

# MediCine

A publication of the Yong Loo Lin School of Medicine • Issue 19 / August 2016

## THE RUN OF THEIR LIVES



# DEAN'S MESSAGE



Dear Reader,

As August rolls around, we welcome the Class of 2021 that has just embarked on the first year of their MBBS studies here at the Yong Loo Lin School of Medicine. We also congratulate the Class of 2016 upon their graduation and hope the medical knowledge and clinical skills they acquired over the last five years will be put to good use in service of the community.

I have said on various occasions that our students do the School proud. Not because they are uncommonly brilliant in their academic excellence, and impressively determined to succeed in their medical studies here at NUS Medicine. Rather, what we find heartening and commendable are their compassion, zest and an earnest desire to want to help make things better for the needy and the unfortunate.

The young men and women who choose to embark on careers in medicine undergo a gruelling, lengthy course of study that is characterised by long days and nights spent at lectures and tutorials, in hospital wards and clinics. Despite this load, many of them are heavily and enthusiastically involved in voluntary projects that share this common purpose and aim of helping the needy and less privileged in our society. It is involvement – and commitment – of the sort that takes up after-school hours, weekend rest time as well as vacation breaks and sees our students engrossed and absorbed in project work and related activities. Four of our medical students exemplify this admirable quality in their support for a cause that they embraced.

These four Year 4 students observed during their hospital postings, the struggles which mental health patients go through, in coping with their illnesses as well as the accompanying social stigmatisation that is still unfortunately applied to mental illness. The students decided that they would try to draw public attention to the plight of mental health patients, and also raise funds for the Singapore Association for Mental Health.

They chose to do this by taking part in a 7-day, 250km ultra-marathon in the Namibia desert in May this year. They set aside time from very busy study schedules to train over the course of six months. They passed up on opportunities to go on elective courses at medical schools overseas so that they could continue to train together. They also carefully chose a name for themselves – Mental Muscle. It was a name that underlined the psychological as well as physical durability needed for the race. It also defined the gritty toughness that is needed by mental health patients in their attempts to cope with their illnesses as well as societal ignorance. The Mental Muscle team comprising Jonathan See, Jon Tan Jui-Ern, Nicholas Eu and Stephen Hwang are of course safely home, having successfully completed their race and they have commenced their fifth and final year of medical studies.

I believe that these four students are on their way to becoming excellent doctors. They saw a need, and they responded with compassion and bold, imaginative and decisive action. It did not matter that they were just students, or that they were a mere quartet. This awesome foursome have succeeded in helping to raise awareness of mental health issues in an imaginative and captivating way. Donations to the SAMH continue to come in. These four students modelled the qualities that NUS Medicine aspires to inculcate in all our graduates. They also demonstrated in a very palpable way what quality of character is, and the boundless and transformational possibilities which it has power to bring about.

Warmest wishes,  
Khay Guan

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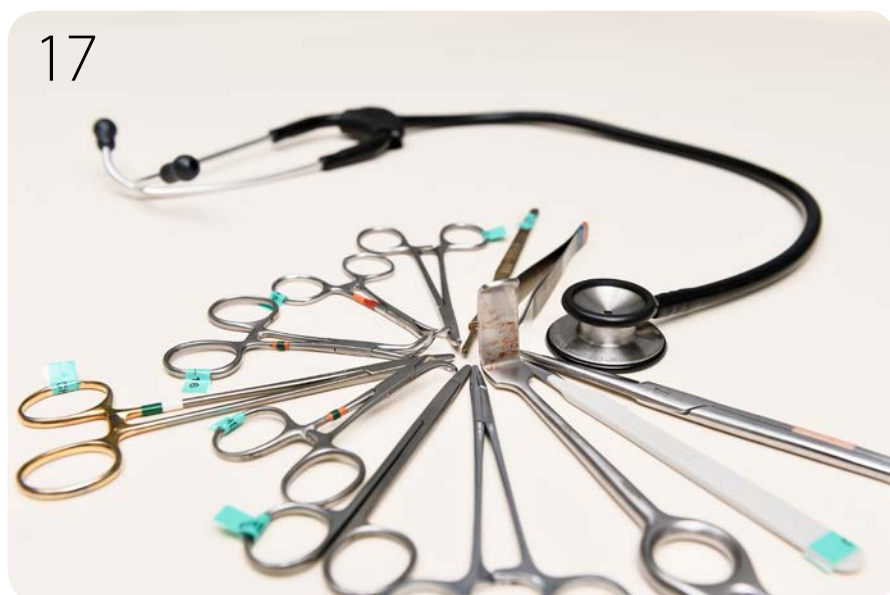
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## MEDICAL DINNER 2016

**BSC (NURSING) 2016 GRADUATE SURESH S/O RAJASEKARAM REFLECTS ON MEDICAL DINNER 2016.**

Medical Dinner 2016 was held at the Raffles City Convention Centre with the theme of celebrating the medical teaching community. Traditionally, this event has been planned and organised by staff of the Dean's Office.

This year, the organising committee included student representatives from Medicine, Nursing and the Department of Pharmacy to provide fresh and exciting ideas from the ground up. The committee decided on a few surprise items in the night's programme, including a flash mob performance that was executed with precision. The main highlight of this event was saying thank you to a very important group of people.

The core of medical teaching would of course be our educators, who tirelessly strive to ensure students receive quality education and training. So it was most appropriate therefore that the graduating Class of 2016 delivered tribute videos to thank their mentors. These mentors created memorable experiences of university life for their students. Many of us took away important lessons in and out of the classroom. In saying thank you, the students recounted how it was like for them to attend their very first lesson with a professor known to be the strictest around. Another student narrated how she felt during a practical session on delivering a baby: it was a session that came with all the sights and sounds!



Through the video, and the many conversations that took place throughout dinner that July 3rd evening, we were able to thank all our mentors for their great work and for making our learning journeys very memorable ones.



## A BURSARY TO COMMEMORATE A FALLEN CLASSMATE

Christine Chong Hui Xian, a third-year medical student, passed away from brain lymphoma in 2009.

But to this day, the legacy of her indomitable spirit and determination continues to impact the lives of medical students at NUS Medicine, through a bursary named after her that provides financial aid for needy students.

The NUS Medical Society Christine Chong Hui Xian Bursary was established by her classmates in the Class of 2012 as a tribute to a girl who was courageous, possessed an unflagging positive spirit, and who strove to complete her microbiology examinations despite the gravity of her illness. The establishment of the bursary was important to Christine's classmates, who envisioned that its recipients would strive to be the kind of doctor she would have been. It was also made possible with additional support from external organisations like the Goh Keng Swee Foundation and the Lee Foundation.

Dr Sin Yong, who was Christine's classmate, staged a magic show in 2012 to raise funds for the bursary and will hold another show, entitled "*Imagine*" in September as a tribute to all donors.

"*Imagine* aims to encourage students as well as working healthcare professionals to hold on to the same goodness that Christine held

on to. We want them to develop the same kind of bravery, boldness and perseverance so that wherever we are, we will strive for kindness to change and shape the world together," he said.

Natalie Lai, one of the bursary's recipients who is currently in Phase 2, believes that the bursary award has done exactly that for her. "The bursary was a great relief for me and has eased my financial concerns, allowing me to fully concentrate on my studies. It would be a blessing to be able to pass on this spirit of giving in the future."

The School believes that one in four of our medical students will need financial aid within the next few years. The Christine Chong bursary has helped 10 medical students to date, and with the support of more donors will be able to help many more.

Dr Sin Yong's "*Imagine*" promises a showcase of dazzling magic effects and visual illusions and will be staged on 16 and 17 September, from 7pm to 9pm at the NUHS auditorium. Admission is free.

Readers are invited to attend the show by registering their interest through this link: <http://bit.ly/1tzAN2O>

Please support a needy medical student by making a gift to the 'NUS Medical Society Christine Chong Hui Xian Bursary' through our [online donation portal](#).

Interested to establish a class bursary or a bursary in honour of a loved one?

Contact us at [giving\\_med@nuhs.edu.sg](mailto:giving_med@nuhs.edu.sg) or call us at 6772 3737.



## PARENTS LEND HELPING HAND TO CHILDREN'S CLASSMATES

Parents often want to give the world to their children, showering them with love, support and guidance. One parent, however, decided she could give something far more impactful and lasting: she rallied the parents of her son's schoolmates at the National University of Singapore (NUS) Yong Loo Lin School of Medicine, to set up a bursary for financially needy students.

