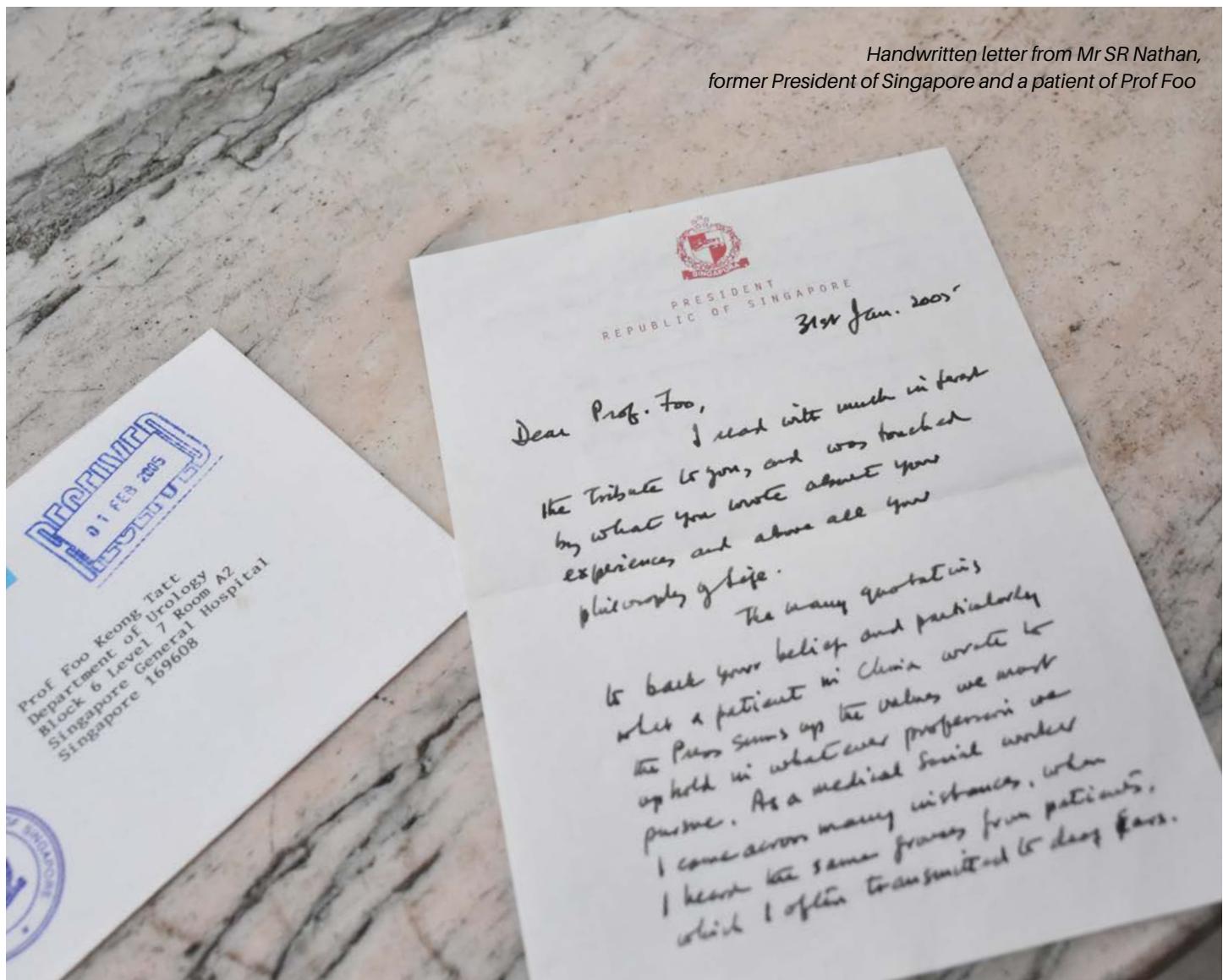
Such networks should be supported by targeted funding and contractual arrangement allowing dedicated time and resources for active participation of practitioners.

Integrated approach to building sustainable Primary Care leadership and research capacity

Tasks ahead for Department of Family Medicine at NUHS

Now, more than ever, we need to build a high performing and sustainable Family Medicine and Primary Care research programme. We need to attract a multidisciplinary research team to be housed in the Department of Family Medicine. Attitudes to 'research' must be changed. We need sustainable Infrastructure and funding to build research themes and programmes. We have to display and disseminate research achievements in various media and act as a clearing house for research expertise, training and mentoring. National and International research co-operation needs to be established to build Primary care research capacity.

