

Dia:gram

EDITION 2019 Vol 5

Diagnostics in a new era

Perspectives on the future

Singapore in focus

The reality of dementia

The Asian woman's pregnancy journey

What mums want

DR AKIRA MIYAUCHI

Revolutionising the management of

Thyroid Cancer

The Thyroid
and Its Diseases



Art has many forms.

At Roche we embrace science and art. Both energise our imaginations and inspire inventions - making our world better.



Note from the Editor-in-Chief



Welcome to our fifth edition of **Dia:gram** – it's hard to believe how quickly time has passed. **Dia:gram** started out as an idea, with the need to bring diagnostics to the forefront of the healthcare conversation. Five issues later, it's amazing to look back on the stories uncovered and the many lives impacted through the power of diagnostics. The most exciting thing is this – we have barely scratched the surface.

In this issue, we have many **Dia:gram** firsts – we venture into the field of geriatric health as we speak to Mr Jason Foo, CEO of the Alzheimer's Disease Association of Singapore, and Dr Chan Kin Ming, who created the first geriatric centre in Singapore. We also speak to Dr Akira Miyauchi, President and COO of Kuma Hospital, Kobe, Japan on his breakthrough research on active surveillance as a recommended management method for low-risk papillary thyroid cancers. And, in wanting to learn more about the motherhood experience in Asia Pacific, we speak to Jintarat Taamsri and Juehee Kim as they share their pregnancy journeys with us.

We're driven to bring **Dia:gram** to the next level – listening to more patient stories, exploring new disease areas, and shedding light on the complexity of the healthcare systems in our region. Thank you for joining us on this journey of growth these past five issues, we're excited for the future of our magazine.

Michelle Medeiros
Editor-in-Chief

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Editorial

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From left to right: Moska Najib, A/Prof Mark Chan, Don Mikkelsen, Lov Verma, Yvonne Ulrich

Reimagining health Diagnostics in a new era

Data shows that the digital health market is expected to surpass USD 200 billion by 2020. Digital devices, and the data and insights they provide, are changing the way the healthcare industry operates. So how are companies like Roche Diagnostics laying the groundwork for success? Moska Najib reports for **Dia:gram** on a panel discussion in Kuala Lumpur, Malaysia that brought together experts from across the APAC region to explore the future of digital healthcare.



Yvonne Ulrich

In today's era of personalised healthcare, advances in medical devices - software solutions, artificial intelligence (AI) and consumer-facing technologies like smartphones and wearables - are playing a critical role to help predict, monitor, manage and make decisions about health. In this ever-changing landscape, Roche's commitment to diagnostic innovation has never been more vital.

An estimated 60-70% of the world's medical decisions are made with the support of in-vitro diagnostic (IVD) solutions¹.

As a global leader in diagnostics, Roche has worked with health partners to detect diseases, determine causes, monitor patient progress and improve outcomes. Building on its core offering, digitalisation is enabling the company to provide value-based solutions to help drive more efficiencies against emerging healthcare needs.

Lance Little, Managing Director for Roche Diagnostics Asia Pacific, says technology is playing a significant role in democratising healthcare services by putting what was once accessible by a few, into the hands of the masses. "Digitalisation is not only changing how people perceive healthcare but is also equipping healthcare systems to address public health challenges." Healthcare systems around the world are under increasing pressure as non-communicable, chronic diseases become more prevalent.

According to the 2017 Revision UN Report, the global population aged 60 and above is growing at a faster rate than the total population. This burden is exacerbated by under-developed healthcare infrastructure and clinical talent shortages, especially in emerging markets across Asia where methods of delivering care continue to evolve. While the need for diagnostic testing will increase, according to Mr Little, digital solutions are addressing these challenges by making processes simpler, more cost-efficient and insightful. "With the advent of digital tools, we will be able to leapfrog and get to lesser served parts of the population to enable better care," says Mr Little.