"A few lives are made easier by not having to worry about taking the MRT before the cut-off timing for free rides to save money, the same few lives will make a bigger impact in other lives when they graduate than I ever could on my own," said Madam Tan, mother of a student from the Class of 2020. Motivated to help change a few lives, her first step towards fundraising has already raised awareness amongst many parents of the plight of the less privileged medical students in the class. In the process of rallying volunteers and donors, more and more parents not only contributed to the fund, but also joined her in the fundraising efforts.

"I knew just a handful of the other mums of my son schoolmates, but felt that as long as two or three of us got started, this could snowball. So the first mum introduced the second mum, and we

got to work. I felt that once we were able to raise the minimum for a fund to be established, it would be easier to approach the wider group of 2020 parents later on. But someone needed to kickstart the fund, and why not me," said Madam Tan.

Another Class of 2020 parent also known as Madam Tan, was glad for the opportunity to work alongside the University to help needy students.

"I became involved after I was personally approached by a couple of fellow parents of the Class of 2020. Since then, I have become more aware of the students' needs," she explained.

Every year, about 200 students apply for financial assistance, a number that surpasses what the School can disburse. It is estimated that one in four medical students will face financial difficulties that will jeopardise their studies.

Both mothers are two homemakers who hope to demonstrate love by example to their children. Their efforts however, will leave a far greater impact on the Class of 2020, and inspire many other parents to do the same.

**Story reproduced with permission of the NUS Development Office.**



## NUCLEAR DNA WHEN CUT ACTIVATES IMMUNE SYSTEM TO ATTACK CANCER CELLS

The conventional wisdom about cancer cells is that they are masters of camouflage, invisible to the immune system. However, occasionally, the immune system is alerted to the presence of a cancer cell and springs into action to attack it.

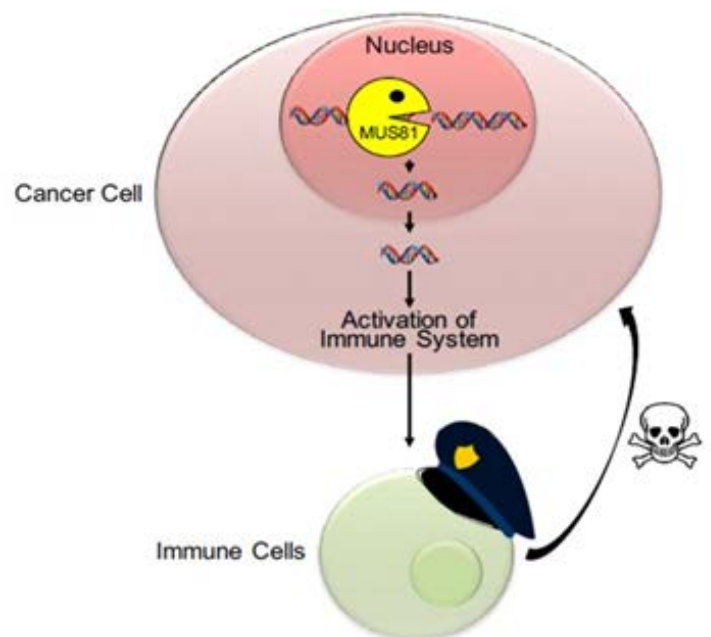
A new study led by Assistant Professor Stephan Gasser of the Department of Microbiology and Immunology at NUS Medicine has identified a snitch that “reveals” cancer cells to the immune system. Published online on 10 May 2016 in the prestigious journal *Immunity*, the study found that when an enzyme called MUS81 cuts DNA in the nucleus, the DNA is not degraded, but rather moves to the cytoplasm in cancer cells. DNA being in the wrong place alerts the immune system, triggering it to attack cancer cells.

Dr Samantha Ho, the first author of the article, and colleagues in the laboratory of Asst Prof Gasser found that out-of-place DNA in cancer cells activates the immune system by producing a substance called interferon that activates immune cells called macrophages and T cells to kill cancer cells. MUS81 plays an essential role in this killing of cancer cells because nuclear DNA was not cut in cancer cells that lacked the enzyme and no activation of the immune system was observed in these cells.

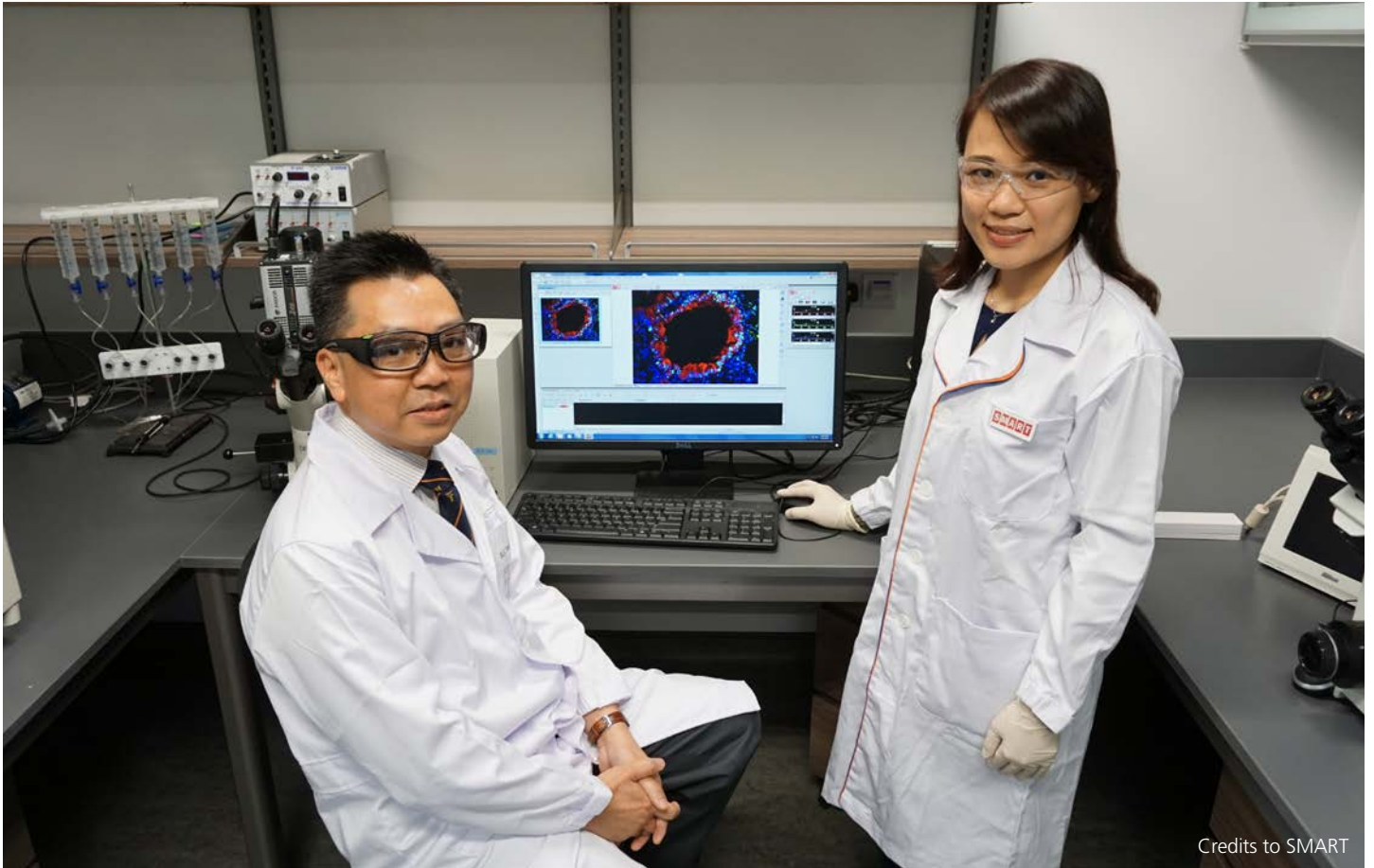
Although most of the work has been carried out using *in vivo* studies, Asst Prof Gasser has been collaborating with Dr Joanne Ngeow at the National Cancer Centre Singapore to characterise the process in different types of human tumours. Their preliminary findings indicate that MUS81-induced movement of DNA to the cytosol also occurs in human cancer cells, including prostate cancer, breast cancer, colorectal cancer, uterine cancer, leukemia, and melanoma cells.

