SMA news

For Doctors, For Patients

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# MEDTECH: Enhancing Healthcare

## Remote Monitoring for Clinical Trials

## Translating Technology Advances for Patient Safety

DukeNUS Medical School

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# The EDITORS' MUSINGS

## Dr Tina Tan

***Editor***

Dr Tan is a psychiatrist with the Better Life Psychological Medicine Clinic, and a visiting consultant at the Institute of Mental Health. She is also an alumnus of Duke-NUS Medical School. Between work and family life, she squeezes time out for her favourite pastimes – reading a good (fiction) book and writing.

Arthur C Clarke's famous third law states that "any sufficiently advanced technology is indistinguishable from magic". This month, we showcase interesting technological advancements in our local medical scene. This is but a snapshot of the efforts to enhance patient care through the use of technology. While perhaps nothing magical in and of itself, the applications of new and available technologies certainly can make the patients' (and doctors') experience magical.

The elephant in the room remains the ongoing dialogue between the medical profession, insurers and their consumers. A few months ago, SMA conducted a survey among private specialists on Integrated Shield Plans (IPs). We have published the results, along with a write up by SMA 1st Vice-President Dr Ng Chee Kwan in this issue (see page 22). Those surveyed encountered various obstacles pertaining to remuneration and the prickly issue of panels. Of course, one might argue that we have only surveyed a segment of specialists, and we probably got the results we were looking for based on the questions we asked. The data speaks for itself. SMA looks forward to continued discussion with the relevant parties and authorities to ensure that healthcare costs do not spiral, nor that patient care is compromised.

## Dr Alex Wong

***Guest Editor***

Dr Wong is a private practitioner who talks too much. This occasionally leads him to write strange things, eat strange foods, travel to strange places and attend strange weddings/funerals that he doesn't necessarily always want to be at. He thinks this is fun and what life should be about.

Medicine is a school of study that greatly values its traditions – and with good reason. Our professional art is rooted in a great humanist tradition that reminds us constantly that we practise medicine for the sake of people and not for science. It's for that reason that we painstakingly pass on the art of history-taking and physical examination, and the importance of good bedside manners; the reason we so frequently intone to younger members of the profession that "the good physician treats the disease, but the great physician treats the patient who has the disease."

At times, this great tradition seems to run counter to the developments of technology. Telemedicine seems to take us away from face-to-face patient interviews, the bedrock upon which the patient-doctor relationship is built. Increasing ease of access to echocardiography, ultrasounds and CT scans have chipped away at the need to refine our examination skills, removing us from that moment of "laying on of hands" when our physical touch not only diagnoses, but also transmits human warmth and empathy. Artificial intelligence (AI)-guided patient-fall monitoring reduces the manpower needed, but it also means that there are fewer staff in the ward when all the patient wants is to talk away their pre-procedural anxiety.

In our giddy euphoria to apply evermore complex and wondrous technology, it's worth remembering that these are all but tools which can be equally used for good and ill. Just as fire in the hands of primordial man allowed us to grasp at some semblance of a better life for posterity, medical technology can better the lives of our fellow men, or bring them great misery. This is as much a time to wonder of ceaseless limitations, as it is of inward introspection into our intentions and methods.

The late Stephen Hawking warned that the development of AI might be the "worst event in our civilisation". As our tools get sharper, we need to be mindful of how the double-edged blade cuts. Yet among the dire warnings of doom and gloom, the great man himself paints a spark of light:

"I am an optimist and I believe that we can create AI for the good of the world. That it can work in harmony with us. We simply need to be aware of the dangers, identify them, employ the best possible practice and management, and prepare for its consequences well in advance." – Stephen Hawking ◆

# A DISRUPTOR OR FALSE DAWN?

## Remote Monitoring for Clinical Trials

Text by Dr Ng Wei Yan and A/Prof Daniel Ting

Clinical research has been an indispensable element in the advancement of healthcare. Prospective clinical trials, which embody the most rigorous of research methodology, are mostly conducted using age-old methods. These involve multiple scheduled on-site monitoring visits based on stipulated protocols throughout the entire study. Assessments are recorded at every visit by trained research personnel, with layers of monitors in place to ensure absolute Source Data Verification (SDV) in accordance with the Good Clinical Practice (GCP) guidelines. While these are held as the gold standard of research practice, they require tremendous amounts of time, effort and resources to reach a successful conclusion in reality. Large amounts of funding are required to sustain these research and the costs are invariably passed on to the patients once the study reaches commercialisation. This has led to some calls to explore more efficient and less demanding ways to conduct these studies by harnessing the power of technology. One of the key proposed conceptual changes involves the use of technological devices to enable remote monitoring of subjects. While such efforts are commendable, they have been met with relatively muted response due to the overall inertia and lack of interest within the industry.

### What is remote monitoring?

The concept of remote monitoring in clinical trials involves the decentralisation of the study away from the designated site of the research. Clinical data is transferred virtually to the primary research site. This can include personal monitoring, video-conferencing monitoring as well as centralised monitoring in selected secondary sites. It requires a shift away from the hundred percent on-site SDV by assigned research associates to a remote SDV approach utilising risk-based monitoring. Risk-based monitoring focuses the verification efforts on high-risk research sites based on trigger events, thereby reducing the volume and frequency of monitoring required. The clinical sponsor will first need to perform a risk assessment to identify high-risk parameters and values, followed by a set of criteria that will serve as an alarm should such deviations occur. Once triggered, it will set off a cascade of risk-mitigation actions to ensure that (a) safety and rights of participants are not compromised, (b) reported data is accurate, complete and verifiable, and (c) trials are conducted to the highest standards in compliance with prevailing GCP requirements.

Remote monitoring of clinical trials is highly reliant on technological devices for the acquisition and transfer of research data digitally. Technological advancement has seen the rise of the Internet of Things such as smartphones, health monitoring wearables and fitness

wearables with increased connectivity through greater Wi-Fi/internet speeds and bandwidth. These technologies have sufficiently matured such that they can now be used to accurately gather data for clinical trials regardless of location, providing a combination of flexibility, automation and digitisation that was not previously possible. Video-conferencing, on the other hand, provides a different dimension of monitoring through a combination of a greater degree of social interaction and direct visualisation. This is of particular relevance when the research verifications require direct clinical visualisation or interaction (eg, symptom-based or user-experience assessment). A separate branch of remote monitoring involves centralised monitoring at distant sites separate from the original research site. This is usually conducted in peripheral centres with trained professionals and specialised equipment. These centres require purpose-built systems to aggregate, verify and transmit electronic health data securely.

## Impact of COVID-19

The shift towards remote monitoring was recommended by the US Food and Drug Administration (FDA) in 2013. However, it failed to resonate with many sponsors and sites alike. This slow adoption has since seen a significant change when COVID-19 spread across the globe in 2020. Social distancing, lockdowns and movement curbs have made it increasingly difficult or even impossible to conduct clinical trials in the traditional way. Subject dropouts, poor-quality data collection and curtailed on-site verification ability have significantly hampered a vast majority of research trials. In addition, attention and manpower were redistributed to help combat the pandemic, resulting in increasingly strained clinical research resources. Lack of continuity put paid to significant efforts sunk into ongoing clinical research; hence many sponsors were forced into a radical rethink to cope with the altered healthcare landscape.

The oversight of clinical trials must be maintained against all odds in order to ensure participant safety. The impetus provided by COVID-19 has helped overcome inertia to adopt practice-changing models of care by shattering long-held beliefs. This has led to greater attention and translation to a remote monitoring model for clinical trials. However, this is by no means a straightforward and easy feat. A wholesale revamp in approach and protocols is required, accompanied by hardware and software restructuring to attain a high standard of remote monitoring. Furthermore, staff have to undergo urgent specialised training and deployment in order to deploy remote monitoring with haste.

One such example is the remote monitoring employed by Pfizer and BioNTech to push through their COVID-19 vaccine trials in record time. Due to lockdowns and social distancing measures, it was a logistical challenge to be able to conduct the large phase III trials using the traditional approach. It was out of sheer necessity that large-scale remote monitoring was employed and that provided the agility and dynamism required to successfully conclude the trial. Through the use of digital technologies such as Zoom and WebEx, they were able to overcome geographical barriers and significantly reduce turnaround akin to having round-the-clock continuous data monitoring.

## Advantages of remote monitoring

Remote monitoring provides several unique advantages compared to the traditional on-site verification approach. Firstly, it reduces logistical barriers by decentralising monitoring, without the need for patient and personnel to travel to a single conducting site. As a result, monitoring and care is brought closer to home, saving time and cost. Furthermore, continuous or repeated measurements performed under such settings provide a better representation of real-life results.

Secondly, remote monitoring mandates the development of a set of supporting system capabilities. These systems improve access control by creating a secure unified or interoperable platform for sharing of source information to authorised individuals. This enables better tracking of source data which can reduce erroneous entries.

Thirdly, digitisation of data recording creates an audit trail which is crucial to deter fraudulent manipulation and correct any erroneous entry. The provenance of these data, including metadata such as timestamps and sources, is clearly recorded to ensure better integrity and accountability. It also replaces the traditional manual paperwork process which is time-consuming to transcribe, error-prone and laborious to both track and store.

Finally, remote monitoring standardises the reporting mechanism across multiple study sites. Proper stringent reporting requirements ensure better identification of any safety or protocol deviations in an early and reliable fashion. This is a crucial component prior to initiating a feedback loop which includes prioritised reviews, identification of compliance issues, and necessary corrective actions so as to ensure adherence to protocol stipulations.

## Remote monitoring in practice

As the use-case for remote monitoring continually expands, it should be viewed as a complementary or alternative model, rather than a direct replacement, to the traditional on-site verification method. Not all parameters, and in essence clinical trials, are suitable for remote monitoring due to the complexities involved. Clinical trials that involve expensive or complex dedicated equipment would not be a natural fit for remote monitoring. Likewise, trials which require on-site attendance for clinical assessment will continue to adopt the traditional on-site model. Conversely, trials that involve monitoring using portable sensor technology and teleconferencing are most adapted for conducting trials remotely. Examples include symptom-based assessments for psychiatric research, cardiac monitoring devices as well as lung function assessments. The

methodologies of these studies could involve either new concepts of research with no established reference ranges, or new measurements using innovative digital products to achieve its aims. The novelty of such approaches, however, does require some level of pre-testing to be performed. The digital device has to undergo preliminary verification followed by clinical and analytical validation of the results before it can be put into larger clinical trials.

Proper application of remote monitoring into clinical trials will also require regulatory guidance and support. Due to lack of extensive experience, researchers can be befuddled by the requirements to assess the feasibility, safety and efficacy of remotely collected data. In this instance, the US FDA and European Medicines Agency have both released clear guidance to help sponsors and research sites transition from on-site to remote monitoring.

## The future

Under the backdrop of a raging pandemic, it is likely that more clinical trials will be designed to adopt remote monitoring. This coincides nicely with the industry-wide push for digitalisation of healthcare as well as the ongoing need for movement control and social distancing to protect vulnerable patients. More advanced digital platforms such as blockchain technology could also come to the fore to provide even greater verification and tracking abilities. However, when the pandemic eventually subsides, whether this conceptual change possess sufficient momentum to change the research landscape irreversibly is really anyone's guess. Hopefully the infrastructural investment and experience gained by the research community during this COVID-19 pandemic will continue to spur efforts to decentralise clinical trials and adopt remote monitoring as the go-to standard whenever possible.

Dr Ng is an associate consultant at the Singapore National Eye Centre and is part of the AI and Digital Innovation department in Singapore Eye Research Institute. His main research interest is in digital health technology.

A/Prof Ting is the director of the AI Programme for the Singapore Health Service, head of AI and Digital Innovation in the Singapore Eye Research Institute and associate professor in ophthalmology with Duke-NUS Medical School.

# HAVE A STORY TO SHARE?

***SMA News* welcomes your thoughts on issues that are of interest to you as a medical practitioner.**

If you would like to submit a response to the above article or write on something that you are passionate about, please email us at **news@sma.org.sg**.

# EMBRACING TECHNOLOGY

Text by Dr Tan Yia Swam

Digital adoption has taken a quantum leap in almost all facets of our lives, brought about by the pandemic. Without these technological advances, this past year under the shadow of COVID-19 would have been even more stressful.