ALUMNI VOICES



EVERY MAN'S BEST FRIEND

Professor Foo Keong Tatt, Emeritus Senior Consultant at the Singapore General Hospital (SGH), championed the practice of Urology in Singapore, pioneering the transurethral resection of the prostate (TURP) procedure here. The trailblazer has taught and inspired generations of clinicians and students and was recognised as 'Alumnus of the year' at the inaugural Alumni Awards organised by NUS Medicine in 2018. The alumnus from the Class of 1965 shares insights from his life's work.



Prof Foo and his classmates had to push their vehicle which ran out of petrol along the Malaysian motorway. Prof Foo is at the rear, with Dr Liew Kuen Hoe, the late Prof Chan Heng Leong and Dr Chan Khai Poh.

Scouting his way to medicine

Born and bred in Penang in the 1940s, Professor Foo grew up with eight siblings and attended the village Chinese primary school. He then transferred to an English school in the district capital. He was good at mathematics and planned to take up engineering as a career. But thanks to the Boy Scouts movement, his ambition gradually changed. When the National University of Singapore was officially formed in 1962, we were there to raise the flag at the ceremony at Bukit Timah Campus,” he recalled.

Prof Foo fondly recalls his medical student days, such as when he tried in vain to take blood from a patient because he could not locate the veins. His tutor patiently coaxed him through the procedure, instead of taking over the task. It is something that he remembers with gratitude because it allowed him to learn from initial failure and to persist. He laughs about how his clinical group also had to take turns to ventilate patients during night duties ('pumping duty') as there was no respirator in those days.

Then there was also the occasional drama. “There was a fire at the library in College of Medicine building next to our hall one day, and the fire damaged the library and the Allen and Farris lecture theatres. We had to quickly help and move out the library books.”

There was also plenty of fun. Once, Prof Foo and his friends took a road trip to Kuala Lumpur to attend a scholarship interview. The car ran out of petrol midway, and they had to push the car to the next petrol station along the Malaysian motorway.

A chance meeting, romance and NUS' gain

After graduation, he returned to Malaysia for his housemanship and served National Service in Kota Bahru as a Medical Officer. He was posted to Surgery to replace the then medical officer who was allergic to gloves and unable to do surgery.

Surgical training at the University Hospital in Kuala Lumpur came next: the hospital had just been established and was under the directorship of Professor T.J. Danaraj, former Dean of Medicine.

“That’s where I met my wife. She was a trainee in the O&G department. We were bringing patients for clinical rounds and we lost our way for a meeting in the hospital. We chatted and got to know one another.”

After completing his training in 1970, Prof Foo went to the UK for his postgraduate (FRCS) and residency, while his wife went to Edinburgh. They got married in Scotland.



Prof Foo at work.

The question about where they were going to live and work was settled after an offer arrived from Singapore. "The University of Singapore answered me first, so we came here in 1972 and joined the University as a lecturer."

Prof Foo began specialising in Urology in 1976 when he was offered the Smith and Nephew's Fellowship and spent his sabbatical in London and Cambridge for a year. Transurethral resection of the prostate (TURP) had just been introduced as a new procedure internationally, and the head of the NUH Department of Surgery then, Professor Ong Siew Chey, encouraged him to learn transurethral work as there was a need for it at that time.

Prof Foo returned to Singapore to establish transurethral surgery as the procedure of choice for treating obstructing prostates. The transurethral surgical procedures eventually distinguished the specialty of Urology from General Surgery and helped to further Urology as a specialty in Singapore.

The urology pioneer

In the 1980s, the Singapore General Hospital wanted to form a department specialising in Urology.

Prof Foo and two other colleagues, Dr Tan Eng Choon and Dr Tung Kean Hin, spent their weekends collecting urological cases, doing clinical research and writing papers and got them published. All the hard work had been done without funding, he noted. What they had was their determination to build Urology as a specialty.

In 1988, the first Urology department in Singapore was finally formed at SGH with Prof Foo as the inaugural head of department. Its staff comprised two consultants and two registrars. The department celebrated its thirtieth anniversary in 2018 with 12 consultants, six registrars and trainees.