Discovering this process in cancer cells has wider implications beyond just describing a phenomenon. Several of the current chemotherapies against cancer activate MUS81 and may therefore trigger a stronger immune response. These therapies could enhance the effects of novel cancer immunotherapies when used in combination, resulting in better health outcomes for cancer patients.

“Through our ongoing collaborative efforts, we hope to explore if our findings here apply to other cancer types as well,” says Dr Joanne Ngeow, Senior Consultant Medical Oncologist at the National Cancer Centre Singapore. “Such studies further our fundamental understanding about how our cells detect cellular damage. Such an understanding can hopefully serve to allow us to devise methods for detecting cancer earlier, as well as pave the way for novel therapeutic strategies.”



**By cutting DNA in the nucleus of a cancer cell, the enzyme MUS81 triggers an immune attack against the cancer cell.**



Credits to SMART

## HOUSE DUST MITES CAUSE DNA DAMAGE AND CELL DEATH IN LUNG, WORSENING ASTHMA

Asthma affects 300 million people globally, with 250,000 people dying from it every year. The house dust mite (HDM) is a major cause of allergic asthma, with approximately 50% to 80% of asthmatic patients found to be allergic to HDM. Approximately 0.3 mm in size, as many as 2 million dust mites can infest an average-sized mattress.

The allergic response to HDM has been well characterised. However, another damaging effect of HDM has now been reported by researchers at the Department of Pharmacology of NUS Medicine and the Singapore-MIT Alliance for Research and Technology (SMART). The researchers found that HDM directly causes DNA damage and cell death in lung epithelial cells, the cells lining the airways in the lung. The work was published online on May 2 in the *Journal of Allergy and Clinical Immunology*, the most cited journal in its field.

Reactive oxygen and nitrogen species (RONS) released by activated immune cells are potent inducers of DNA damage. SMART PhD student Tze Khee Chan, along with her advisors Associate Professor W.S. Fred Wong of Department of Pharmacology, NUS and Professor Bevin Engelward of Massachusetts Institute of Technology (MIT) and

other colleagues, discovered that the lung epithelial cells themselves produce RONS in response to HDM. The RONS can potentially damage the DNA of the lung epithelial cells. If the damaged DNA is not adequately repaired, it could lead to cell death and promote inflammation that worsens asthma.

In response to DNA damage, the cell's DNA repair machinery kicks into gear. This is the system that is constantly fixing errors in the DNA that occur because of environmental assaults or as a by-product of cell division. The authors found that blocking DNA repair resulted in more DNA damage and cell death in both cultured lung epithelial cells and an experimental mouse asthma model. Thus, a person's DNA repair capability could help to determine how susceptible that person is to developing chronic asthma. These findings provide new insights into the processes underlying allergic asthma and suggest new ways to predict susceptibility for the disease.

### FACT BOX

#### DNA Repair and Asthma:

- In asthma, DNA damage in lung epithelial cells activates the DNA repair process
- DNA repair may help to keep airways in the lung functioning properly
- Blocking DNA repair causes more DNA damage and cell death

**An individual's DNA repair capacity could help to determine how susceptible he or she is to developing asthma**





## LOWER DOSAGE SAFER FOR STROKE PATIENTS

Treatment for ischaemic stroke can be made safer (especially for patients with inherently higher risk of bleeding) by reducing the dose of clot-buster tissue plasminogen activator (tPA) by a third, a new study by neurologist Vijay Sharma, associate professor at NUS Medicine and his research partners shows.

The Enhanced Control of Hypertension and Thrombolysis Stroke Study (ENCHANTED), which was conducted in 13 countries, enrolled a total of 3,310 predominantly Asian (63%) stroke patients who were eligible for clot-busting therapy and randomly assigned them to be treated with alteplase, a recombinant tPA (r-tPA), at either the approved standard dose of 0.9 mg per kilogram body weight or an experimental lower dose of 0.6 mg per kilogram body weight. The primary outcome measure of the trial was the rate of death or disability after 90 days.

The result of the study published in the May 10 issue of The New England Journal of Medicine (NEJM) reveals that reducing the dose of alteplase by 33% significantly decreased incidents of symptomatic intracerebral bleeding (1.0% vs. 2.1% in the standard-dose group). The improvements may appear small numerically, but Assoc Prof Sharma explains how clinical impact can be substantial. "Annually, on the global scale, improving a complication rate by just one percent has the potential to save tens of thousands of people." He and his research partner, Professor Craig Anderson of The George Institute for Global Health, in Sydney, Australia designed the research study.

Lowering the dose of alteplase also helped more patients to survive a stroke, but with a trade-off—more patients on the lower dose ended up with residual physical disability after 90 days. For every 1000 patients given the lower dose of alteplase, there were 19 fewer deaths than in the group given the standard dose of the drug. But 41 more patients were left with mild to moderately severe grades of physical disability. "A reduced dose may not provide such a good recovery of function," notes Assoc Prof Sharma, "but for patients with an intrinsic high risk of bleeding, it is better (to receive a lower dose) than receiving nothing at all. And being alive with some recovery as a result of r-tPA is surely preferable to most patients than early death."

In spite of the safety advantage shown, ENCHANTED failed to show non-inferiority of the lower dose of alteplase to the standard dose; 53.2% of patients given the lower dose of alteplase suffered disability or died by 90 days, while only 51.1% of patients given the standard dose suffered the same fate (odds ratio, 1.09). ENCHANTED's finding will not change current clinical practice guidelines on tPA dose regimen, but it certainly provides clinicians a strong basis to consider a reduced dose of tPA to mitigate the risk of life-threatening intracerebral haemorrhage in individuals prone to bleeding. "Clinicians can lower the dose off-label, with the consent of the patient," Assoc Prof Sharma assures.

He reiterates the importance of the on-going research, emphasizing what they seek is "a very high degree of precision in balancing the risks versus benefits of r-tPA". "We are making the treatment simpler, cheaper and safer."



## DEAR DOCTOR

PROFESSOR LOW CHENG HOCK, EMERITUS  
CONSULTANT, GENERAL SURGERY, TAN TOCK  
SENG HOSPITAL, WRITES TO THE NUS MEDICINE  
CLASS OF 2016.

My Dear Child (and Fellow Doctor),

It seems just yesterday that I watched you walk up the stage to receive your white coat and begin a grueling five-year journey to becoming a doctor. And now I see you walk up the same stage to receive your degree.

And your name grows longer with the addition of four letters – MBBS. This new state comes with heavy responsibilities... keep to your principles and you will find your journey fulfilling...

I hope you are taking your year of the "baptism of fire", aka "internship" in good stride. Keep your spirit high. There is no better thing for the heart than to be able to help lift somebody up and medicine gives you that opportunity.

To be a good doctor you will need hardware and HEARTware.

Your hardware are the computers, robots, simulation machines etc. and they are absolutely necessary. Your HEARTware are compassion, empathy, kindness, professionalism, ethical principles, patience and the human touch. These are just as important. Hardware helps to make you a doctor... but it is HEARTware that makes you a healer. I hope you will acquire these values as you progress along your medical journey.

Remember, patients are our main concern. They are the reasons for our existence and they are often our best teachers. It's not the gallstone in bed 23 or the jaundice in Room 3. It is Mr Lin and Mrs Tan, the uncle and aunty.

I learnt the meaning of compassion in my third year in medical school, when I saw one of my teachers, Prof Donald Gunn, walk to a child who was badly deformed. His eyes were far apart and the bones were all crooked. Prof Gunn lifted the child up and gave him a hug. It made the child smile. A crooked but beautiful smile, one that could only come from a child who was so lacking in attention and love, that while I have forgotten all about Apert Syndrome today, I can always recall Prof Gunn's lesson in love and compassion.

We must always remember that years of clinical practice can harden our heart muscles and numb our souls. We need to constantly lubricate with the milk of compassion, because the heart of medical education is the education of the heart.



Prof Low with his medical students.



Prof Low receiving a commemorative plaque from the NUS Medical Society in 2012.

There may be times of discouragement. Remember there are many people out there who would willingly trade places with us. Be grateful for what we have. Internship is top of the medical hill but it is the first step in a lifelong medical journey. So, never stop learning. It is a lifelong process.