Looking back, how fortunate are we to be able to order food and groceries online and have them delivered to us? My friends who are not in customer-facing roles were able to work from home during Singapore's circuit breaker and in the months after, instead of having to risk exposure during commutes. Students were able to continue some form of education online. Entertainment and emotional support continued through various forms of social media, online games, streaming of movies, etc.

## Bettering healthcare through technology

In healthcare, webinars have helped us all to continue medical education, and even allowed for mass broadcast events like the telemedicine and COVID-19 vaccine webinars held jointly with the Ministry of Health (MOH) and professional bodies, each attended by almost 1,000 participants. In fact, the SMA held its very first virtual Annual General Meeting via Zoom in April 2020 and subsequently, monthly Council meetings have also been virtual. International meetings were possible with some accommodation for time zone differences. I found it really convenient and enriching, without the hassle of air travel. It is also environmentally friendly![1]

With the aid of technology, the SMA Doctors-in-Training committee has also been able to connect with our student members from the National University of Singapore's Yong Loo Lin School of Medicine, Duke-NUS Medical School and Lee Kong Chian School of Medicine, as well as overseas universities. Close to 500 overseas medical students who came back to Singapore amid the pandemic are stranded here due to COVID-19, and have not been able to resume their clinical lessons. Informal support in the form of the various Telegram and WhatsApp groups flourished, with fast responses to queries and fairly quick rectifications of fake news.

Once again, I thank new friends made over the past year – even though I am busier and not able to be online as much now, I am warmed by your lovely messages.

## A double-edged sword

Some hospitals and medical practitioners have implemented telemedicine effectively. Upgrading of electronic medical record systems are in the works, to better integrate technology in the delivery of treatments.

The portable ultrasound can serve as an extension of our hand and help to pick up abnormalities that fingers are not able to perceive. While some may lament the loss of clinical acumen, I would say that we should make use of technology as it becomes available, and use it to guide and augment clinical decision-making rather than replace clinical judgement. In my breast surgical practice, the bedside ultrasound is invaluable in differentiating a prominent ridge of lumpy breast tissue from a real lump, and in giving immediate confirmation of a suspicious solid lump versus a clearly benign simple cyst!

However, as with everything, technology has its downsides.

Cybersecurity is a real concern, with frequent reports of various database breaches and leaked personal data. We have to do our due diligence by keeping up to date with basic safety measures. These include using passwords of adequate complexity, changing them regularly, using different passwords for different systems, etc.[2] The professionals will also need to do their part in ensuring that hardware and software are kept up to date to minimise risks.

The rise of electronic platforms offering "medical concierge" services, "free medical advice" and "convenient specialist consultations" have also been worrying. There is currently no regulation over such services. It cheapens the doctor-patient relationship, and lacks accountability. The SMA is in discussions with MOH regulatory services to better define the scope and boundaries, and see how best we can protect patients.[3]

## Doing good by others

I spoke in Parliament about cyber-bullying, and it saddens me to see this happen to doctors. Personal posts are taken out of context and amplified, and anonymous emails are set up to criticise and insult with no accountability or personal responsibility. I am still studying to see how to protect myself and others from such attacks.[4] I can only remind myself to think before I speak/type, and to simply be kind – to see things from the other person's point of view. I don't have to like or agree with them, but I don't have to put them down.

What does being professional mean? One should be consistent and competent, in work and in behaviour. One should be ethical and have a strong moral compass – be honest, honourable and reliable. Finally, one should support others. Be an enabler, to empower others to achieve more than what they can alone. Teaching and maintaining professionalism is a lifelong journey.

It has been a really difficult 15 months co-existing with COVID-19. Chronic stresses are building up, and I am aware that some doctors are facing financial difficulties. Some are not coping well emotionally. Some might have taken to potentially self-destructive habits. I urge everyone to stay united and to reach out to us at SMA (sma@sma.org.sg) for help when needed.

The SMA Council doctors are volunteers – though we might be slow in response, we hear you and we care. "Emerging Stronger, Together" is not just a fancy tagline. Let's actualise this! ◆


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*1. Barilo P. How video meetings are helping reduce environmental impact [infographic]. Zoom [Internet]. 22 April 2019. Available at: https://bit.ly/38EaMWV.*

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Dr Tan is a mother to three kids, wife to a surgeon; a daughter and a daughter-in-law. She trained as a general surgeon, and entered private practice in mid-2019, focusing on breast surgery. She treasures her friends and wishes to have more time for her diverse interests: cooking, eating, music, drawing, writing, photography and comedy.


Illustration: Dr Justinian Zai

# HIGHLIGHTS

## From the Honorary Secretary

Report by Dr Ng Chew Lip

### Position statement on troubled Integrated Shield Plans

In the past few months, there has been a lot of discussion on the changes in Integrated Shield Plan (IP) policy terms and the long-term sustainability of the IP scheme. The SMA 61st Council has issued a Position Statement to address this matter and make our position clear. This paper aims to discuss the current state of affairs and explore ways of ensuring sustainability of the IP scheme while safeguarding patients' interests and right of choice of healthcare providers.

The position statement can be found at https://www.sma.org.sg/ourvoice/index.aspx?ID=71.

### SMA representation in MHIC

The Ministry of Health has announced on 14 April 2021 the appointment of a 12-member Multilateral Healthcare Insurance Committee (MHIC) comprising representatives from stakeholders including SMA, Life Insurance Association, Academy of Medicine, Singapore and private hospitals.

Dr Tan Yia Swam and Dr Ng Chee Kwan from the SMA Council will be the SMA representatives to the MHIC. We see our role as being representatives of doctors and the voice of our patients. We welcome the formation of the committee and hope the MHIC discussions can help in achieving fair, equitable outcomes for all as well as a sustainable healthcare system.

To view the announcement, visit https://bit.ly/3mMmpAZ.

### Passing of Dr Yong Nen Khiong

The SMA Council informs with regret the news of Dr Yong Nen Khiong's demise on 15 March 2021. Dr Yong was SMA's longest serving President, serving six years over the periods of 1980 to 1981; 1982 to 1985; and 1987 to 1989. He was conferred SMA's highest honour, the SMA Honorary Membership, in 2002.

The SMA Council wishes to extend our deepest condolences to Dr Yong's family during this time of grief. SMA sent a delegation to Dr Yong's funeral wake. The eulogy for Dr Yong can be found on page 12.

### Keeping email addresses updated

SMA sends emails regularly to update Members on important matters. One of our recent emails, sent on 26 March 2021, informed Members of the 61st SMA Council's Position Statement on Integrated Shield Plans.

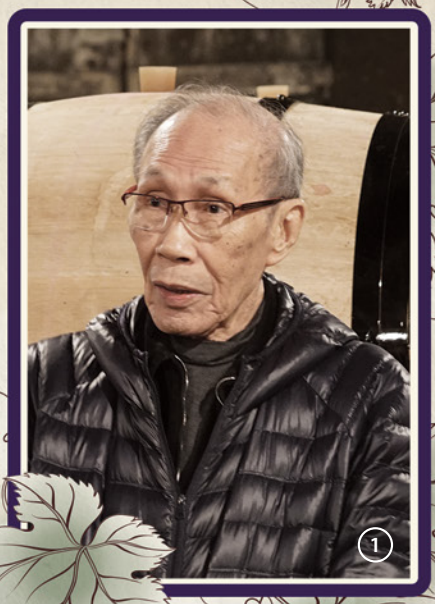
If you did not receive the email from SMA on 26 March 2021, or you have not been receiving emails from SMA, do contact membership@sma.org.sg with your updated email address. ◆

Dr Ng is an ENT consultant in public service. After a day of doctoring and cajoling his two princesses at home to finish their food, his idea of relaxation is watching a drama serial with his lovely wife and occasionally throwing some paint on a canvas.

IN MEMORY OF

# DR YONG NEN KHIONG

(1927 - 2021)



Text and photos by Dr Wong Chiang Yin,
SMA Council Member and Past President (2006-2009)

***This eulogy was first delivered at Dr Yong's funeral on 17 March 2021.***

SMA Dinners can be sombre if not boring affairs. So as young Council members, we decided that we could liven things up by bringing a few bottles of good wines to drink at this event. The year was 2002 and NK Yong was conferred the SMA's highest award, the SMA Honorary Membership. As Honorary Member, he sat at the head VIP table. Halfway through dinner, I scribbled down the list of wines we had at our table on a paper napkin which I handed over to him at the head table before scurrying back to mine.

Moments later, he came over to our table and said: "How can you drink all these wines without me?"

That incident had NK Yong's joie de vivre written all over it and that was how I got to know NK and his lovely wife Melina.

It is no exaggeration to say that NK was the grand old man, if not the father, of the Singapore wine scene. Vignerons coming to this part of the world would beat a path to his home to dine and wine with him. It was he who first put Singapore on the map in the wine world. For many years, my friends and I were very fortunate to frequent his residence and enjoy the company and wisdom of NK while digging into the wonderful spread of food that Melina invariably cooked up.

There are too many lessons about life and wine that I have learnt from NK over the years. In the interests of time, I will share three here.

**Lesson 1: The character of the wines reflects the character of the winemaker.**

If the winemaker is effusive, jovial and cheerful, so will the wines be. If the winemaker is calculated and contemplative, the wines will be likewise. In other words, your work reflects your personality, your character.

**Lesson 2: Good wines must pass the "fresh test".**

There are wines and there are wines. Some are made to impress wine critics, some are made to pair with food, etc. Whatever the case may be, the wine must taste fresh, and that comes from good acidity and fruit. I am a huge adherent to NK's fresh test. The lesson here is in life as in wine, one must approach each day with positivity and energy.

**Lesson 3: Great wines have balance.**

Great wines have that mystical and all-round endearing nature that nothing really sticks out, everything is there in the right place and right proportions. It is all about balance. It is so with wine, and it is so with people.

NK began to write a wine column for the *Business Times* (*BT*) in 1988 and continued to do so for 30 years. He sought to educate *BT* readers on the joys of wine appreciation. He often wrote about legendary wines, but he also delved into affordable everyday wines that many could afford and have access to. This to me, reflects his philosophy to wine. In an interview with *SMA News* in 2009, he said "I do not see what there is about wine that should make you feel superior to others. Wine is a drink basically to wash your food down and to quench your thirst with. Except that it tastes better than water and has the added advantage that the alcohol content, in moderation, induces a feeling of well-being and makes you take a more charitable and benign view of the world". In other words, to NK, at the end of the day, despite the academic

and philosophical musings about wine, it is just a drink to be enjoyed in the company of friends.

NK was indeed a world-class wine aficionado. But he really got interested in wine only in the early 80s. Before that, he was already a world-class heart surgeon and a titan of medicine.

NK was the longest serving President of the SMA. He served for six years as President over three spells: 1980 to 1981; 1982 to 1985; and 1987 to 1989. He is one of the gold standards that all Presidents of SMA have to measure up to. In January 1965, he performed the first open-heart surgery in Singapore, using a heart-lung machine donated by an American non-governmental organisation called the China Medical Board, using staff trained by him to work the machine, on a young woman with atrial septal defect. He went on to take up the Foundation Chair of Surgery when the Faculty of Medicine was set up in the University of Malaya in 1965 in Kuala Lumpur and stayed in that position for ten years. He performed the first open-heart surgery in Malaysia in 1969. In other words, the first open-heart surgeries performed in two countries, Singapore and Malaysia, were done by the same person – NK Yong.

He returned to Singapore to set up a private practice and he was elected to the SMA Council as Treasurer in 1979.

His formidable clinical skills were evident even when he was 81 years old, when over dinner, and to the alarm of the younger doctors that were with him, he self-diagnosed that he had an acute dissecting aortic aneurysm, which was then promptly stented.

Another aspect of him that many may not know is that he is also a dyed in the wool Anglo-Chinese School (ACS) boy. His father was a famous ACS teacher who was also for a time Principal of Kampar ACS in the 30s. In the mid-1980s, when I was a student in Anglo-Chinese Junior College, my then-principal, who was taught by the senior Mr Yong Ngim Djin, was still talking to me about his beloved teacher. NK cited his father as the most important influence in his life – for being a good Christian and a pillar of the Church. NK said it was from him that he learnt to show compassion and charity towards his fellow human beings.