On APAC

“This region accounts for half of the world population. In fact, it is a world in and of itself and the opportunities are endless. There is incredible diversity in this region - all types of healthcare systems and varying access to healthcare solutions. By being fast, cost efficient and offering high quality diagnostics, we can help healthcare systems in emerging markets make health more accessible.”



Michael Heuer, the (ai) CEO of Roche Diagnostics

Solutions that matter

Modern day healthcare extends beyond individualised diagnosis and help improve decision-making processes. It's also focusing on preventive analysis by monitoring a patient well before they are ill thereby identifying the need for early intervention. An example would be the human papillomavirus (HPV) test as first-line screening for cervical cancer. HPV is the leading cause of cervical cancer, causing more than 99% of cases² according to the WHO. New technology helps healthcare providers diagnose women at risk for cervical cancer by individually identifying the presence of HPV genotypes 16 and 18 - the two genotypes responsible for about 70% of all cervical cancer³ - and reporting the 12 other high-risk HPV types as a combined result. Unlike a Pap smear test that focuses on abnormalities in the cells of the cervix, the HPV test detects changes before cancer has even developed by identifying the presence of the high-risk virus.

Such advancements in diagnostics are enabling healthcare practitioners to detect diseases early and save more lives. However, the digital environment comes with significant implications that require careful balance. “Our business strategy is to ensure that we evolve in the digital world without moving away

from our core business,” says Mr Little. As the industry faces growing demands from physicians seeking better tools for decision-making, hospitals asking for faster and more accurate solutions and laboratories aiming to be more efficient, Mr Little believes digitalisation can further strengthen Roche's value-based approach.

From insights to value

By adopting a data-driven mindset, Roche wants to ensure that the right kind of data delivered in the right way can help institutions address key issues related to a patient's health. Connecting the stakeholders - patient, physician, payer and healthcare provider through its digital solutions will facilitate easier communication between the parties involved. According to Silke Hoernstein, Digital Transformation Officer at Roche Diagnostics, digitalisation becomes meaningful only when companies like Roche are able to turn data into insights and create value that meets stakeholder needs.

“We take a holistic and integrated approach to our digital transformation. We want to elevate the experience of our customers and support them with data-driven insights.” Digital tools can draw from an encyclopedic knowledge

of best practices and patient information by delivering insightful data when it is most useful. Solutions that can analyse complex situations, and help clinicians translate knowledge into action through diagnostic decision-making tools will pave the way for the future. By reducing inefficiencies and accumulating the right data sets to help train medical algorithms, digitalisation can enhance not just an individual's own care but everyone else's, too.

A compelling vision for the future, Ms Hoernstein emphasises that digitalisation in the healthcare industry requires a shift in mindsets. “In the digital era, the world is turning faster than ever. While this requires us to move quickly, speed is often contradictory to perfectionism. Today, we are striving for perfectionism in our approaches but what we need to do is take risks and experiment, fail fast, and learn fast. The speed with which we act will determine our success.”

Embracing a new vision for sustainable healthcare

Modern diagnostics reduces costs by diminishing subsequent health problems, reducing hospitalisation and avoiding unnecessary treatment. While the future of sustainable healthcare depends on

diagnostics, the diagnostics industry has traditionally shied away from taking centre stage and showcasing the impact it has on the wider healthcare environment.

As health systems worldwide move from treatment to prevention, and from volume to value, diagnostics can accelerate this shift. However, changing the mindset of the industry calls for a greater willingness to embrace technology and innovation. By integrating digitalisation, the diagnostics sector has a great opportunity to place itself at the centre of healthcare delivery by improving treatment outcomes and lowering healthcare costs; utilising data to detect patterns of diseases; reducing operating costs and raising productivity to accelerate a more holistic and democratised healthcare model. This means looking beyond survival and embracing a new vision for sustainable healthcare.

The role of diagnostics in the future

As with all new transformations, challenges accompany the promise. While the volume of data generated and made available to healthcare providers, patients and payers are growing rapidly, healthcare systems are struggling to turn this data explosion into meaningful information.