Be humble; learn from everyone.

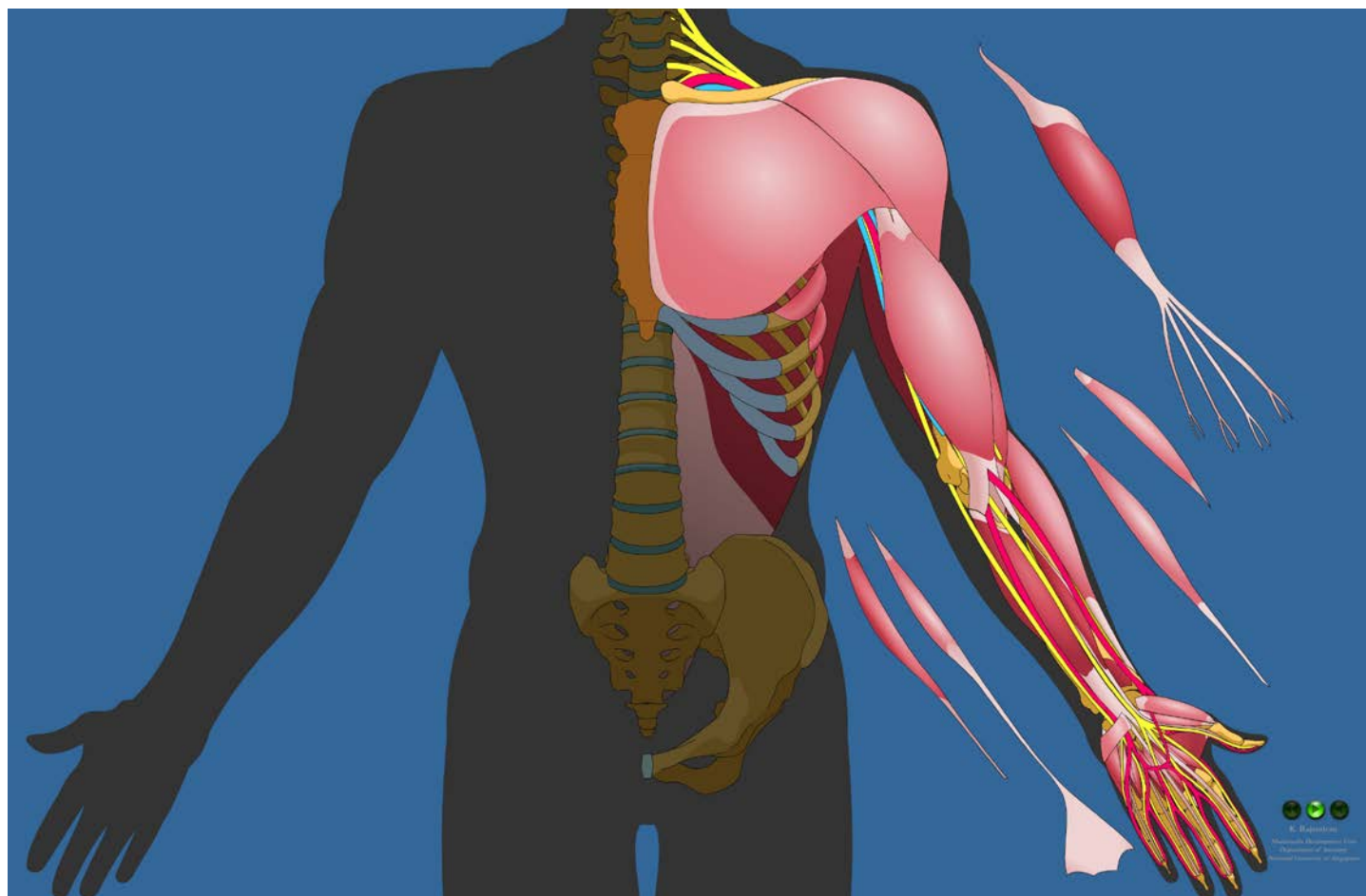
The nurse knows more about tubes and catheters in the ward than you, the OT attendant knows the lightings adjustment better than you.

Humility is a humble pie whose taste is sweet. Or, in the words of Thomas Carlyle, "Every man is my superior in that I may learn from him."

Help each other along the way. Stand on each other's shoulders so that you can see further and contribute more. In the search for medical expertise there are no borders and in the service of medicine the sky has no limits.

And so, dear Doctor, in your hands and on your shoulders rest the responsibilities of moulding a new generation of doctors, who must be greater than the past and who are also in tune with visions of the future. You have what it takes to be a very good doctor, someone who will serve the country well and help add years to life, while adding life to years.

CH



## THE ART BEHIND THE SCIENCE

ARTIST AND ILLUSTRATOR BAY SONG LIN IS DRIVEN BY A PASSION TO GIVE LIFE TO THE DEAD.

Few people can claim to do what Song Lin does on a daily basis – and fewer still the people who have been at it for as long as she has done.

### GIFTED FROM THE START

She is the long-time in-house illustrator at the Department of Anatomy, where she draws detailed pictures of human anatomical structures. A regular day for Song Lin is mostly spent on the computer, or at times, in the Anatomy Museum. Using Adobe Flash or Photoshop, she digitally creates, or enhances and adds effects to photographs of body parts. Some of these graphics illustrate the different layers of skin and blood vessels that lie beneath the flesh. Others are drag and drop slides that students use in interactive learning. These animations give life to the words in textbooks, and help illustrate the finer workings of the body and its systems, such as how arteries, veins and muscles are intertwined.

Work is labour intensive, like the animation of a foetus developing in the womb (one of many parallel projects) that took her 3 - 4 months to create – almost one-third the gestational duration of a baby. Creating muscles is also a tricky and arduous process. When specimens are not available, Song Lin has to create them from scratch digitally. That's when Gray's Anatomy comes in handy. "I probably pore over the pages in the textbook more times than medical students!" the mother of a 15-year-old boy chuckles.

The Nanyang Academy of Fine Arts alumna began doodling the moment she learnt to hold a pencil. She went on to pursue formal training in graphic design and worked in publications and website development before joining the Department of Anatomy in 2002.

Her maiden visit to the Kent Ridge campus included a visit to the then-Anatomy Hall where she was shown a cadaver on a trolley. Her prospective employers wanted to be sure she wasn't uncomfortable working with human remains, she recollected. Far from it. Instead, she views the department's Silent Mentors (as the donated bodies are referred to by staff and students) as key teachers who unselfishly help students to understand the masterpiece that is the human body.

### A KEEN STUDENT

Through her work, Song Lin believes she's helping students to learn better. "It's not just about drawing; I get to learn also." Her passion is tangible as she shares about visits to the Anatomy museum to

# PEOPLE OF NUS MEDICINE



A colour pencil drawing of the old Anatomy hall at Sepoy Lines



Song Lin at work

study specimens and hours poring over Atlases of Anatomy, simply because she would not know how to draw these body parts if she does not read up. She also works closely with the Department's professors to ensure that the illustrations are done accurately.

## AN ARTIST AT HEART

In her spare time, Song Lin also enjoys drawing and spending time with her husband, an art teacher, and her son, John. She shows us a portrait of John done with colour pencils, and one of tree roots, one of her favourites to draw because of its resemblance to blood vessels (see Contents page). The avid artist is most comfortable with pencil and paper. Earlier this year, she did a drawing of the early medical school facility at Sepoy Lines. The work was presented to Health Minister Gan Kim Yong at the opening of the Human Anatomy Teaching Facility in April. The late Chua Ek Kay is her favourite Singaporean artist and his mural at the Clarke Quay MRT station is one of her favourites. "His style is natural and unrestrained, and his strokes are very confident. I admire those whose styles are 'free', like the Impressionist style," she says. When it comes to style, Song Lin's departmental colleagues and generations of students who have pored over her illustrations would agree that she's in her own league.



A portrait of Song Lin's son, John, rendered via colour pencils



## THE RUN OF THEIR LIVES

Moved by the struggle of mentally ill patients against disease and stigmatisation, four NUS Medicine undergraduate students embarked on a 7-day, 250km ultramarathon in May in the Namibia desert to highlight their plight. Their effort received widespread media coverage and helped to raise funds for the Singapore Association for Mental Health. Safely home and on the cusp of their final year in medical school, Jonathan See, Stephen Hwang, Nicholas Eu and Tan Jui-Ern, Jon reflect on their epic journey.