When asked what makes a good surgeon, his answer was telling. He said: "Your heart must be in it. To live fully, you must have passion burning in you – and that applies particularly if you want to excel at anything you choose to do." That was vintage NK. Passion and conviction were never things found in short measure in the man.

He has left us. He has left a giant void in many of our hearts as well as in the areas he excelled in – medicine and wine. But we can take solace that he is now with his Maker, drinking the best wines and ambling in the most serene and picturesque vineyards. ◆

***Legend***

*1. Titan of medicine and wine*

*2. Dr NK Yong cutting his birthday cake in 2020*

*3. Dr NK Yong, Mrs Melina Yong and Dr Wong Chiang Yin in front of the hill of Corton Charlemagne, Burgundy*


# TRANSLATING TECHNOLOGY ADVANCES FOR PATIENT SAFETY

## *Nursing Innovations at Point of Care*

Text by Hoi Shu Yin and Wendy Leong Hui Ling

Patient safety has reached its twenty year milestone since the publication of the landmark report *To Err is Human* in 1999 by the US Institute of Medicine. The prevalence of harm and pervasiveness of safety issues in healthcare called for attention, and efforts were dedicated to improve the reliability of healthcare systems to reduce the risk of harm to patients. The most common adverse events include hospital-acquired infections, medication errors, surgical injuries as well as safety events resulting from inadequate handoffs, pressure injuries, falls and failure to rescue.[1] Advances in technology could potentially springboard innovations for patient safety with strategies to optimise care. Examples include automation of tasks, introduction of alerts and improving workforce productivity.[2] This article introduces two innovative technological solutions developed locally by nurses to enhance patient safety.

### A patient monitoring system for falls prevention

The prevalence of inpatient falls and related injuries poses complex challenges that impact healthcare systems worldwide, creating a heavy burden on medical and social services. In 2018, Tan Tock Seng Hospital and CoNEX Systems and Services Pte Ltd, a Singapore-based engineering solutions company, co-developed an innovative patient monitoring system named PreSAGE® for falls prevention in single and isolation rooms in the hospital environment. The system uses thermography, proprietary machine learning, predictive algorithms and image processing techniques to predict bed-exit situations and trigger advanced warnings to facilitate early intervention. The system was developed based on three key design principles: (i) non-contact, (ii) non-intrusive, and (iii) automated continuous monitoring.

#### How the system works

Figure 1 illustrates how the system is operationalised in the patient care room. A thermal sensor unit is mounted on the ceiling and captures continuous movement data. Once a bed-exit behaviour is predicted, the sensor unit triggers a visual and audible alert to the nurses. When a nurse enters the room, the sensor detects a second person by the bedside and the system is momentarily deactivated. After the nurse leaves the bedside, the system switches back to monitoring mode. The automatic deactivation of the alarm when intervention is received (eg, when the nurse attends to the patient) and reactivation when risk is anticipated (eg, the patient is left alone) is a unique feature of the PreSAGE® system. In comparison with other bed-exit alarm detection systems, this system prevents fall incidences related to staff forgetting to re-activate the alarm system after attending to the patient. As the system uses thermography that does not capture any identifiable features of the subject, patient and staff privacy is preserved. System performance is also maintained in the absence of light, an edge over systems that use optical imaging systems for bed-exit detection.

#### Validation and proof-of-value demonstration

A proof-of-concept study approved by the Domain Specific Review Board was conducted with 80 recruited patients. A total of 11,573 hours of images were recorded with 223 episodes of bed-sitting positions and 93 episodes of unassisted bed-exits captured. The development of a predictive algorithm enabled an alarm trigger to allow a 15-second pre-exit lead time for staff to intervene before the patient assumes a standing position from the bed. The predictive capability of the system led to achieving a high sensitivity score of 99.7% and a specificity score of 100%. In a subsequent proof-of-value evaluation of the system in real-time ward deployment, PreSAGE®

① How it works

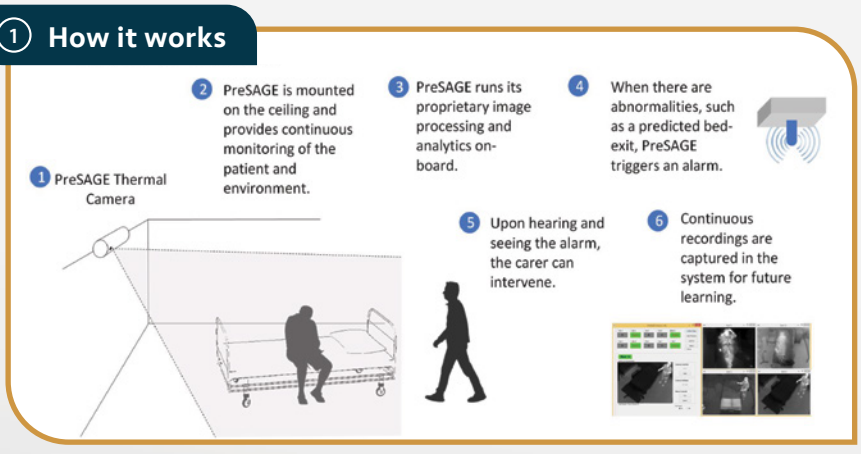



*Photo: CoNEX Healthcare*


Photo: TTSH Nursing Service

achieved a sensitivity score of 100% where alarms were triggered for all bed-exit attempts and a positive predictive value of 90.8%. False alarms were generated when the images of the patient and staff overlapped when staff attended to patients, resulting in auto-reactivation of the alarm system. Staff reported positive experiences with the system in a survey conducted post-deployment, including feedback on its ease of use and perceptions of improved surveillance facilitated by a live monitoring dashboard. There was a 34% reduction in falls rate and a 67% saving in manpower hours.

## Bedside Alarm Recognition system

Various medical equipment and devices are used in the acute hospital for treatment or monitoring purposes. Medical equipment, including medication pumps, dialysis machines and ventilators, commonly triggers an audio alarm to signal the need for a nurse's intervention. These alarms can be both critical and time-sensitive, requiring immediate attention. In an isolation room ward configuration, sound levels emitted from the alarms are inadvertently lowered when the room doors are closed, sometimes even being inaudible from outside the patient room. This poses a safety issue when the nurse cannot be alerted in time to an equipment alarm, delaying the response to a critical situation and potentially resulting in a failure-to-rescue event. Solutions such as the use of sound amplifiers and baby monitors were assessed to be inappropriate for deployment in healthcare environments due to the need to maintain confidentiality of conversations occurring within the patient room and to ensure that patient privacy is preserved.

The Bedside Alarm Recognition (BAR) solution was co-developed with an industry partner to address the safety issue. BAR leverages on proprietary audio signal processing and machine learning techniques to enable the recognition of a range of medical equipment audio alarms while filtering human conversations and ambient noises in real time. Once the BAR device successfully recognises a medical equipment's audio alarm in the patient room, it relays the information to an external alarm indicator unit which includes both audio and visual indicators to alert the nurses for timely intervention. The BAR solution is also designed with the capability to automatically disarm when the equipment alarm is attended to and this feature enhances the ease of use and operational efficiency. Figure 2 illustrates the key benefits and features of the BAR solution.

The BAR solution is designed as a plug and play system where the device can be plugged directly into the electric wall socket in any room to facilitate rotational use of the device in different isolation rooms when needed. The BAR solution is currently in its prototype phase and will be evaluated for its performance to ensure 100% sensitivity in detecting and transmitting the alarm signals and providing a low false positive rate to prevent alarm fatigue among the nurses.

## Conclusion

This article demonstrates how two innovative technological solutions developed locally by nurses could contribute significantly to patient safety. Advances in technology (eg, use of thermal sensors) can be leveraged to increase the range of digital offerings that can be creatively adapted for application in clinical settings. Nurses are aptly positioned to change practice at point of care and should continuously seek innovative ways to optimise technology for safer and better care. ◆

***Legend***

*1. PreSAGE® system set-up and operational workflow*

*2. The BAR solution's key technology features and benefits*

***References***

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Shu Yin is currently chief nurse at Tan Tock Seng Hospital. She enjoys gaining experiential knowledge in the quality and patient safety domain and has implemented several quality improvement initiatives to improve care and quality outcomes. She believes in designing the work environment to empower and enable every staff to improve and innovate and continues to seek technological solutions to digitalise the workplace for better and safer care.

Wendy is a senior nurse manager in the Quality department at Tan Tock Seng Hospital. She is also involved in innovation projects for better patient outcomes and experience. She envisions to enhance and provide safe and quality care for patients through improvement and innovation leveraging on technology.


# ULTRASOUND IN PRIMARY CARE

Text and photo by Dr Kwong Seh Meng

Point-of-care ultrasound (POCUS) has enjoyed increased interest and exposure over the last decade. A quick, non-invasive investigation modality is always a welcome tool in a clinic. Also, because ultrasound allows one to actually see in real time what we can only infer through history, palpation and/or auscultation, it is an exceptional feedback tool of the clinical examination.

POCUS was endorsed by the American Medical Association in 2001. Doctors from diverse specialties can, should, and have been trained to use ultrasound within their scope of practice.

## How ultrasound is being used

Traditional piezoelectric probes have varying frequency ranges allowing proper penetration, image acquisition and good resolution of different organs. Very commonly, primary care doctors started off using POCUS within the familiar realms of obstetrics (acquiring the basic parameters for antenatal care – fetal presentation(s), amniotic fluid index, cardiac activity, placentation and estimated fetal weight). As practice grew,

**Table 1. The ever-increasing applications of ultrasound in primary care**

| | | |
|---|---|---|
| Acute | Obstetrics and Gynaecology | Assessing delayed menses, diagnosing pregnancy, threatened abortions/ectopic pregnancies, pelvic inflammatory disease, domestic helper check-ups, routine well-mother antenatal scans, "discovering" intrauterine contraceptive devices, etc |
| | General Surgery/ Gastroenterology | Assessing lumps and bumps, biliary colic, gallbladder stone/sludge, assessing acute jaundice, ureteric colic and acute hydronephrosis, triaging benign prostatic hyperplasia, testicular pain, assessing the acute abdomen, hernias, or for foreign bodies and post-removal checks (glass especially), etc |
| | Vascular | Detecting or monitoring abdominal aneurysms, bedside peripheral vascular access, assessing deep vein thrombosis or varicose veins, measuring carotid intima thickness, etc |
| | Eye | Assessing acute floaters for retinal detachment, measuring optic nerve diameter in raised intracranial pressure |
| | Orthopaedic | Assessing muscular strains/ligament or tendon tears or overuse injuries (usually by comparing both sides), imaging acute joint swellings, assessing the median nerve in carpal tunnel syndrome/other nerve entrapment, imaging peripheral nerve for nerve blocks, etc |
| | Lung/Respiratory | Assessing pneumothorax/shortness of breath (SOB), pneumonia, pleural effusions, assessing high-risk COVID-19 patients with SOB, etc |
| Chronic | Chronic non-communicable disease | Assessment of fatty liver, simple kidney/liver cysts, renal parenchyma thickness in chronic disease, assessing ventricular wall motion abnormalities, ejection fraction in simple cardiac assessments, etc |
| | Home care | Vascular access, ascitic tap, assessing the inferior vena cava for fluid status, assessing disease burden (when patient has eschewed further hospital visits), etc |
| | Nursing home | Checking nasogastric tube placement (where nurses may be uneasy with equivocal litmus paper results), difficult indwelling urinary catheter (IDC) placement or when the IDC is blocked, following up on simple kidney/liver cysts, assessing lumps and bumps and communicating the risks to family, assessing the lung for pneumonia (in delirious shouting patients) or haematuria/urinary tract infection in uncooperative and institutionalised patients, assessing residents with frequent chest pain/swollen limbs. To assess body functions at end of life |

*The above table of uses does not imply a clinical problem can be totally managed with POCUS – having the modality in most cases presents the clinician with more information and an opportunity to risk-stratify and safely guide next steps, where the absence of POCUS would have forced a community clinician to refer onwards.*

physicians have found many other uses for it. With the advent of multi-frequency probes via microchip technology (eg, the Butterfly iQ), the opportunities have only multiplied (see Table 1).