Prof Foo also founded the Singapore Urological Association in 1986. Fast forward three decades and the Association today has more than 90 members along with a structured training programme and examinations conducted by the Joint Committee for Specialists Training (JCST).

Lauding him as the Father of Singapore Urology in 2007, the Singapore Medical Association noted Prof Foo's



Prof Foo was recognised as 'Alumnus of the year' at the inaugural Alumni Awards organised by NUS Medicine in 2018.

significant contributions to the development of the specialty here, his dedication to the training of generations of urologists who continue his good work and are now serving actively in various hospitals. It also noted the founding of the Singapore Urological Association, with him as its first President in 1986, his service as the Secretary General of the Urological Association of Asia for the last eight years, and also as Honorary Executive Director of the Association. In both capacities, he helped to put Singapore on the map of urology in Asia and the world.

The art of balance

One of the reasons that Prof Foo remained in institutional practice was to fulfil his passion for teaching. "Developing young minds is very important. I think now the main difference is to teach the younger generation not to over-treat. They tend to pay too much attention to science, but actually practising medicine is balancing the science as well as the art; the art of medicine may be more important. Whatever you do, there is always a risk. If you do too much, the patient may be worse off... it's very important for us to treat the patients individually, to consider various aspects and treat them as a whole."

He rattles off six Chinese characters that he learnt from Professor Wu Jieping, a pioneer of Urology in China:

“一切为了病人,为了病人一切, 为了一切病人”

Translation: "Everything we do should be in the interest of the patient, and we should look after the patient as a whole. Treating all patients, irrespective of class or creed."

"The important thing is to individualise the treatment of patients. The younger generations might know about the latest controlled trials and technologies, but to apply them to real life situations require experience. That is why it is important to keep experienced doctors to be around to supervise them."

One good example of treating patients as a whole, is in the management of Benign Prostate Hyperplasia (BPH), a common problem worldwide. Prof Foo helped to define the clinical disease as an adenoma, and classified according to the grade of the disease, evidenced by the degree of the growth's intrusion into the bladder (intravesical protrusion of prostate or IPP) and seen on



Prof Foo and his calligraphy.

clinical ultrasound. This has helped to treat this common disease more cost effectively. IPP was cited by Prof Claus G Roehrborn in the American Urological Association (AUA) lecture, at the European Urological Association (EAU) meeting in London in 2017, attended by more than 10,000 participants. It is a moment that Prof Foo remembers with pride.