Just a year ago, none of us would have imagined completing a 250km run in the heat of a desert. But what started out as a dream became reality as we crossed the finish line of The Sahara Race (Namibia) 2016 on 7th May.

## GETTING INTO SHAPE

Training and preparing for this race was tough, and every “first” was painfully memorable – the first time we sprinted up Pinnacle@Duxton, our lungs were burning. The first time we ran a full marathon, our joints ached so badly that we walked around the hospital wards like penguins. The first time we dug our feet deep into the soft desert sand, we felt like we were barely moving. Of course, this was a lot easier to bear as we were undertaking the race together as four buddies. We trained 2 - 3 times a week, and in the short span of nine months, we also contacted four groups of Singaporeans who had run the desert race for advice on preparation.

For all our expectations, training and preparation, there were still areas we were unprepared for when we started off on the actual race. One thing that far surpassed our expectation was how the cumulative distance of 250km took a huge toll on our joints, and made every step in the second half of the race unbearably painful. Yet despite the challenges on the course, we eventually managed to pull through together. To us, that was all we asked for, to complete the race safely as a team.

## WHY WE RAN

Many have asked us why we did what we did and our answer is that we wanted to help change the way Singaporeans view mental

illness and people who had mental health problems. We too held ignorant and prejudiced views about mental illnesses and patients. Unwittingly, we contributed to their stigmatisation. The realisation that this stigma is so deeply rooted in us, our family and friends, and the rest of society is a jarring one, especially after seeing how it affects patients and their loved ones.

In the hospitals we were posted to, we saw patients who only sought help after years of suffering in silence, as they were afraid of the repercussions of being labeled as people with mental illness. We saw patients whose families and friends had abandoned them because they could no longer accept their behaviour and did not want to be associated with them. Even families who remained supportive suffered as neighbours and friends began avoiding them. We witnessed the widespread and invasive effects of this prejudice towards mental illnesses and resolved to make a difference in whatever small way we could.

## COUNTING THE COST

But working on this project and trying to make a difference was never easy. On top of training, we had to plan and manage the public awareness campaign, fundraising and numerous other administrative responsibilities. There were many days where we went to school with only 2 - 3 hours of sleep the night before and along the way, there were many sacrifices that we had to make. Some of us had to forgo opportunities for exchange studies at prestigious medical schools overseas. Others entered elective postings feeling unprepared, tired and facing disappointment from our tutors because we had not read up on the topics sufficiently. To make time for the race, we also sacrificed the precious 2-week break that we had between Year 4 and Year 5 of medical school.



Nevertheless, what kept us going was the knowledge of the impact that our project was creating. Whenever we received an email from a person suffering from mental illness seeking help, or one from someone offering to volunteer at the Singapore Association for Mental Health, it brightened our day to know that we had reached people who now know more about mental health. While our fundraising is still short of our \$50,000 goal, seeing it grow slowly over time, knowing that our project will be able to contribute financially to the SAMH and people with mental illnesses is also very satisfying. Each time the SAMH tells us how our project has raised awareness about their organisation, we feel extremely grateful, and moments like this keep us going.

## LESSONS LEARNT

There are numerous lessons we have learnt through our journey. During the Race, we met a competitor called Simon Wheatcroft. He had lost his sight at age 17 due to a degenerative eye condition. He was the first blind competitor in 4 Deserts history to attempt the race without a human guide, using only a handheld GPS guiding device. Despite withdrawing after three stages, he epitomised the spirit of the race and was awarded the Spirit Award by the race organisers. During his award acceptance speech, Wheatcroft bravely summarised his feelings in seven words: "I failed, but I will be back". His example, as well as the stories of people struggling with their mental illness are lessons that we treasure. These have taught us much about what it means to have determination, and to keep coming back despite setbacks.

Home again and the Race behind us, we have turned our focus to completing our final year of medical studies. Like everyone else, we are regular medical students, anxious about our upcoming, final year, worried whether we are sufficiently prepared for MBBS exams. But going through the Race has reminded us of how much each of us can do as a person. As we see more and more patients in medical school and over the course of our medical careers, we end up recognising only our ability to help people as doctors.

We determine our value on the basis of how well we can cure a patient or how accurate our diagnosis is. After a while, we lose sight of how a simple conversation with that patient could enhance the value of a clinical diagnosis. Yes, we are medical students, but the awareness of mental illness and the funds that we have helped to raise by embarking on the Sahara Race was something that we did as four ordinary people who saw and responded to a societal need. The Race is an endeavour, one which stands as a constant reminder to us that there is only so much we can do as doctors, that while we practice the science of medicine, we should always remember the human touch that is so vital in the healing process.

**If you wish to donate to Mental Muscle's fund for the SAMH, please visit <https://give.asia/donate/new/mental-muscle-sahara-race-namibia-2016#/steps/form>**





***“This was not guilt: guilt is what you feel when you have done something wrong. What I felt was shame: I was what was wrong.”***

*Atul Gawande – Complications: A Surgeon's Notes  
on an Imperfect Science*

The practice of medicine is fraught with psycho-social-legal uncertainties and complexities that range from the unusual to the subliminal. Right or wrong? Now or never? To tell or to keep quiet? To carry on or to discontinue? A biomedical ethicist discusses the existential dilemmas confronting doctors, while a clinician highlights challenges faced by healthcare professionals here in the course of their work and identifies pathways to their resolution.



## HAS MEDICINE SOLD ITS SOUL?

BY PROF ALASTAIR CAMPBELL,  
CENTRE FOR BIOMEDICAL ETHICS

In *Doctored: The Disillusionment of an American Physician*, Dr Sandeep Jauhar writes:

***“Most of us went into their medicine to help people, not to follow corporate directives or to maximise income. We want to practice medicine the right way, but too many forces today are propelling us away from the bench or the bedside.”***

Jauhar’s sense of betrayal and personal failure is common among many doctors today. They embarked on the practice of medicine full of high ideals, choosing it as a career, not just for prestige and a good income, but because they wanted

to help people in their time of need, to make a difference in patients’ lives, as they battle with illness or disability. But the disillusionment comes early on, as shown by many studies of medical students – as the joke puts it, they progress, not from pre-clinical to clinical phases of study, but from pre-cynical to cynical! Their youthful idealism fades as they encounter the realities of medical practice today and work with some senior doctors who seem to be interested only in money and personal fame, not in the health of their patients.

So what has gone wrong? – and can we fix it? The ancient story of Faust’s pact with the devil seems to capture my concern about what has happened to modern medicine. Faust is a scholar who is depressed and bored with his life, and so he sells his soul to Mephistopheles, the devil’s emissary, in return for 24 years of riches and pleasure. In one version of the tale (to be found in *Dr Faustus* by Christopher Marlowe) the pact with the devil has its inevitable end, and Faust is cast into hell; other versions (for example, *Faust* by J. W. von Goethe) have

a happier ending – thanks to the pleading of an innocent woman who was seduced by Faust, God pardons him, despite his numerous sins. So has modern medicine made a Faustian pact, has it sold its soul? And, if so, can it still be redeemed?

### WHAT MONEY CAN’T BUY

In *What Money Can’t Buy*, the Harvard philosopher, Michael Sandel, argues that there have to be moral limits to markets, if we are to preserve those things we value in, and for, themselves. So, if we try to commodify health, education, personal relationships, or acts of kindness to strangers, we destroy their essential nature – we corrupt them to a point when they no longer have real value. Instead they become mere trade-ables in a market, where self-interest rules, the rich get richer and the vulnerable are exploited for commercial gain. Such commodification is corrupting health care. I shall take two examples – the domination of health care provision by massive transnational financial interests; and the perverse incentives in some methods of delivering health care, which maximise

income at the cost of adequate patient care. But first, we need to recognise the central point: the market alone cannot ensure justice and fairness in health care provision.