One simply starts by scanning themselves first. It was interesting to discover renal cysts and a gallbladder polyp in my scans. It was instructional to discover my biceps tendon had been transposed anteriorly by the surgeon during the operation for a bad shoulder injury almost a decade ago. I had to correlate it with the operation notes on the National Electronic Health Record (accessed via another kind colleague's account! Ahem!).

I am blessed to have been exposed to routine bedside ultrasound work in my postings in general surgery and urology during my medical officer days. This foundation made getting started much easier. Getting a certificate in General Abdominal Ultrasound at the Singapore General Hospital's Postgraduate Medical Institute certainly helped to allay some fears. But this was not enough though.

## Pitfalls of POCUS

The problem with early adopters is that the naysayers are mostly right.

A POCUS practitioner does have to heed the concerns of their vastly more experienced radiology colleagues, because ultrasonography is operator-dependent. You will not see pathology if you are not even aware of its existence or what it is supposed to look like. Continuous learning is thus essential. Certain organs are much harder to learn to scan (eg, cardiac) than others. Having said that, the chances for absolute safe practice in a clinical environment reduces significantly as one moves into the community.

Even with the appropriate certification and background work, I have been caught out before (more than I would have liked, but thankfully less). I am forever indebted to the many colleagues and teachers who have given open, constructive feedback and probed my enthusiasm with sincere questions and pointers. I am also grateful to friendly radiographers who graciously provided image acquisition tips. Consistent, high-quality feedback is essential wherever one is practising.

However, an inquisitive mind grounded in the basic medical sciences and the principles of ultrasound is also required to push the envelope and find new areas of application. Take the role of lung ultrasonography for risk-stratification of COVID-19-positive patients for instance, borne more out of necessity for lack of other imaging resources and a need for reducing patient contact and maintaining sterility.

Self-learning via multiple free and paid online websites, and attending local or overseas courses (out of one's pocket) certainly helped too. Of note, one should try to avoid courses the ultrasound teaching community refer to as "Pump and Dump", where techniques are taught or quickly demonstrated during the session which leaves no avenue for feedback for further practice on image acquisition – the certificate is useless then.

## The local scene

Pre-COVID-19, there were fledgling courses organised by the National University of Singapore for POCUS-related work, but the pandemic had since put a stop to that development. It was saddening to hear that courses were suspended after many years of background work to bring accredited teaching to Singapore. I look forward to those courses resuming soon.

But while COVID-19 took away the teaching, it brought patients closer to accepting the bedside scan. Especially since many simply did not want to visit the hospital or anywhere else.

Ultrasound probe companies have not been slacking either. As we may be aware, there are high distribution costs after the Health Sciences Authority's approval for the machine/probes, which may bump the retail price of a portable ultrasound set beyond S$15k when it is being sold for around S$4k to S$5k elsewhere in the world. With more practitioners and growing interest in the devices, it would not be unrealistic to expect better probes at a much cheaper price point in the near future (one can already buy wireless probes for veterinary medicine on AliExpress and Taobao for approximately S$2k). Battery life, heat management, improved portability, cloud storage, remote consulting and artificial intelligence-guided image acquisition and labelling are some of the common trends in this space. Sonosite (Fujifilm), Clarius, EchoNous and GE Healthcare are some ultrasound-probe companies that come to mind.

It is also heartening to learn that medical students are now given the opportunity to use bedside ultrasound in their pre-clinical years (some American universities even presented students with a probe together with their white coat). I wonder if they are allowed to bring the probe to the dissection hall (pre-dissection)? It is hoped that this new group of students will come to find more high-value applications to bedside ultrasound and break the boundaries of clinical medicine for the benefit of all patients.

## Non-clinical perks

One of the greatest joys of practising ultrasound personally has to be documenting my third child in utero – from an intrauterine gestational sac, to her break-dancing with her stubby hands and feet at 12 weeks, to thumb-sucking, giving me the middle finger on the scan when she was at 20 weeks and making me guess her gender (I searched high and low for testes of course!).

I am immensely satisfied by my post-graduate journey to learn POCUS, and I look forward to discussing POCUS images with and learning from my colleagues in the near future! ◆

***Legend***

*1. The author's daughter flipping the finger in utero*

Dr Kwong is a GP anchor who also practises in a nursing home. He last contributed to *SMA News* for "Overcoming the Last Mile on Diabetes" with a cartoon guide to Type 2 diabetes (http://bit.ly/4810-Opinion2) which he still finds to be the best tool for explaining the condition to patients.

# POCUS in Singapore EDs

Text and photo by Dr Toh Hong Chuen

This story began 20 years ago.

Supported by Mr Tan Tee How, then-CEO of the National Healthcare Group (NHG), three emergency department (ED) heads (A/Prof Peter Manning, A/Prof Eillyne Seow and A/Prof Francis Lee) from the cluster went down under to Australia on a study trip to learn how to use ultrasound to manage trauma patients. Point-of-care ultrasound (POCUS) was about to cause a paradigm shift in emergency medicine (EM), and there were two reasons for this.

Firstly, almost out of the blue, there was this new bedside tool that could help improve diagnostic accuracy and increase safety and success of many emergency procedures. Secondly, the nature and practice of EM revolves around one central construct: time. Because the physician who orders, performs, interprets and acts on the scan is one and the same, emergency ultrasound (EUS) could dramatically shorten the entire clinical decision-making process, saving precious time, manpower resources and possibly even lives.

Returning from the trip, the trio never looked back.

## Laying the foundation

The first chapter was a difficult one to write. Back in year 2000, EUS was a complete non-entity in Singapore; there were no machines, trainers, curriculum, credentialing mechanism or quality assurance. There were doubts regarding its utility in the real world and serious concerns regarding the start-up resources and uncertain medico-legal implications. The sentiments were best summed up by Dr John Forbes' remark made two centuries earlier in his preface to the translation of René Laënnec's treatise on the newly invented stethoscope, "that it will ever come into general use, notwithstanding its value, I am extremely doubtful; because its beneficial application requires much time, and gives a good deal of trouble both to the patient and the practitioner".

To begin, the EUS pioneers in both Singapore Health Services and NHG took small but significant steps in quick succession. Anchoring on the two most widely accepted applications in literature at that time – focused assessment with sonography in trauma (FAST) and focused assessment for abdominal aortic aneurysm (AAA) – key stakeholders within and outside the EDs were engaged to achieve their buy-in.

Conversations with the departments of radiology and general surgery started. Working together, the three departments in Tan Tock Seng Hospital organised the first POCUS course in Singapore in 2005. A partnership like this helped promote its acceptance within the institution. Hospital administrators were engaged to secure funding for smaller, lighter and cheaper units tailored for point-of-care use. To create a platform for the local community to learn from overseas experts, international courses such as the ultrasound life support course from the World Interactive Network Focused on Critical UltraSound were introduced. Nationally, POCUS was incorporated in the emergency medicine's seamless curriculum. And to grow a critical mass of subject matter experts, consultants were sent overseas to take up emergency ultrasound fellowships. All these laid the foundation for subsequent chapters to be written.

## What it is, and is not

Soon, it became clear that one of the greatest stumbling blocks to the development of POCUS was the understanding of POCUS itself – the popular and prevailing notion that POCUS was an extension of a physical examination. Rather, it should be seen as a procedural skill, yielding the fruits of a point-of-care test like the ECG, portable X-ray and glucose meter.

The difference may seem subtle, but the implications are not. Take a patient with abdominal pain for instance. While one can learn how to and perform a thorough physical examination of the abdomen and arrive at a reasonable and defensible assessment, no emergency physician would have the proverbial 10,000 hours needed to gain mastery in performing abdominal sonography or clock a couple more thousands to interpret them like a radiologist. In the dynamic and hectic environment, there is also no time or space for a comprehensive radiological abdominal scan to be performed inside the ED.

Instead, before performing POCUS, one needs to be clear that there is a focused question that POCUS can

answer, usually in a distinct or binary "yes/no" fashion, like "is the aorta less than 3 cm?", and then using the findings to inform the clinical impression. One should not scan around the abdomen "hunting" for the cause of the patient's abdominal pain. In this way, the utility of POCUS is maximised, and misuse minimised. Having the POCUS assessment targeted and outcome focused also translates to a training programme that can be rigorously structured, with a high standard of competency attainable.

Last but not least, as it is not an extension, it should not be used as a replacement of physical examination.

## Changing practice through education

The transition to residency in the early 2010s opened a new window of opportunity for the development of EUS. In April 2013, with POCUS listed as one of the 23 milestones in EM training, a group of physicians, including A/Prof Francis Lee, Dr Ang Shiang Hu, Dr Chan Kim Poh and Dr Gene Chan, was tasked to develop the EUS curriculum for EM residency.

The curriculum would eventually be organised in two parts: resuscitation and focused organ-specific ultrasound. Key domains of competency were articulated, along with the number and types of scans that go into credentialing competency. Dedicated ultrasound scanning shifts, simulation training and the use of institutional quality audit as a teaching tool were proposed. On 11 July 2013, the EUS curriculum was endorsed by the EM Residency Advisory Committee and incorporated into the EM core curriculum. This marked a crucial milestone. From then on, succeeding generations of EM residents would be formally trained in and credentialed to perform EUS. Defined in the curriculum, POCUS became a standard of care across all EDs in Singapore.

## Scope of practice

Moving beyond FAST and AAA scans, the scope of EUS expanded considerably on both diagnostic and therapeutic fronts, such as the focused assessment of the heart, lung and inferior vena cava, as well as performing central line insertion, femoral nerve block and thoracocentesis. The increased proficiency in these applications is accompanied by a parallel capability in performing organ-specific scans within the POCUS framework, such as evaluating the gallbladder and kidney. With each application as a building block, a variety of ultrasound-integrated approaches and algorithms emerged, addressing common presentations such as chest pain, abdominal pain, dyspnoea and hypotension. This expansion is underpinned by a growing body of research supporting and directing the use of POCUS.

## A wider appeal

The interest in POCUS is clearly not restricted to EM in Singapore. Many specialties have also adopted it in various settings, from intensive units to specialist outpatient clinics. Accompanying this is a strong and growing demand for training. For example, within five years of its founding by A/Prof Francis Lee, the Alexandra Academy for Clinical and Emergency Sonography at Khoo Teck Puat Hospital registered more than 1,000 participants from over 20 countries, with most participants practising outside the ED. POCUS is also gradually being incorporated into both graduate and undergraduate medical education. With more providers being trained in and performing POCUS, one might argue that it is also starting to shape the way healthcare is delivered here in Singapore.

## Conclusion

Certainly, this story does not end here.

There are still many chapters and sections waiting to be written, which could include the creation of a local EUS fellowship, evolution of programmatic assessment in the curriculum, integration of POCUS findings into electronic medical records, research collaboration, engagement and partnership with other fraternities, and many more.

Reflecting on what and how the pioneers and fraternity have achieved over the last 20 years in developing POCUS in our EDs, I am hopeful that we shall be able to read more about them in the not-too-distant future. ◆


### Acknowledgements

*The author thanks A/Prof Eillyne Seow and A/Prof Francis Lee for sharing the historical perspectives mentioned in the article, and A/Prof Seow for kindly assisting in the review of the manuscript.*


***Legend***

*1. Dr Paul Wan (left) as a Year 4 medical student in 2011, learning to perform the FAST scan during his ultrasound elective from Dr Jerwin Pasco. Having completed his EM residency, Paul is currently a member of the EUS subcommittee*


Dr Toh is a senior consultant and head of department of the Acute and Emergency Care Centre at Khoo Teck Puat Hospital, with interest in POCUS and medical education. He is blessed with his wife Agnes and two teenage girls, Clara and Hannah.



# TIPS ON THE DOS AND DON'TS

Text by Dr Tan Yia Swam

This article presents my personal tips on handling the "new" era of social media. I'm not saying that it's the best, but I have not gotten into any trouble – yet!

For the official word on professionalism and advertising, please refer to the Singapore Medical Council's (SMC) Ethical Code and Ethical Guidelines 2016 (ECEG), as well as the accompanying Handbook on Medical Ethics. Also relevant are the Private Hospitals and Medical Clinics (PHMC) (Advertisement) Regulations 2019, although the regulations to be made under the upcoming Healthcare Services Act will in due course supersede the current regulations, after it is enacted and comes into force.