A man for all seasons

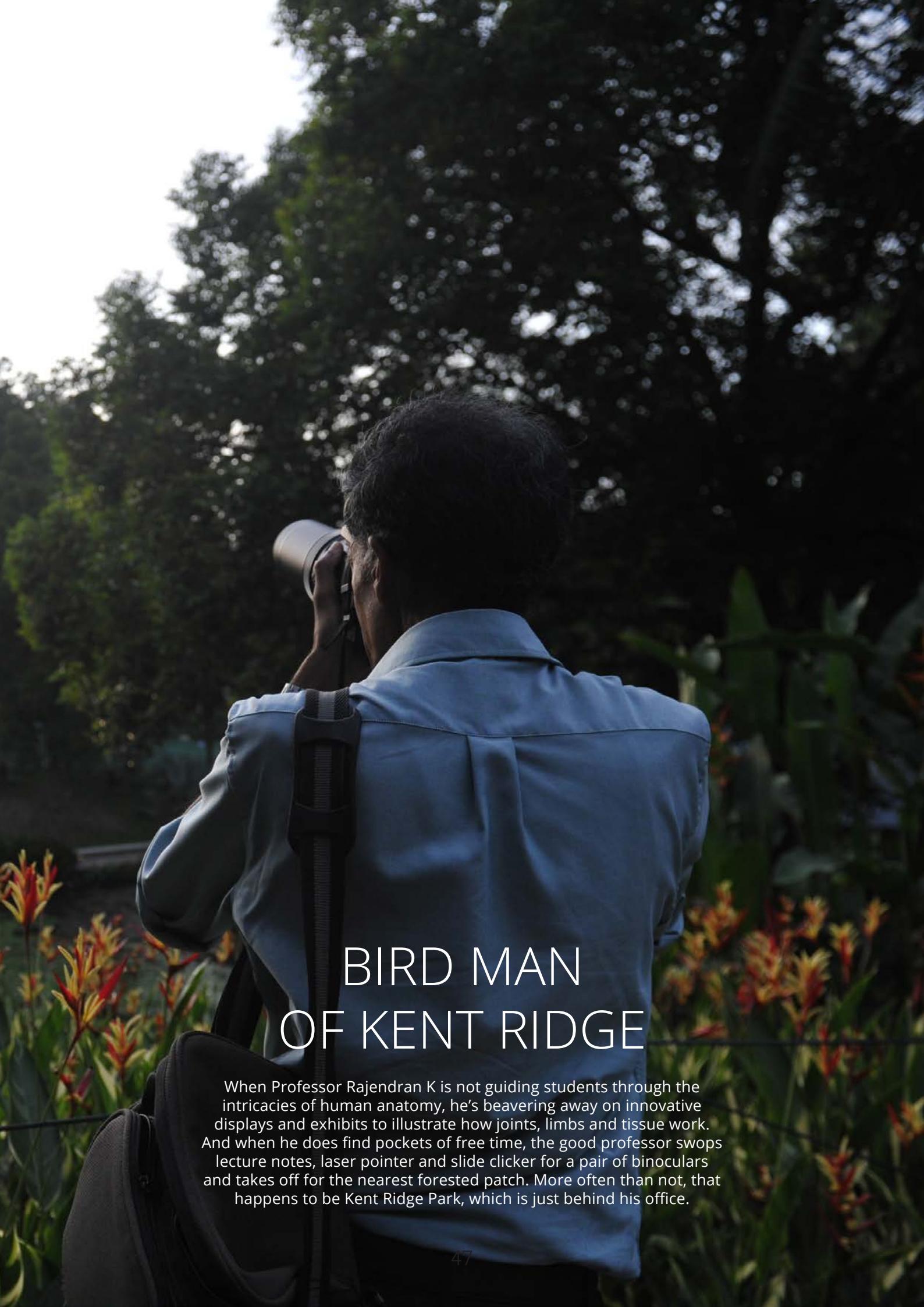
Prof Foo still works a five-day week and juggles teaching and clinical work and research.

He keeps cards, letters and thank you notes from students, patients and colleagues, including a handwritten letter from then-President Mr SR Nathan. He also has his diary, logs and copies of his letters to his family in Penang from his college days. His brother is also an alumnus from the Class of 1969.

Outside of work, the 77-year-old treasures his personal time with his wife and their 27-year-old son, a musician, and daughter-in-law.

He keeps in touch with his extended family and relatives in China, Malaysia and Singapore, plays the Chinese flute, paints, practises calligraphy and does water colour paintings, swims, t ai chi and meditates.

Being mindful and relaxed boosts the immune system, and is key to preventing illnesses and maintaining good health, he says. It's good, sound, fluid advice, one might say.



BIRD MAN OF KENT RIDGE

When Professor Rajendran K is not guiding students through the intricacies of human anatomy, he's beavering away on innovative displays and exhibits to illustrate how joints, limbs and tissue work. And when he does find pockets of free time, the good professor swaps lecture notes, laser pointer and slide clicker for a pair of binoculars and takes off for the nearest forested patch. More often than not, that happens to be Kent Ridge Park, which is just behind his office.



Crimson Sunbird

There, he lets the other love of his life take flight – birdwatching. And there are quite a number to train his binoculars on, he says. These range from native species to migratory flocks that stop over on their way to distant lands. Just as Singapore has much to offer homo sapien tourists, the island appears to be an irresistible port of call for visitors of the feathered kind.

The variety of birds in Singapore has also increased and Prof Raj reckons there are possibly between 100 and 200 species that are resident here. The bird population may also have been boosted by people who release their unwanted pets into the wild. The numbers also swell with the addition of species like the glossy starling, the egret and the hornbill, all of which have made the Little Red Dot home.

“We are truly a garden city, which means birds have sufficient greenery for them to move from one area to the next without having to fly too long. They also have sufficient space and the range of environmental conditions that they need to settle down. I think in that sense, Singapore’s Garden City concept is a major success.”