## **NO HIDDEN HAND**

The phrase the 'hidden hand' comes from the writings of Adam Smith, a 18th century philosopher and political theorist who was one of the leaders of the Scottish Enlightenment. He suggested that self-interest will eventually ensure that markets work for everyone's benefit and not just for the benefit or the more successful. It is often used today to claim that markets are self-regulating, that by their nature they will ensure a fair distribution of benefit and prevent excessive individual gain. Many scholars think this is a misreading of Smith, but, even if it were accurate, it clearly cannot work in the field of health care. There are several reasons for this:

Firstly, patients are not 'customers' or 'consumers' in the normal sense of these terms, since they lack the depth of knowledge and expertise to judge which 'product' or 'service' best meets their needs. This remains true, even with the advent of the Internet. Certainly, many patients now do extensive research online and so come to a consultation armed with facts and questions, and this may be even more common in private practice. This is in part a good development, leading to a more informed partnership between doctor and patient. But, patients (or their families) simply cannot have the capacity to make balanced clinical judgments or to assess conflicting evidence, since these capacities are dependent on many years of medical training. There will always be a knowledge gap.

Of course, this is not true only in medicine. We depend on expert advice in a number of purchasing situations – for example, when buying technically complex devices, like smart phones or smart TVs. But the gap is greater in medicine and the consequence of making the wrong choice much more serious. That's why we want our doctors to have professional ethical codes, but don't require the same for people selling electronic goods.

Secondly, in many medical encounters patients can be very vulnerable. Their health – or indeed life itself – may be at stake. In such situations of anxiety and uncertainty

they desperately need practitioners they can trust completely. They need objectivity and professionalism from their health care providers; and they need to know that what is being offered to them is done on the basis of need and effectiveness, not as a means to profit the provider, or to balance the books.

Thirdly, the laws of supply and demand do not work in health care, since it is always possible to identify more and more needs in order to create a greater demand. As medicine progressed dramatically over the 20th and 21st centuries, it stimulated more and more demand. People are living longer, but as a result there is a rising tide of chronic illness. At the same time, more and more human problems become medicalised (shyness, for example), stimulating a fresh demand for pharmaceutical or other medical solutions ('a pill for every ill'). It follows that the market for health care (unlike, say, the market for smart phones) is not self-limiting. In the escalating demand for health care the market can guarantee satisfaction – if at all – to only the most wealthy consumers. This limitless demand escalates the costs of health care, creating shortages of even the most basic services for the less well off.

We can now see two examples of how the market in healthcare prevents the fair and effective distribution of resources.

## **INDUSTRY CAPTURE**

The massive growth of the pharmaceutical and medical devices industries over the past few decades has led to a catastrophic undermining of the medical profession's independence and objectivity. This is well documented in many publications by medical authors who have the knowledge and authority to describe the situation from the inside. Two authors are former editors of one of the top medical journals, *The New England Journal of Medicine* (see *The Truth about Drug Companies* by Marcia Angell, and *On the Take* by Jerome Kassirer); and a recently published book is authored by a senior research fellow in the highly respected Oxford University Centre for Evidence Based Medicine (see *Bad Pharma* by Ben Goldacre). The extent of the industry's influence on medical practice, on prescribing, and on publication is fully documented in these books and in many other articles.

Here are the main features: a) Publication

Bias. The industry ensures that the clinical trials they sponsor are published only if there is a supportive result and, if there is not, they either suppress publication, or 'spin' the article in a more favourable way. This means that there is a huge disparity between findings published under their auspices and independent studies. Thus clinical decisions are being made every day on insufficient or biased evidence. b) Sponsored educational events. These are the main ways in which postgraduate education is provided and in which clinicians are kept up to date on new developments. Some of the influence is subtle, some more obvious, for example, senior medical figures are paid to give favourable accounts of a specific product. The total amount paid to doctors and health care institutions in the USA can now be discovered, thanks to a clause in the 2010 Affordable Care Act, known as the Sunshine Act. In 2014 it amounted to a staggering US\$6.49 billion! c) Ghost writing. Articles are published in high impact journals, with a distinguished list of authors, but in fact the paper has been ghost written by a person employed by the industry. d) Study Design Trials are sponsored to promote a product, with a design almost guaranteed to gain a favourable result.

In addition to these problems, there is increasing evidence that the industry is influencing both the publication policy of journals and the decisions of regulating authorities, such as the FDA. Cancer drugs are a powerful case in point. An article in this year's *British Medical Journal* (BMJ) revealed that trials for cancer drugs were 2.8 times more likely not to be randomised than other trials; and only 42% of the 72 drugs approved by the FDA from 2002 to 2014 for solid tumours met the criteria set by the American Society of Clinical Oncology Cancer Research Committee for meaningful results for patients. Moreover, the median gains in progression-free survival for these drugs were only 2.5 and 2.1 months respectively (see *BMJ* 2015;350:h2068).

Another example of industry capture is the growth of health maintenance organisations (HMOs), which can incentivise doctors to provide less than the standard of care required for patients, while at the same time squeezing the fees they can charge. This in turn leads to perverse incentives to increase income by adding more and more tests and

## INSIGHTS



treatments, as discussed in the next section.

Such a clear picture of industry capture does seem to prove the point that medicine has sold its soul to commercial interests, maybe for some personal gain for some doctors, but (ironically) to the detriment of the profession as a whole, since they are no longer masters in their own house.

### PERVERSE INCENTIVES

A financial incentive is 'perverse' when it leads to encouraging practice, which is the opposite of what needs to be achieved in order to deliver effective and equitable care. Some health systems have such incentives built into them. For example, if doctors are allowed to both prescribe and dispense medicines and if they get only a small fee for consultations, then they are incentivised to over-prescribe in order to make an adequate living. The result is the current major problem of antibiotic resistance. Another perverse incentive comes from some fee-for-service systems, since the more tests that are ordered and the more referrals that are made, the higher will be the earnings both of individual practitioners and the institutions in which they work. (In Doctored Sandeep Jauhar describes one patient who was admitted for shortness of breath, and being seen by 17 specialists!) A third perverse incentive comes from the growth of medical litigation. As patients become more prone to sue, doctors are incentivised to order more and more tests and procedures to cover every eventuality (this could be part of the reason for the 17 consultations mentioned above). This leads to what has been called 'defensive medicine'. A fourth incentive comes from provider-

induced needs. These are created in several ways, but one common one is to provide 'health screening' aimed to raise anxieties in otherwise healthy people, so that they feel the need to purchase unnecessary treatments or unmerited further investigations.

All of these factors have led to drastically escalating health care costs, but without the benefits to patients we might expect from such expenditure. The American health care scene provides a prime example of this, since it has the highest per capita health expenditure in the world, but is well down the ranking in terms of health outcomes. However, the problem is evident in many other countries also, where the illusion that 'market forces' will bring both efficiency and justice has gained acceptance from those funding or managing the health system.

We can recall that one version of the Faust story results in him regaining his soul, thanks to the grace of God. But we cannot expect a divine solution to medicine's surrender of its soul! If the erosion of professional values in the profession is to be stopped, or even reversed, then the change must come from within the profession itself. How might things change? We need to change both individuals and systems. As regards individuals, much more needs to be done to prevent the slide into cynicism, and this must start when doctors and other health professionals begin their education, and must continue throughout postgraduate training. This is costly on human resources, since the loss of idealism can be reversed only by committed and personalised mentoring. There are many committed senior

practitioners who have not abandoned their ethical dedication, and who can act as role models for the younger generation. A very good example can be found in the lessons learned by the late Dr Richard Teo, a medical practitioner who was enticed by the material rewards of private practice and thought of himself as happy and successful, but then sadly discovered that he was soon to die of terminal cancer.

He then realised that his life had become meaningless, because he had abandoned his professional ideals (sold his soul, if you like). This is all conveyed movingly in a lecture he gave before his death. <https://www.youtube.com/watch?v=umLkfADe17s>

However, having ethically dedicated individuals will never be enough to change things. We need to confront the systemic problems, which are turning healthcare into a parody of the ideals of medicine. There is no denying the magnitude of the challenge here. In Singapore, as in many other countries, we will have to deal with the 'silver tsunami', a rapidly ageing population with an increasingly shrinking work force, facing the onslaught of undiagnosed or inadequately prevented chronic illnesses – notably diabetes. The current healthcare system, with its segmentation into primary, secondary and tertiary care services and the on-going efforts to strengthen health prevention and promotion measures will very easily be engulfed by this tidal wave. Of course, steps are being taken to deal with this at a national and a local level. But we cannot ignore the 'elephant in the room'. As Deep Throat says in *All the President's Men*,

'Follow the money!' In other words, unless we radically alter the financial incentives and re-apportion the funding to meet the truly vital health priorities of adequate primary care and effective health promotion and disease prevention, the system will never change sufficiently to meet this massive challenge. Good will never be enough, and practitioners will continue to experience burn out and loss of ideals, as they see their efforts undermined by the pursuit of profit.