## Knowing your social media platforms

There are many social media platforms in the market: Facebook, Twitter, LinkedIn, YouTube, Pinterest, Instagram, Tumblr, Flickr, Reddit, Snapchat, WhatsApp, Quora and WeChat, not to mention all the different blogs, online forums and communities!

I discuss my approach to social media in these three broad categories:

1. What do I want to use it for?
2. How may I use it in a professional way?
3. How may I protect myself?

## What do I want to use it for?

Growing up, I used various platforms, depending on whatever the "in" thing was then. In fact, one might guess a person's age just by looking at the platforms he/she uses. Do you remember ICQ? Or Friendster? How about online games like Neopets and MapleStory?

For some, I either stopped using them or they died a natural death; others, I maintained because I actually found them relevant and useful, like WhatsApp for daily communications with friends IRL (in real life) and Facebook to keep in touch with overseas friends. Other platforms like YouTube are great for free music videos and surgical videos, and Pinterest for contents and images on art, comics, online shopping and food.

So, ask yourself, what do you use social media for? Is it for purely personal uses? To have an online presence as an influencer? To build a brand? Is it for business or leisure?

Next, decide which platform suits you. Will you be writing articles, or do you believe that a picture speaks a thousand words? Do you have the time or budget to maintain that social media presence and engagement? Keep in mind that healthcare is not quite like selling jewellery online; nobody dies from not getting a flower pendant immediately, but if you were to miss a question on an urgent medical condition – who is to be held responsible?

## How may I use it in a professional way?

It was only in recent years that I started to think about reaching out to the public. I had been reposting articles on my personal social media accounts, and sharing occasional thoughts about healthcare. Subsequently, wanting a larger audience while still maintaining some form of privacy, I started a blog. As I ventured into private practice, I felt the need to have some form of social media marketing. However, I also felt strongly that healthcare cannot translate directly to business, and there must not be any kind of incentivised ads on any of my social media accounts. The ECEG and PHMC (Advertisement) Regulations 2019 are very clear on this.

Yet these lines can be blurred when patients approach you on social media. And how about good friends who have

directed their relatives to you? ECEG Sections C12.5 to 7 cover the nature of relationships with patients and social media. I have also highlighted below some relevant segments of the ECEG and Medical Registration Act (MRA).

**ECEG Section C10: Visual or audio recordings of patients**

If I have a recorded segment of a surgery, can I show it on my social media? Keep in mind that if the patient is identifiable, explicit consent must be obtained.

**ECEG Section D3: Comments about colleagues**

What if a reader posts a question about their own doctor? What would be the appropriate and professional way to reply? Keep in mind that one has not assessed this patient's condition and has no way to verify if the reader is who he/she claims to be, or whether the facts of the case are as stated.

**ECEG Section G: Advertising**

Please study this section inside out as you embark on social media marketing. Some key points in brief: nothing self-laudatory ("Singapore's No. 1 Breast Surgeon!"); nothing that is sensationalised ("She would have died, but I stepped in and saved her life"); and nothing that has financial inducement ("Come in for a visit now and get a set of beauty collagen masks from Korea for free! While stocks last!").

**MRA Section 39(1)(a)**

Where a doctor can be the subject of a complaint to the SMC for "*the conduct of a registered medical practitioner in his professional capacity or on his improper act or conduct which brings disrepute to his profession*".

The nature of the medium used may unfortunately accentuate the impact of an act, thereby bringing "disrepute to the profession". Take this scenario for example: I attend a wine tasting event and have sips of four types of wine. I exercise responsibility and take a hired car home, but I flush red easily. That one photo published by the event organiser may then draw comments ("Wow, how much did you all drink?"), and speculations ("I wonder if she could drive after that?"; "Oh my God, she operated on me the next day!"; "*Wah lau*, these doctors all drink a lot!")

It may not matter that my alcohol level was already back to normal – the magnifying effect of social media draws negative comments, and this brings disrepute to the profession.

## How may I protect myself?

Singapore is very small, and our various communities overlap frequently. How many times have you found out in the midst of consultation that the patient and you went to the same school, or grew up in the same neighbourhood, or have a common friend? An even more awkward situation may be that their spouse was your ex!

Online, these connections get amplified. With the power of Google, any information you share online never goes away. If a person searches hard enough, there will be something that you might have forgotten about (or wished to be forgotten!). Another fictional example: a video of you drunk and dancing half-naked, or making some undying declaration of love to your junior college crush – who is now married to your head of department.

I share here some reminders on how we can protect ourselves online:

1. Behave as well as you can in real life (Thank goodness social media wasn't popular in my teens!);
2. Behave well online;
3. Maintain a private space (some do not have a personal online presence, just pure business);
4. Learn to set boundaries: Check the privacy settings of various platforms, keep track of regular updates and cleaning up of data;
5. Have a bunch of real life friends who are also your online friends – they help to look out for accounts impersonating you and alert you early, so that you can report to the relevant platform and post a warning on your main account.

## Sharing tips and tricks for everyone

I hope my simple guide will be helpful for colleagues on social media. Younger readers (who are probably way more internet savvy): if you have any additional tips to share, do send them in to news@sma.org.sg. Now, I better go check on my privacy settings!

Stay safe, and have fun! ◆


## Acknowledgements

*The author wishes to thank Mr Lek Siang Pheng, deputy managing partner for Dentons Rodyk and SMA Honorary Legal Advisor, for his input in this article.*



***Further readings***

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Dr Tan is a mother to three kids, wife to a surgeon; a daughter and a daughter-in-law. She trained as a general surgeon, and entered private practice in mid-2019, focusing on breast surgery. She treasures her friends and wishes to have more time for her diverse interests: cooking, eating, music, drawing, writing, photography and comedy.


# SURVEY ON
# Integrated Shield Plan Providers

Text by Dr Ng Chee Kwan, SMA 1st Vice President

*The majority of specialists had issues with the implementation of Integrated Shield Plan (IP) panels, and the implementation of IP panels and pre-authorisation had an impact on patients' quality of care.*

Many Singaporeans depend on IPs to cover for their hospitalisation costs in private hospitals. The IPs cover the costs of the hospital facilities, room and board, as well as the fees of the private specialists. Private specialists, especially those who treat mainly Singaporeans with IP policies, are particularly affected when there are changes in these policies.

In 2016, the Health Insurance Task Force (HITF) came up with several recommendations to tackle the rising cost of health insurance in Singapore, including the introduction of fee benchmarks, implementation of panels of preferred healthcare providers, and pre-approval of medical treatments.[1] Accordingly, the Ministry of Health (MOH) came up with fee benchmarks for over 200 common surgical procedures.[2] IP providers implemented panels of preferred specialists, who provide inpatient treatment at rates that have been pre-determined by the IP providers. Patients are incentivised by their IPs to get treated by panel specialists, as they incur lower upfront costs and benefit from a longer period of post-hospitalisation cover. Subsequently, IP providers implemented a pre-authorisation process in which specialists are required to submit information on patients' medical conditions, proposed treatment and estimated costs for IP provider's approval before hospitalisation.

Anecdotally, many specialists had expressed their concerns about the implementation of the panels as well as the pre-authorisation process. These complaints included:

a. Panel specialists are remunerated insufficiently, often below the lower range of the fee benchmarks;

b. It is difficult for doctors to get on some panels;

c. It is difficult for panel doctors to refer patients to an appropriate specialist due to limited choices;

d. The amount of information requested in the pre-authorisation form is excessive;

e. The pre-authorisation process causes undue delay in patients' treatment; and

f. The amount pre-authorised is insufficient to cover the total bill.

SMA thus commissioned an online survey to obtain specialists' opinions on these issues.

The survey was conducted on the online SurveyMonkey platform, between 18 September and 2 October 2020. An invitation to participate in the survey was emailed to all SMA Members on the mailing list on 18 September 2020, and a second reminder was sent on 27 September 2020. In addition, a direct link to the survey was provided to SMA Council members for the purpose of distribution via WhatsApp chat groups. The survey comprised 25 questions (https://bit.ly/2R6OwPp). Specialists were required to provide their names and MCR numbers, as a measure to improve the validity of the survey.

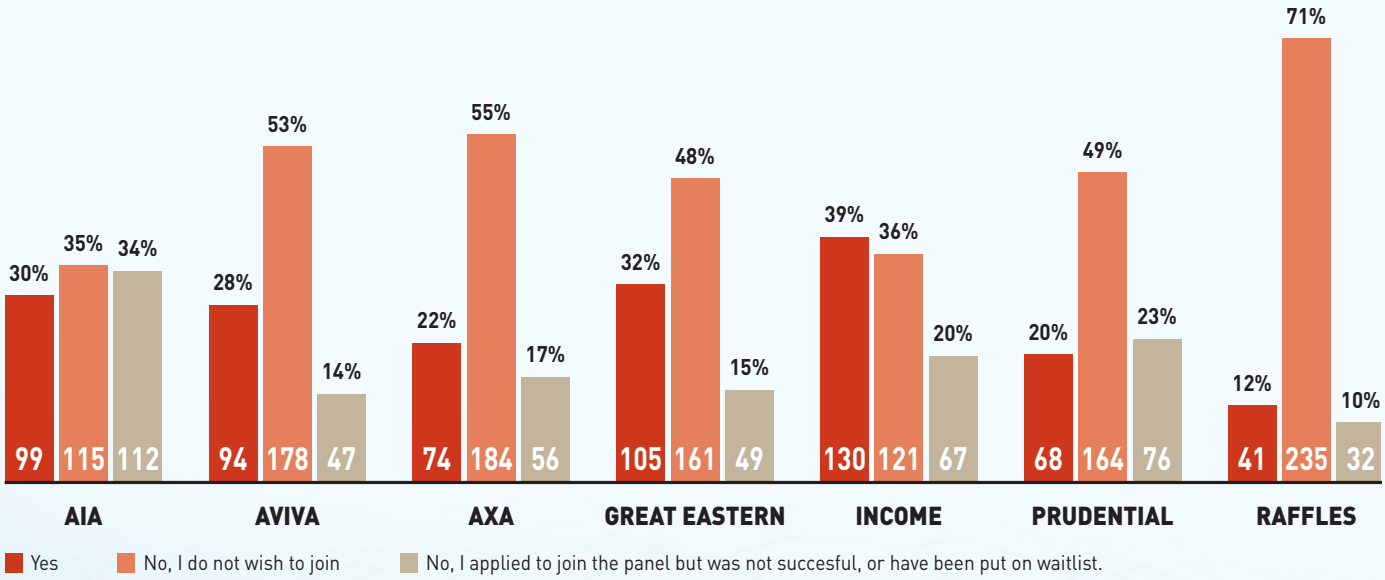


*Figure 1. Are you on these integrated shield plan panels?*

There were 333 specialists who completed the survey, of which 97% were practising in private practice and 3% in restructured hospitals. The summary and discussion of the results of the survey are as follows:

- The participation of specialists in panels was relatively low, with the lowest at 12% (Raffles Health) and highest at 39% (NTUC Income). A substantial percentage of specialists did not wish to join panels, ranging from 35% (AIA) to 71% (Raffles Health). There was a significant percentage of specialists who wished to join panels but were not able to do so, ranging from 10% (Raffles Health) to 34% (AIA) (see Figure 1).
- Across the IP panels, the majority of panel specialists responded that the panels only allowed remuneration below their usual fees, with the exception of the NTUC Income panel, where the majority of panel specialists responded that the panel allowed remuneration comparable to their usual fees (see Figure 2).
- 53% of specialists had more than ¼ of their patients seek treatment elsewhere because they were not on the patients' IP panel (see Figure 3). This shows that the introduction of IP panels has affected specialists' practice in that a significant number of patients decided to seek treatment elsewhere when the respondent was not on the patients' IP panels.
- 63% of specialists had a view that IP providers should allow all specialists to join their panels (see Figure 4a). In addition, 14% of specialists who selected "Others" gave comments that there should not be IP panels (see Fig 4b).
- 64% of specialists would accept minimum remuneration at the mid-range of the MOH fee benchmarks, 22% would accept minimum remuneration at the upper bound of the fee benchmarks, and 13% would accept minimum remuneration at the lower bound of the fee benchmarks. None of the specialists would accept remuneration below the fee benchmarks (see Figure 5).
- 57% of specialists had previously been unable to refer patients to an appropriate panel specialist, due to limited choice, while 11% did not have this problem (see Figure 6). This is a surprising statistic and reinforces the view that the current number of specialists in IP panels is insufficient to provide for patients' total healthcare needs.
- With regard to pre-authorisation, 56% of specialists thought that the information requested in the pre-authorisation form was excessive, while 34% did not think so (see Figure 7). The percentage of specialists that responded that the pre-authorisation process of the IP provider had caused an undue delay in their patients' treatment ranged from 9% (Raffles Health) to 35% (AIA) (see Figure 8). The percentage of specialists that responded that there were instances when the amount pre-authorised by the IP provider was insufficient to cover the total estimated bill ranged from 11% (Raffles Health) to 46% (AIA) (see Figure 9). Overall, the results suggest that the pre-authorisation process could be improved.
- The percentage of specialists that responded that the insurance companies had previously questioned their clinical indication for treatment ranged from 15% (Raffles Health) to 48% (Aviva) (see Figure 10). This demonstrates a shift in IP providers' attitude in actively questioning doctors' treatment before they are willing to authorise treatment.
- When specialists were asked to rate their experiences with the IP providers, the mean experience rating (1 representing the worst experience, 5 representing the best experience) ranged from 2.11 (Aviva) to 3.24 (NTUC Income). Only two insurance companies (NTUC Income and Prudential) achieved a mean rating above 3 (see Figure 11). This could be due to attractive remuneration rates – NTUC Income has the best remuneration rates (see Figure 2). In addition, specialists had more positive experiences with these insurers – they had less issues with NTUC Income and Prudential in terms of delays in patients' treatment (see Figure 8) and questioning of clinical indications for treatment (see Figure 10).
- The key statistics from the survey are listed in Table 1.