When Prof Raj was five years old, his mother sparked his interest in birds by pointing out the different breeds that they saw, such as the magpie robin and the tailorbird, whose nest was situated in a little plant in their garden at home.

However, as close as he has been able to get to his subjects, he does not accept the idea of birds as pets.

“I think they are best observed in their natural environment,” he said. Despite the highly urbanised environment, places like the West Coast Park, Sungei Buloh and Pulau Ubin also offer good vantage points from which to observe myriad species.

Technology helps birdwatching take flight

As with all other aspects of life, technology has enabled and enhanced the bird spotting experience.

“The support in terms of equipment has improved tremendously over the years, and there hasn’t been a better time to have an interest in birds,” he said. On most of his forays, the professor is armed with his



Hornbills

rusty pair of binoculars as well as a camera kitted with telephoto zoom lens.

"Many birds were out of reach, because they were too small or too far away. Now, the equipment has brought them closer," he said.

"The most rewarding birdwatching experience is when a rare and interesting bird you were hoping to 'capture' appears out of nowhere and up close. The rewarding experiences are quite endless, like getting a fleeting woodpecker or tailorbird at Kent Ridge Park. Such birds appear and disappear very quickly."

"There are also equally disappointing moments when you see an opportunity and you don't have your camera."

Naturally, native species are always on his watch list, even when he is traveling. So when Prof Raj visits his sisters in Adelaide, he also spends time photographing the different varieties of feathered wildlife there.

"My favourite bird probably remains the one that I have

not photographed yet. It has to be something rare and attractive to be interesting," he said.

For years, Prof Raj had waited in vain to capture the crimson sunbird up close. Then he struck gold on Christmas Eve at the Orchid Garden last year – there, right in front of him was the object of his long search, perched on a bush. He was able to snap several photos of the striking creature, resplendent in its signature red feathered outfit.

"It was like the best Christmas gift," he said, the glee of finally getting that prized photograph still evident.

In birdwatching, sight goes with sound. Over the years, Prof Rajendran has also learned to identify various bird calls.

"Some bird sounds take a long time to distinguish because they overlap with other bird calls, but you get used to it, it's like a person's voice or a piece of music. When you hear it, you know it's there. I think it's an exciting part of birdwatching, hearing the birds and knowing they are there," he said.



Common Kingfisher

Singapore a many-feathered splendour

Over the years, Prof Raj noticed that the habits of local birds changed.

"Birds have become more familiarised with people today. In those days, you could easily observe the javan mynahs, sparrows and pigeons. Now, they come closer and closer, and become easily accessible, so they may not interest you too much," he said.

Although Singapore offers birds a good living environment with plenty of fauna and flora, Prof Raj believes more can be done for them, such as continuing to ensure new developments do not interrupt the nests of birds in wooded areas.

Since birds are generally shy, the seasoned spotter recommends watchers dress in dull-coloured clothing, move gently and avoid eye contact with the objects of their admiration.

Striking a balance

In 2010, Prof Raj decided to share carefully curated photographs that he took of bird species by publishing

them in a desktop calendar. He gave copies to colleagues and friends, many of whom were surprised and delighted by his photographic skills. The photos that accompany this article feature in the 2019 calendar, which like the previous years, was an instant hit.

Having taught at NUS Medicine for close to 40 years, he finds his work life and hobby intertwined.

"My belief is your job is only complete if it allows you to keep your hobbies. If you don't have your hobbies, you are not living a balanced life. Your hobbies define you, and if you cannot be yourself, it is a minor tragedy. Working here has given me the chance to indulge in my hobby," Prof Rajsaid.

"Birdwatching has kept me connected to nature and made me aware of the importance of human beings being sensitive to nature. In nature, there is a balance, every living thing is part of it. Seeing the birds successfully surviving in the environment, I think it's a good sign which speaks for Singapore's efforts at keeping our natural environment good."



HELP OF THE HELPLESS

"Do you need a reason to help others?"

That response, gently rendered to a journalist who sought to understand the basis of Dr Oon Chiew Seng's lifelong concern for the aged and disadvantaged, was a neat summary of the beliefs and conviction that have energised the NUS alumna through a long and distinguished career.

Trailblazing medical student, pioneering obstetrician and gynaecologist, philanthropist, ardent champion for dementia care – Dr Oon's abiding compassion for the poor, disadvantaged and needy has led her to take on a variety of roles and responsibilities. It has also culminated in her establishment of a trust dedicated to helping dementia patients as well as her philanthropic support for research into ageing-related illness.