## A DREAM SCHEME

What then should we hope for, if medicine is to 'save its soul'? Let me suggest four key values that need to be incorporated in a genuinely ethical health care scheme:

**Honesty.** The scandal of publication bias must be stopped, so that clinical decisions are made on reliable research evidence. There are signs that this is happening, despite lobbying against it by the industry. The European Medicines Agency is now insisting on full access to the clinical research reports on which their decisions are based. This means that independent researchers can check the accuracy of the claims being made by the providers of products. At the same time two organisations – PLoS (Public Library of Science) and AllTrials – are pushing for open access and complete publication of trial results (whether favourable or unfavourable to the product). So, every health practitioner needs to ask herself or himself, Am I making clinical decisions on complete and unbiased evidence? And every clinical researcher must ask the key question – will my findings ever see the light of day if I get the 'wrong' answer? We need honesty at both individual and institutional level to extract ourselves from the current ethical morass in clinical research findings.

**Empowerment.** We cannot, of course, isolate medicine completely from the health care industry, and there is no denying the amazing successes in health gains and the eradication of diseases it has achieved. But the balance of power is skewed in the wrong direction. The industry should serve the professions and the public, not be allowed to manipulate the situation to meet its own ends. The professions need to face up to the fact that major aspects of their on-going education, plus virtually all of their specialist conferences, are heavily indebted to the industry. Who then calls the tune? Clearly governments also have a part to play here, since (unlike the health care industries) they are answerable, not to shareholders, but to the public who elected them. Thus it is not sufficient to see such industries as simply good for the economy, if some of their activities are clearly detrimental to health. Here it becomes essential to make sure that regulation of these industries and their products is genuinely independent.

**Autonomy.** Self-determination or autonomy is an essential value for both health care professionals and patients. The ideal clinical encounter is a partnership between patient and professional, each with a role to play to ensure genuinely patient-centred care. A key factor in this (in addition to the honesty discussed above) is time. If the health care system prevents adequate time for the clinical encounter (or enables it only for the paying patient), then all there can be is a quick solution (often of a pharmaceutical kind) and no opportunity to help patients take responsibility for their own health, to exercise their autonomy and direct their own lives.

**Justice.** Since health is not a commodity, but a human personal achievement valuable in

itself, every patient should be enabled to develop a capacity for health, according to their needs, not their ability to pay. Of course, people may squander that capacity; they may refuse to take responsibility for actions that undermine their health, and so frustrate the efforts of professionals to help them. But that offer of help, that fostering of capacity, should have nothing to do with the wealth or poverty of the patient. It should be equally available to everyone in need, with the richer patients able to purchase more 'hotel' facilities, like private rooms and more elegant surroundings, but not a higher standard of medical care. Equally justice in health care requires that payments for professional services are aligned with major health care needs. Given a rapidly ageing population, this means that efficiency and effectiveness in primary care, prevention and chronic disease management should be adequately rewarded.

## Conclusion – Apathy or Hope?

As I noted earlier, whether medicine regains its soul is not something that can depend on a deus ex machina - a divine offer of salvation. No, it is up to us, patients and practitioners alike, to refuse to give up hope of a more ethical system than we have now, and to work to make things change. The motto of King Edward VII Hall (that has nurtured many NUS medical students) is based on a poem by Alfred Lord Tennyson, Ulysses. The motto reads 'to strive, to seek, to serve'. But in Tennyson's poem, there is even greater resolve:

*To strive, to seek, to find  
And not to yield.*

To save the soul of medicine, it seems we must have such resolve!



## NAVIGATING ETHICAL ISSUES IN MEDICAL PRACTICE

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### BACKGROUND

Media reports, tea-room conversations and reflections of medical professionals, suggest a current practice situation characterised by diverse ethical challenges. The origins are multifactorial. Our patients have become culturally more heterogeneous and their belief systems, values, goals and preferences are almost always not precisely known<sup>1</sup>. Many are visitors or temporary residents and inadequately insured; generally there is an increased desire to exercise autonomy through expression of preferences and making decisions.

Unfortunately, many are misinformed by inaccurate or inadequate medical information obtained through “research” – usually from the internet. Media reports cause them to distrust the profession and the system; patients demand instant solutions, can’t accept uncertainty of medical outcomes, see death as a failure and have become litigious. Compounding all these are the technological developments that enable irreversibly failed body systems to be supported for prolonged periods.

The medical system by design has resource limitations to help control runaway costs; yet it is required to deliver services that result in high patient satisfaction, substantial cost recovery and even generate some profit. Doctors (and other healthcare professionals) have limited cultural competence and skills in complex communications. Often, they are in a transactional doctor-patient relationship based on commercial values, consumer-driven practices and technology-driven considerations. They may be paid on the basis of fee for service, in which service is usually quantified by numbers and rewarded. The doctor thus often experiences moral distress and conflicts of interests – he has to weigh personal rewards against his patient’s best interests.

## **ETHICAL ISSUES**

A review of criminal court convictions, civil court findings of liability and Medical Disciplinary Tribunal findings of professional misconduct will give an idea of the extreme ethical violations that have occurred. Studying the reports of the Singapore Medical Council for the last decade reveals no major change in the nature and incidence of violations. Though reassuring, it is obvious that this is only the tip of the iceberg.

Categorisation of scholarly work in ethics produced here in the past decade reveals that about a third pertained to ethical issues originating from the clinical medical specialties (dramatic ethics); another third rose from everyday ethics; the remainder pertained to research ethics and ethics education. The phase covering the end of life was the setting for most of the scholarly inquiry.

Experience gained through the deliberations of the Clinical Bioethics Committee at the National University Hospital over the past

decade also reveals that most referrals pertained to issues related to the medical care rendered to patients nearing and at the end of life and who had lost decision-making capacity.

With this background, the following can be expected to be the more common ethical issues that the medical practitioner and the team in an acute hospital setting will need to identify, address and resolve.

These include confidentiality breaches, conflicts of interest, disagreements between different stakeholders, decision-making, failure to set goals of care, gifts, insistence on non-clinically indicated interventions, the inadequately-insured patient, non-disclosure, remote consultations, over-servicing and the unavailability of doctors for consultations. In an academic medical centre like ours, there are additional unique issues – requests to use non-licensed investigational drugs, fragmented care from multiple sub-specialists, vigorous measures to prevent death and a general ignorance or reluctance to consider the cost of “doing everything possible”. The majority of these issues unfortunately occur during everyday doctor-patient encounters and are often not even recognised and hence rarely reported. When clinicians gloss over these ethical issues routinely, the consequences accumulate, the practice ethos changes and then manifests as dramatic ethical issues. How may these be prevented or minimised, and when necessary be addressed and resolved?

## **PERSONAL COMMITMENT TO PROFESSIONALISM**

An abiding personal commitment to professionalism in the face of persistent threats is a fundamental. Given that the usual locale for contact between patient and doctor is a private setting and hence not readily observable by colleagues and supervisors, we will not know how good our “bedside manners” are, or how professional we were in that encounter. The temptation to compromise is intense when the perceived reward is irresistible. The large daily number of such encounters is sufficiently high to subtly shape and mould us, both positively and negatively. By the time a negative attitude or behaviour attracts attention, it may have become too ingrained within and difficult to change.