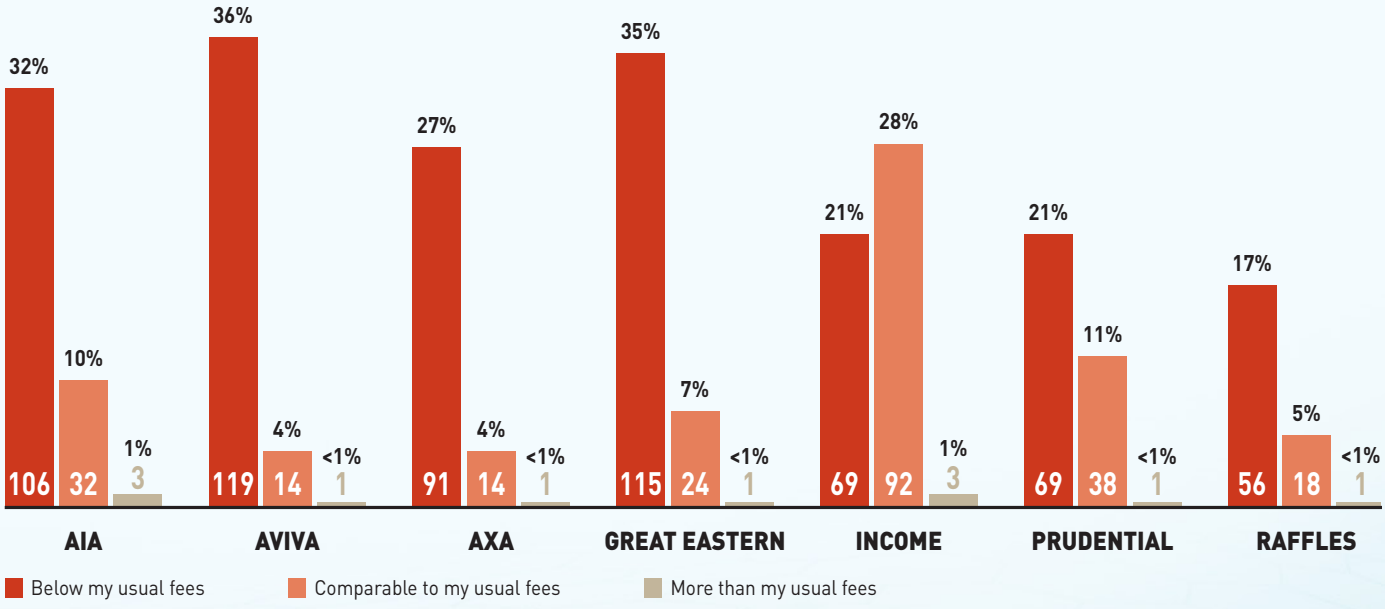


*Figure 2. If you are an IP panel specialist, how do the fees that you are allowed to charge compare with your usual fees?*

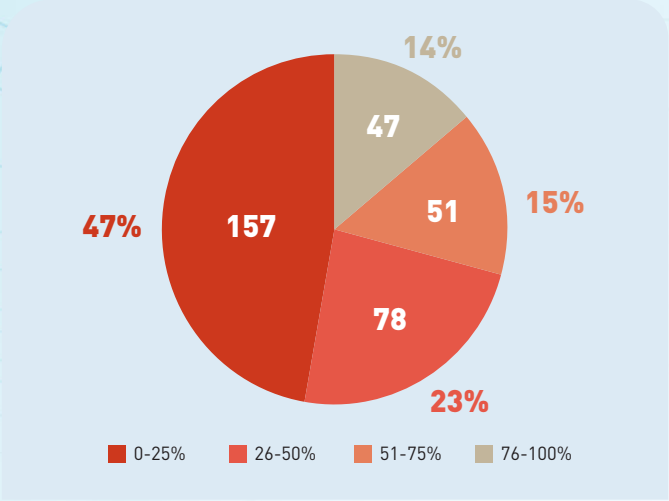


*Figure 3. What proportion of your patients decide to seek treatment elsewhere because you are not on their IP panel?*

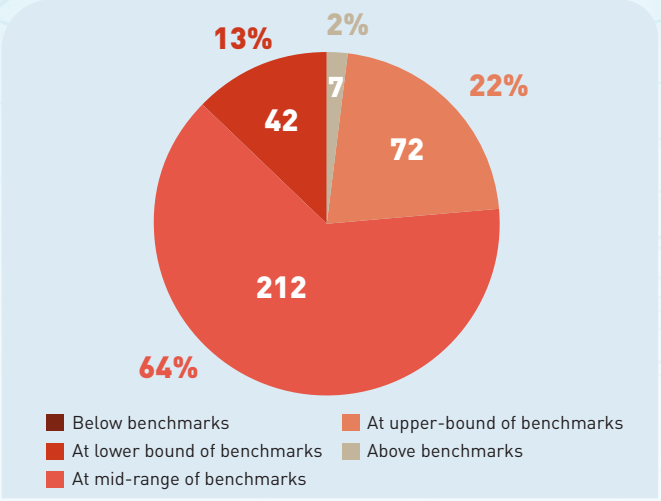


*Figure 5. What is the minimum remuneration that you would accept as a panel specialist, using MOH fee benchmarks as a reference?*

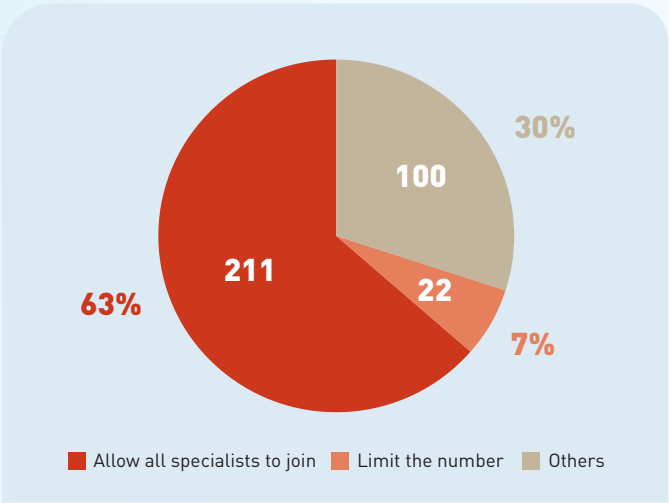


*Figure 4a. What is your view with regard to insurance companies accepting specialists into their IP panels?*

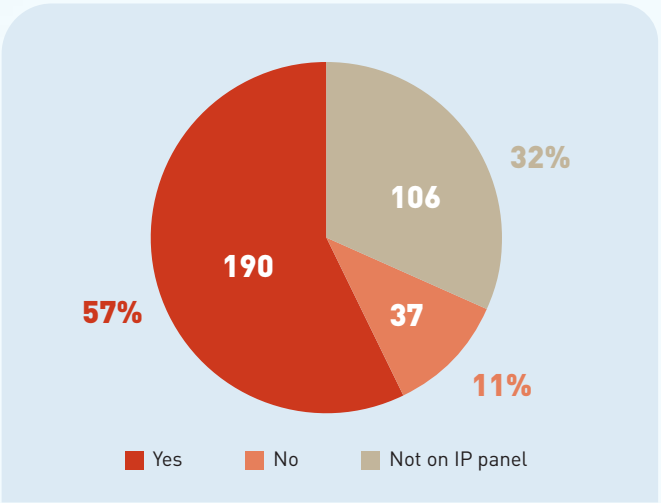


*Figure 6. If you are on IP panels, have you previously been unable to refer your patients to an appropriate panel specialist, due to limited choice?*

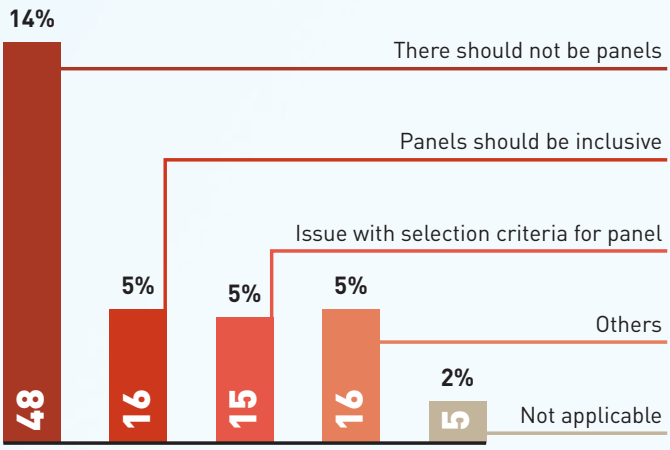


*Figure 4b. What is your view with regard to insurance companies accepting specialists into their IP panels? Comments made under 'Others'*

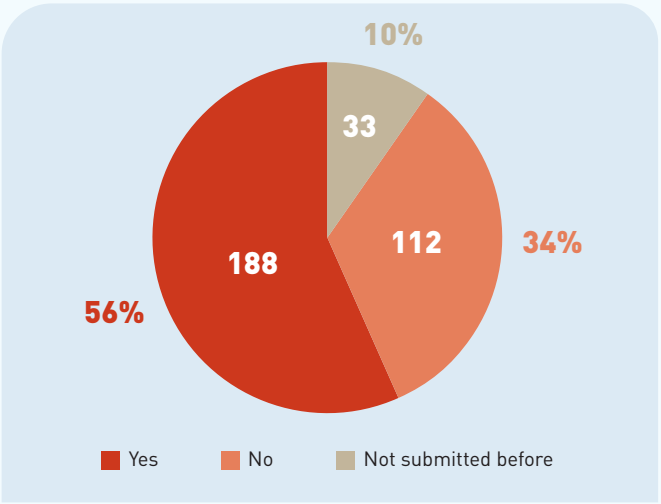


*Figure 7. Do you think that the information requested in the pre-authorisation form is excessive?*