Born in 1916 in Penang to a businessman father and housewife, Dr Oon pursued medical studies here and in India during World War II, and returned to work under Professor Benjamin Henry Sheares (who became Singapore's President) at the Kandang Kerbau Hospital. While she has lost count of the number of babies she has delivered, their parents remember the doctor who helped to bring their children into the world. Here and even in New York, she would run into people who wanted to express their gratitude for safely delivering their babies many years ago.

Besides her work in obstetrics and gynaecology, Dr Oon's other passion lay in caring for the elderly and sick. It led her to serve as Chairman of the Building Fund and Member of the Medical Committee of the Sree Narayana Mission Home for the Aged Sick from 1984 to 2000.



When she retired in 1991, the mah-jong exponent did not sit back. She wanted to do more for the elderly. Learning that Singapore needed a dementia home, she set out to learn about dementia home care in Australia.

Eventually, she managed to procure funding of about \$2 million a year for the Apex Harmony Lodge at Pasir Ris, the first purpose-built lodge that cares for dementia patients in Singapore. She relinquished her role as Chairman of the Apex Harmony Lodge Management Committee in 2011, but retains a keen interest in the Lodge's work.

Her gift that same year to the NUS to inaugurate the Oon Chiew Seng Fellowship in Medicine – later converted to the Oon Chiew Seng Professorship - has greatly enhanced the Yong Loo Lin School of Medicine's effort to provide quality medical education and undertake translational research in the fields of ageing and dementia. Students, faculty, healthcare professionals and patients will greatly benefit from the talent that the professorship will attract. Professorships established at NUS Medicine act as magnets for world-class academic talent. Top academics in their turn, will drive the strong, transformative research and education programmes important to informing the thinking and work of policy makers, and the efforts by community service organisations, ultimately helping those with neurodegenerative conditions such as dementia and those who seek to help them. The Professorship is also supported by various notable individuals, including Ms Ho Ching, Chief Executive Officer of Temasek Holdings. She is one of the countless babies delivered by Dr Oon.

"My mother always spoke fondly of Dr Oon and her role in getting me safely delivered in Kandang Kerbau Hospital. Having grown up hearing about her and meeting her for the first time when I visited the Apex Harmony Lodge some years ago, I was very impressed that at over 80 years old, she went around the world to study homes for elderly dementia and Alzheimer's patients, before she started one here in Singapore. The Apex Harmony Lodge was very thoughtfully designed, and it reflects not just the care, but also the meticulous thinking and drive that Dr Oon has," shared Ms Ho.

Explaining what started her on her lifelong journey of caring for others, Dr Oon said, "When I was young, I saw my late father helping many people in need. They used to come to our house along Scotland Road and he would help them. I witnessed his good deeds and decided that I would like to do the same."

They say home is where the heart is: a living, breathing space where our most deeply held values and beliefs are formed. Dr Oon's journey began at home – witnessing transformative experiences that led to an affirmation of her own Believe-In-Giving spirit – and since then, that journey has brought much warmth and comfort to thousands – helping to transform and improve the quality of life for many. Singapore is a better place because of the humanitarianism of Dr Oon Chiew Seng.

FEBRUARY

MARCH

APRIL

19-22 **February**

Workshop: Grant Writing
NUHS Tower Block

26-27 **February**

**Workshop: Fundamentals of
Simulation-Based Healthcare Education**
Level 3, Centre for Healthcare Simulation,
Centre for Translational Medicine (MD 6), NUS

06 **March**

Workshop: SCRI Grant Writing
Clinical Research Centre (MD 11), NUS

21-22 **March**

**Cochin Institute-NUS MSC Cancer Programme
Joint Symposium**
Cochin Institute, Paris, France

27-29 **March**

**14th NUS-Nagasaki-LSHTM Symposium
on Infectious Disease**
Centre for Translational Medicine (MD 6), NUS

30 **April**

**Workshop: Debriefing in Simulation-based
Healthcare Education**
Level 3, Centre for Healthcare Simulation,
Centre for Translational Medicine (MD 6), NUS

Details are subject to change.

Inspiring Health For All



Yong Loo Lin
School of Medicine