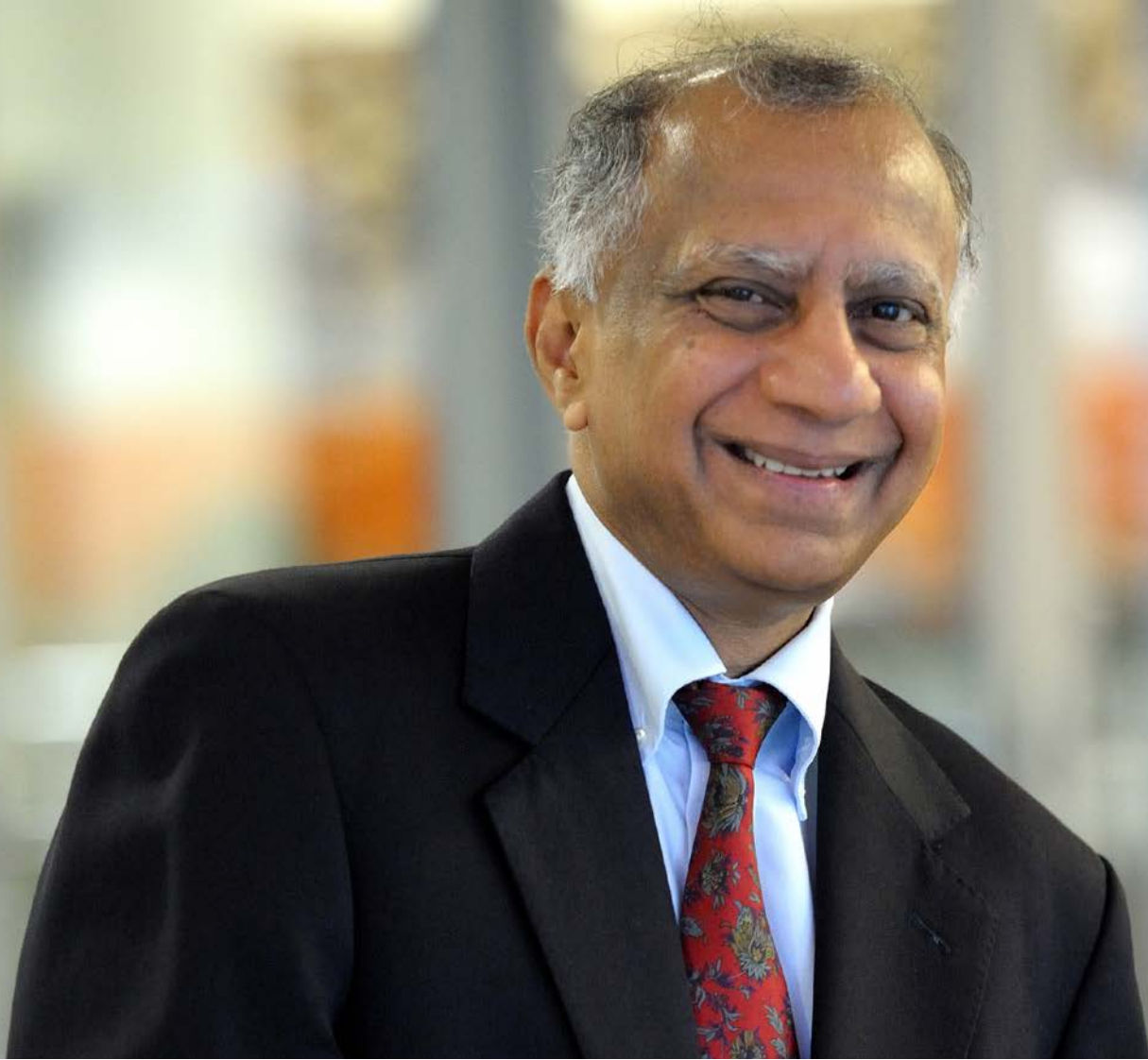
The responsibility and duty thus falls on self. Regular self-reflection and mindfulness accompanied by intensive strengthening of our knowledge base is known to be very essential. Some questions that can guide our reflections on a consultation are: Does the patient feel comfortable with me? Are my interpersonal skills so developed that they allow patients to express themselves and be comfortable with me? Is ethics part of my analysis of the encountered clinical situation? Does my view of my patient’s decision provide a generous understanding of their values? Am I treating like cases alike? Are individuals with different social and cultural backgrounds equally able to express themselves?

## **BUILDING CULTURAL COMPETENCE**

The second proactive measure would be to build our own cultural competence. So often, we focus only on the disease, the symptom, the sign and the results of investigations, such that we fail to appreciate who deep down is the person we are trying to care for. There are the usual descriptors, e.g. “Indian married female, aged 35” or “a 85 year old with severe dementia and activities of daily living (ADL) dependant”. Are these enough? The team needs to spend more time with patients, taking time to befriend them, understand their world view and perspective of their illness, understand their system of beliefs, explore their values and preferences, reconcile the two and through interviewing family members, establish the authenticity of their statements. This background knowledge enables rich and fruitful discussions that contribute so much to customising care, especially towards the end of life.

## **STRENGTHENING COMMUNICATION SKILLS**

When our patients’ illnesses deteriorate, the need to communicate with them and family members acutely develops; often the situation is also characterised by a loss of the patient’s decision-making capacity. In such a charged state, family members can be expected to be emotionally overwhelmed and respond in a highly defensive mode comprising shock, denial and anger, taking a variable period of time to reach acceptance. The situation calls for a specialised type of interviewing, in which the emotional barriers can be identified and addressed in the light of relevant ethical obligations and



values. Such interviewing skills need to be deliberately developed.

### **HELPING CARE PROVIDERS IN A TEAM TO COME TOGETHER**

Many patients have multiple co-morbidities, each managed by a sub-specialist. It is not uncommon for subspecialists to focus on the specific pathology they have the expertise in and offer intervention and prognosis without taking into effect the other morbidities, prognoses and previously stated values and preferences. The value conflicts which then arise in team members provokes in them emotional reactions. Studies show that when adequately coached and supported, the team as a group will

move through the following five phases: (i) expression of feelings of frustration, (ii) sharing disempowerment and helplessness, (iii) the revelation of the value conflict, (iv) enhancing realistic expectations and (v) seeing opportunities to change the situation instead of seeing only obstacles resolved<sup>2</sup>. This allows them to move from an individual interpretation of the situation to an open communication phase, resulting in the original value conflict being revealed and resolved. Team leaders need to possess these coaching and support skills so as to keep their teams functional. When such team-related conflicts are not resolved, patients and relatives receive mixed and often opposite messages; they too will slip

into a defensive mode, communication will break down and a simple ethical issue becomes a dramatic ethical dilemma.

### **CONCLUSION**

Medical professionals and teams are high-capacity units with intense internal motivations to do the right thing, for the right reason and to do it well. At times they need a little nudge, some guidance and, maybe an occasional prod. With these in place, they can be depended on to overcome ethical issues in the same way that their predecessors have done in the past.

### **REFERENCE**

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2. Grönlund CF, Dahlqvist V, Zingmark K, Sandlund M, Söderberg A. Managing Ethical difficulties in Healthcare: Communicating in Inter-Professional Clinical Ethics Support Sessions. *HEC Forum*. 2016 May 5 (E pub ahead of print).



## SCHEDULER

# AUGUST - OCTOBER

Date	Event & Venue
Aug 2	<b>Flag Day</b>
	<b>Visiting Committees</b>
Aug 2 – 5	Cluster 4 (Departments of Surgery, Anaesthesia and Orthopaedic Surgery)
Sept 20 – 23	Cluster 1 (Departments of Biochemistry, Anatomy and Physiology)
Sept 26 – 28	Cluster 6 (Departments of Medicine, Psychological Medicine and Paediatrics)
Sept 28 – 30	Cluster 3 (Alice Lee Centre for Nursing Studies)
Oct 3 – 7	Cluster 2 (Departments of Microbiology, Pharmacology, Pathology and Diagnostic Radiology)
Aug 3	<b>Rag Day</b> University Town, NUS
Aug 10	<b>White Coat Ceremony</b> University Cultural Centre, NUS
	<b>Neighbourhood Health Service (NHS)</b>
Sept 3 - 4	Taman Jurong
Oct 1 - 2	Marine Terrace
Sept 6	<b>NUS Medicine Safety Day</b> Safety Carnival and Forum: "Think Safety; Act Safely" MD1, Level 3
Sept 9	<b>Keynote Address 2016</b> Auditorium, NUHS Tower Block
Oct 8 - 9	<b>Public Health Service (PHS)</b> Clementi
Oct 18	<b>NUS Awards &amp; Appreciation Night</b> University Cultural Centre, NUS

*Details may be subject to change at the discretion of the respective departments without prior notice.*

# Our students go the extra mile. A few have covered 250 km.



At NUS Yong Loo Lin School of Medicine, we nurture our leaders to go further for their patients. Many learn the language their patients speak. Others give up personal time to see to their patients' needs. And 4 of our students each endured 250 km in the Sahara Desert Race to raise awareness of the struggles mental health patients face. When it comes to our patients' welfare, our students go the distance.