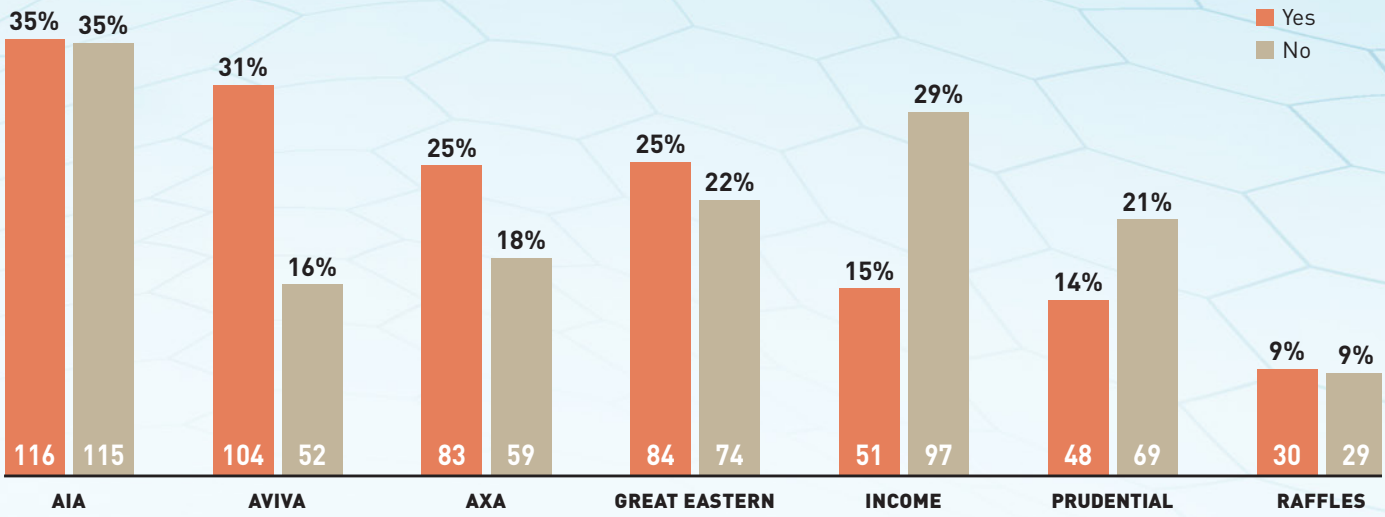


*Figure 8. Has the pre-authorisation process of the insurance companies caused an undue delay in any of your patients' treatment?*

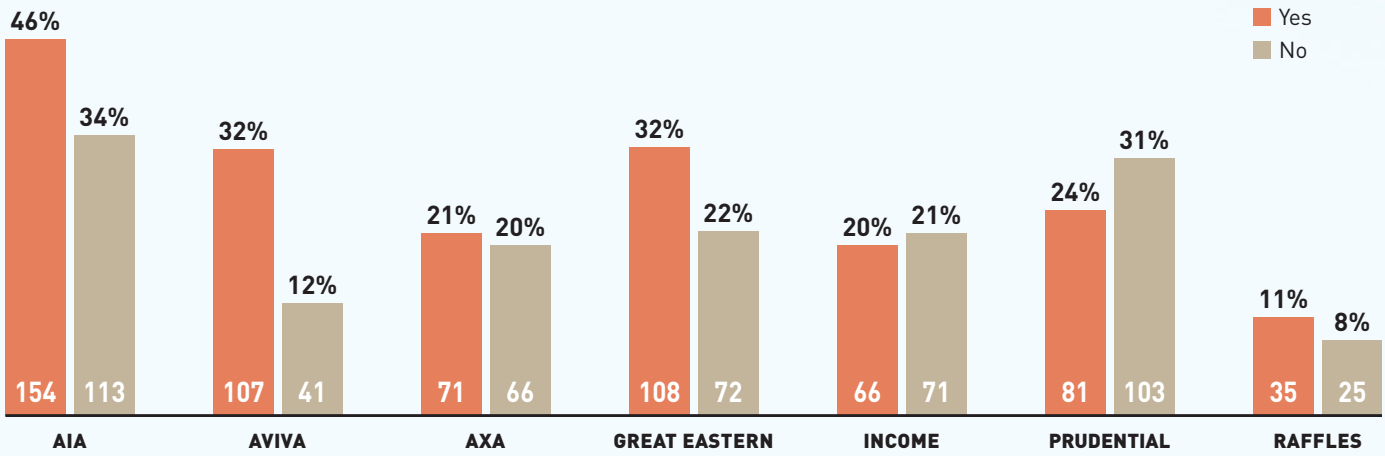


*Figure 9. Have there been instances when the amount pre-authorised by the insurance companies was insufficient to cover the total estimated bill?*

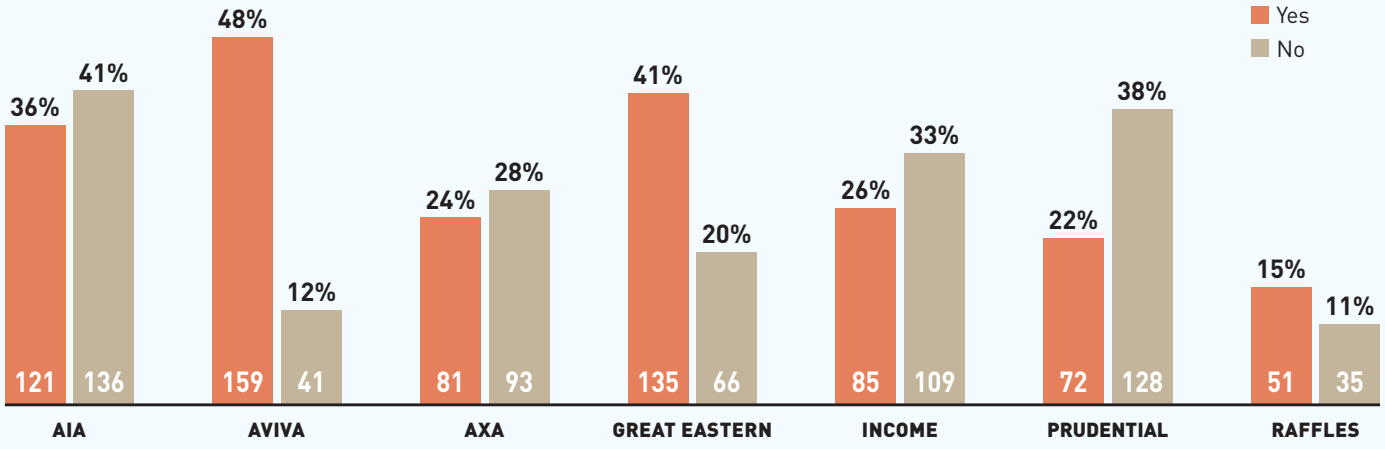


*Figure 10. Have the insurance companies previously questioned your clinical indication for treatment?*

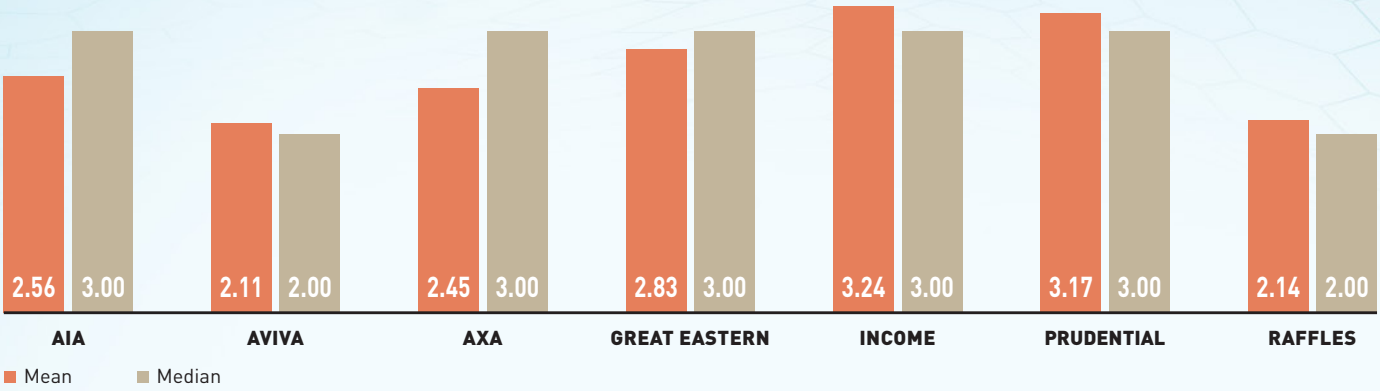


*Figure 11. On a scale of 1 to 5, how would you rate your experience with this insurer?*

## Table 1. Key Statistics

| | |
|---|---|
| Number of specialists who completed the survey | 333 |
| Percentage of specialists on IP panels | 12 to 39 * |
| Percentage of specialists who did not wish to join IP panels | 35 to 71 * |
| Percentage of specialists who were unsuccessful in joining IP panels | 10 to 34 * |
| Percentage of specialists who had more than ¼ of their patients seeking treatment elsewhere because of IP panels | 53 |
| Percentage of specialists who had a view that IP providers should allow all specialists to join their panels | 63 |
| Percentage of specialists who would accept minimum remuneration at the mid-range of the MOH fee benchmarks | 64 |
| Percentage of specialists who had previously been unable to refer patients to an appropriate panel specialist, due to limited choice | 57 |
| Percentage of specialists who thought that the information requested in the pre-authorisation form was excessive | 56 |
| Percentage of specialists that responded that the pre-authorisation process of the IP provider had caused an undue delay in their patients' treatment | 9 to 35 * |
| Percentage of specialists that responded that there were instances when the amount pre-authorised by the IP provider was insufficient to cover the total estimated bill | 11 to 46 * |
| Percentage of specialists that responded that the insurance companies had previously questioned their clinical indication for treatment | 15 to 48 * |

* Varies according to IP panel

## Conclusion

As far as we know, this is the first comprehensive survey of specialists' opinion on IP providers. The number of specialists who participated in this survey is around 22% of the approximated 1,500 specialists in private practice in Singapore. The number of specialists could have been limited by the requirement for specialists to provide their names and MCR numbers. The results could be viewed as a reflection of the opinions of the general body of specialists. However, there could be selection bias, in that those with issues with the IP providers could have chosen to participate, while those who had no issues did not. In addition, as this was an electronic survey, specialists who did not have email or WhatsApp chat group access would not have been able to participate.

In summary, this survey shows that the majority of specialists surveyed had issues with IP panels, in terms of remuneration, difficulties in getting on the panels and patients having to seek care elsewhere. Patient referrals were also compromised due to limited choice of panel specialists. The pre-authorisation process sometimes caused delays in patients' treatment and there were instances when the pre-authorised amounts were insufficient to cover the total bill. During the pre-authorisation process, specialists were often asked to provide excessive information, and IP providers frequently questioned specialists' indications for treatment.

We hope this survey will assist IP providers, MOH and the respective professional bodies in their efforts to improve IP policies, for the benefit of all parties concerned. ◆

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*1. Health Insurance Task Force. Managing the Cost of Health Insurance in Singapore. Available at: https://bit.ly/2G8GYWP.*

*2. Fee Benchmarks Advisory Committee Report. Available at: https://bit.ly/3slPtuT.*

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# STRENGTH IN TIMES OF ADVERSITY

Denisse is a Year 5 medical student at the University of Edinburgh.

Singapore Medical Society of the United Kingdom (SMSUK) rounded off 2020 with two online events – one for our members in the UK and the other for members studying remotely in Singapore. For those in the UK, we hosted a "Wine and Dine" social event on 19 December. Participants were given the option of making mulled wine or baking together in breakout rooms, with a mini competition held to vote for the best creations! We also incorporated our ever popular "speed-dating" segment, with participants rotating through breakout rooms given seven minutes at a time to meet fresh faces. Our members in Singapore had the opportunity to get together with fellow SMSUK members to bake Christmas-themed treats and stood a chance to win shopping vouchers with the video of their baking process!

We are proud to have started 2021 on a high with our sixth annual conference, held on 6 and 7 February. This year, our committee collaborated with Malaysian Medics International UK and the Hong Kong Medical Society of the UK to bring together medics from all three societies. Our conference this year focused on contemplating the attributes and skills needed to succeed in the medical profession amid times of uncertainty and rapid medical and technological advancements. With talks ranging from humanitarian work to coding in medicine, our conference delegates certainly had much food for thought! Despite being unable to gather in London as with previous conferences, the planning committee successfully brought together enthusiastic delegates and experts at the top of their fields from Singapore, Malaysia, Hong Kong, the UK, and even Timor Leste and Germany!

The 26th Committee of SMSUK will be stepping down in March and handing over our duties to the 27th Committee. On behalf of the 26th Committee, I would like to express our deepest gratitude to SMA for the valuable opportunity to share about our society in this column and for the *SMA News* team's guidance and partnership throughout our term. We look forward to many more years of collaboration with SMA!

– Tan Ying Hui, Editor, SMSUK

2020 has, to say the least, been a year riddled with unprecedented global disruption to our lives, jobs and relationships with one another.

What started out as an outbreak in late December 2019 eventually developed into a full-blown pandemic that has changed the world through social distancing, closure of schools and non-essential businesses, and limitations on travel. Wearing masks and washing hands have now become the norm for everyone – difficult changes that we all had to adapt to quickly.

## COVID-19's impact on medical education

Life before the pandemic feels like a distant memory. March 2020, I was on a week-long vacation in Budapest and was taking in the breath-taking skylines by the Buda Castle when I received a notification from the medical school: "Owing to the widespread transmission in Edinburgh and the rest of the UK, our clinical placements for the rest of the term have been cancelled and we are allowed to go home and conduct the course online." Medical education was not spared from the impact – curriculum and assessment were restructured with major changes to clinical placements. Needless to say, we were shocked and anxious about the uncertainty that came with learning clinical medicine online.

As the number of COVID-19 cases accelerated in the UK and showed no signs of abating, my parents urged me to return home to Singapore. I underwent a self-induced, non-mandatory 14-day home quarantine (just to make sure I was socially responsible to those around me). Over the next few days, Edinburgh Medical School took swift action to transition our Year 4 cohort to online learning, holding daily live tutorials interspersed with patient case scenarios to simulate how we would approach and manage medical conditions in a real clinical setting. Our end-of-year assessment was changed into an online open book examination and objective structured clinical examinations were postponed to the following academic year.

Although lecture style teaching was readily converted to an online configuration, interactive small group sessions and clinical exposure were not as readily recreated. Given the change in the medical school's curriculum structure, the pandemic has birthed an exasperating dichotomy for medical students. A virus that capitalises on human contact for survival is hindering an educational ecosystem that also necessitates human interaction.[1]

Online learning is useful and convenient, but is it enough to replace face to face clinical exposure? Our medical school harboured those same thoughts and decided to introduce a three-week Year 4 catch-up placement in Year 5. To facilitate the extra catch-up and to make up for lost time, adjustments were made to Year 5 placements. While we normally have six-week blocks of O&G, paediatrics and psychiatry, each, as well as four-week blocks of other specialties (dermatology, ENT, ophthalmology, etc), these are now curtailed to five- and three-week blocks, respectively.

## Going back onto the wards again

I flew back to Edinburgh in late July in time for Year 5 and went through 14 days of quarantine. The thought of being able to get back onto the wards after months of online learning made those isolating days a bit easier to get through. We were assigned to shifts such that there would only be one or two medical students on the ward or in clinic at any one time, including weekends and night shifts.

After attending a mandatory session on donning and doffing of personal protective equipment, I was finally able to step into the hospital again! The excitement of seeing and talking to patients, and observing and assisting with clinical procedures reignited the joy of medicine in me. It was after all the genuine rapport and interactions, the patient-doctor relationship, and the ability to provide comfort and hope to the infirm that drew me to embark on this long and arduous medical journey in the first place.

On the wards, I realised that many things had changed due to the pandemic. As the UK government prepared for an influx of COVID-19 cases, the National Health Service was instructed to reduce the number of non-essential medical services. Surgical procedures were reduced and patient follow-up intervals were lengthened in a bid to prevent the health system from crumbling under pressure. After months of fighting the virus, healthcare professionals were also beginning to suffer from COVID-19 fatigue. Medical education has since taken a back seat. Fewer patients coming into hospital translates to fewer face-to-face clinical opportunities for us. We were also barred from any aerosol-generating procedures such as bronchoscopy and intubation.

With that in mind, the medical school adopted a hybrid learning approach, supplementing reduced clinical exposure with online teaching sessions and resources. Although I had expected this, I still felt slightly disappointed about missed clinical opportunities. Nevertheless, I strove to make sure that I maximised whatever time that was assigned to me on the wards or clinics, be it involving myself in clinical procedures like taking bloods and setting IV plugs, or having a chat with patients about their lives and conditions.

## The importance of resilience in a pandemic

I would be lying if I said I wasn't stressed out by everything that happened in the last year. So many things in medical school (and the world) have been turned on their head and we were expected to adapt to these changes quickly. It did not help that with our limited interactions with fellow medical students and friends, we felt even more alone in this uphill "battle". The notion of resilience has never been more important than now: this ability to recover and bounce back in the face of adversity, to focus efforts on events that we have control over and to have the optimism to see bad situations as temporary rather than permanent.[2] This pandemic has built a strong sense of resilience in us, a key trait that would no doubt be of help to us when we graduate as doctors, dealing with workplace stresses, building coping strategies and developing self-efficacy.

It is unfortunate that COVID-19 has been disruptive to our medical education, but perhaps it reflects a recognition that a paradigm shift in the traditions of medical education may be necessary to prepare medical students and future doctors to face more novel crises in the years to come.

COVID-19 has exacerbated the uncertainty of the future and we do not know whether our medical education would be impacted further, but with the right mindset, resilience and optimism, we will rise to the occasion and come out stronger than ever! ◆


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*1. O'Byrne L, Gavin B, McNicholas F. Medical students and COVID-19: the need for pandemic preparedness. Journal of Medical Ethics 2020; 46(9):623-6.*

*2. MindTools. Developing resilience: overcoming and growing from setbacks. Available at: https://bit.ly/37iCbNu. Accessed 24 October 2020.*

# Project Sukacita

## Bringing Joy to Those We Serve

Text and photos by Chia Yi Mian

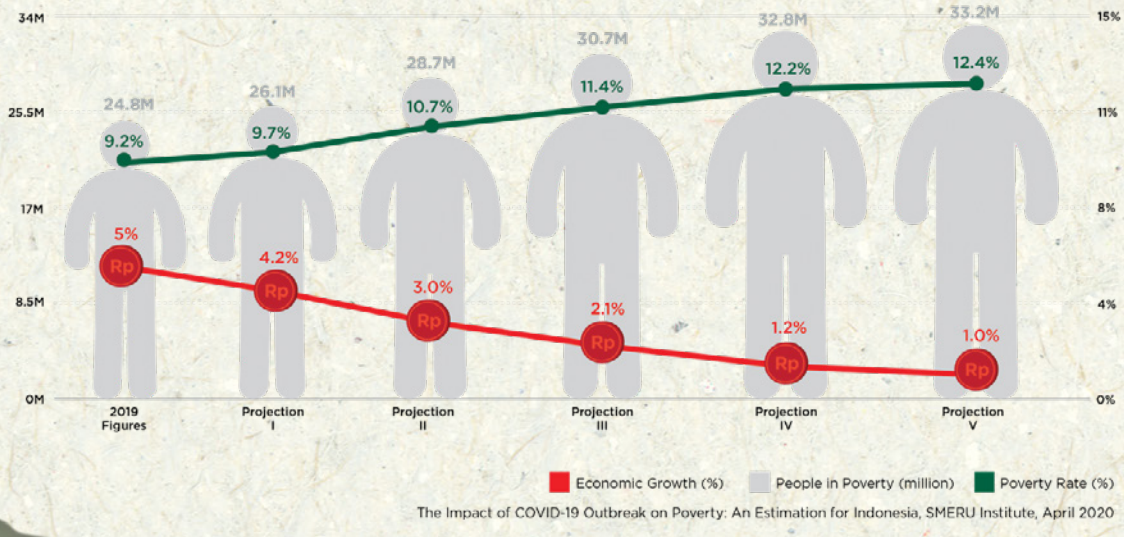
Yi Mian is a final year medical student from the National University of Singapore Yong Loo Lin School of Medicine and recipient of the Tanoto Foundation Scholarship. She enjoys spending time with her loved ones and her cats during her free time.

2020 was a rough year not just for Singapore, but for the whole world. As measures were put in place to curb the spread of COVID-19, community involvement projects (CIP) could not carry out their usual activities. As part of the organising team of Project Sukacita VII 2019, an overseas CIP in Indonesia, I was dismayed that we would not be able to follow up with the villagers that we had interacted with previously in person.

### The team and our goals

A flagship community service project under the Tanoto Scholarship, Project Sukacita is a platform where Tanoto Scholars work together to volunteer and contribute towards enhancing the quality of health and education of the underprivileged communities. The annual CIP has been running since 2012. Our team comprises Tanoto Foundation scholars from the National University of Singapore Yong Loo Lin School of Medicine, Singapore Management University and Nanyang Technological University. With strong support from the Tanoto Foundation and the three schools, a total of 33 volunteers took part in Project Sukacita in May 2019.

Our project aims to encourage the locals in Pangkalan Kerinci, Indonesia, to adopt a healthier lifestyle by improving health awareness, achieved through conducting health screenings and health education. In Indonesia, one out of four children under five years old face the threat of stunting. Stunting is the result of malnutrition and a lack of physical and social stimulation. This can impact a child's development, resulting in lower cognitive ability and, on a larger scale, impact economical productivity. Of note, the SMERU Research Institute[1] projected an increase in the poverty rate in Indonesia as a result of the COVID-19




The Impact of COVID-19 Outbreak on Poverty: An Estimation for Indonesia, SMERU Institute, April 2020


2

3

pandemic, further perpetuating the risk of stunting in children.

## Serving the community

During our two-week long trip, we held multiple educational activities with the children which taught them the importance of hand and oral hygiene. Targeting our concerns of stunting in the region, we also engaged the children with interactive play to educate them on food nutrition and the importance of a balanced diet. Separately, we held two sessions of health screenings for the children and their parents. The health screenings focused on identifying existing ear and oral conditions for the children and the measurement of body mass index and blood pressure, and addressing any acute concerns, of the adults. 143 children and 122 adults underwent our health screening programme.

4

During the health screenings, our volunteers shared advice tailored for each participant based on findings during the sessions, and provided educational pamphlets. Participants with alarming complaints or conditions requiring medication were directed to local doctors who volunteered their time with us. As our project only spanned two weeks in an entire year, it was important to ensure that the locals were directed back to the local healthcare system for follow-ups. Having local doctors volunteering on-site was the first step towards sustainability and ensuring long-term follow-up.

We also launched a longitudinal programme with the local childcare to track the children's height, weight, diet and dental hygiene monthly. The collected data is reviewed by our team such that early identification of children who are not growing adequately or require more nutrients in their diet will receive prompt intervention. With this, we hope to alleviate the problem of stunting faced by the children we serve. The Tanoto Foundation, which oversees our project, is also actively engaged with the Indonesian government in efforts to prevent stunting. To find out more, visit https://tanotofoundation.org/stunting.

## Looking to the next trip

Although Project Sukacita 2020 was cancelled, I hope that the local children will be reminded of us when they practise hand hygiene frequently during this pandemic. I also hope that the locals will be as excited to see us again as we are to serve them again! ◆

SMA and the SMA Charity Fund support volunteerism among our profession. *SMA News* provides charitable organisations with complimentary space to publicise their causes. To find out more, email news@sma.org.sg or visit the SMA Cares webpage at https://www.sma.org.sg/smacares.

## About the Tanoto Foundation

The Tanoto Foundation is an independent philanthropic organisation founded by Sukanto Tanoto and Tinah Bingei Tanoto, based on the belief that every person should have the opportunity to realise his or her full potential. Tanoto Foundation programmes stem from the belief that quality education accelerates equal opportunity. We harness the transformative strength of education to realise people's full potential and improve lives. Tanoto Foundation focuses on making an impact in three areas: improving learning environments, future leaders development, as well as medical research and sciences. Tanoto Scholarship provides scholars with a holistic leadership development programme. Beyond financial assistance to deserving undergraduate students, the scholarships also equip the scholars with structured leadership skills training, community service and networking experience.

***Legend***

*1. Education programme with childcare children – handwashing exercise*

*2. Project Sukacita VII – with local partners and volunteers*

*3. Health screening – education session with specially designed health education booklet*

*4. Health screening – screening children for dental caries*

***Reference***

*1. Suryahadi A, Al Izzati R, Suryadarma D. The impact of COVID-19 outbreak on poverty: an estimation for Indonesia. Available at: https://bit.ly/3dgP12p.*

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