Don Mikkelsen, Service Manager of Laboratory Services at Middlemore Hospital in Auckland, New Zealand says there is still a long way to go in making data relevant. “Diagnostic laboratory testing is becoming more digital and more valuable. Traditionally, laboratories created atomic data - small individual data points on the samples that were being processed - but now we are seeing more intelligent interpretation of the data. One of the issues is that we produce such a huge bulk of data that healthcare providers are getting swamped.”

Laboratory testing plays a crucial role in the detection, diagnosis and treatment of diseases in patients. An estimated 60-70% of all clinical decisions from a patient's diagnosis and treatment, hospital admission and discharge are based on laboratory test results¹. Although health records are increasingly electronic, they are often still trapped in silos. Many contain data that machines and systems cannot read and or have data that is outdated. This can lead to delays in treatment, or worse. Mr Mikkelsen says proper scaling of laboratory services is key to their growth. “Installing more advanced facilities, providing training in new skill

sets, and recruiting staff that have the right knowledge and expertise can improve the approach to healthcare delivery and patient outcomes. With the transformation we see today, the role of the laboratory is no longer limited to the four walls within which it operates. Thanks to automation, digitalisation and integration powered by diagnostics, we are able to vastly expand the efficiency, scope and quality of diagnostic capabilities that we offer, thereby having a direct impact on healthcare delivery and patient outcomes.”

For Yvonne Ulrich, the founder of Patients Are Us, access to medical diagnostic information has meant that patients have ‘more hope’ well in advance. The cancer survivor says it was not luck that found her tumour. She did. After losing a friend to breast cancer, Ms Ulrich proactively underwent genetic counselling to assess her risk. Though at the time, her risk ratio was determined as low, Ms Ulrich maintained a schedule of twice yearly breast examinations. During one of the visits, her doctors discovered a lump, later diagnosed as early stage breast cancer. “My case is just an example of how patients are no longer passive receivers of treatment but investigators of their own health.”

Access to information is changing the relationship between patients and doctors. The use of personal health data is an opportunity to adjust treatment and therapeutic strategies to move towards more personalised medicine. “There is a

lot of information out there but it is not organised. By using software solutions, industry players should aggregate patient data into a platform that allows collaboration on treatment decisions and recommendations.” Ms Ulrich believes this ‘knowledge sharing’ will increase trust not just within health practitioners but also among patients and caregivers and ultimately will help us to understand how we will cure cancer.

On the other end of the spectrum, diagnostics is also changing the nature of consultations between the doctor and patient. While a typical consultation takes about ten minutes and occurs every three to six months, according to Associate Professor Mark Chan, a senior consultant cardiologist at the National University Heart Centre in Singapore, technology gives health practitioners the ability to ‘interpret and contextualise’ the huge repository of a patient's data and precisely predict treatment outcomes for patients.

“You don't want a healthcare practitioner running a busy clinic, with only 15 minutes or so per patient, to look through five years' worth of data in order to determine an appropriate treatment for a patient.

As healthcare providers, we need ‘augmented intelligence’ to deliver reliable, meaningful and actionable data that help us make more rapid informed decisions at the point of care.”



From left to right: Lance Little, Lov Verma, Silke Hoernstein, A/Prof Mark Chan

20 years on ...

“PEOPLE WILL WONDER WHY WE WERE MAKING A BIG DEAL OF BIG DATA. INDIVIDUALS WILL GO TO PHYSICIANS AND KNOW EVERYTHING ABOUT THEMSELVES. LABS WILL LOOK LIKE FACTORIES WHERE TECHNICAL SOLUTIONS WILL BE EXECUTED IN FULLY-AUTOMATED WAYS. VALIDATION AND INTERPRETATION OF RESULTS WILL BE DONE BY MACHINES WITH EXPERTS TAKING CARE OF THE MORE COMPLICATED CASES.”

Michael Heuer,
the (ai) CEO of Roche Diagnostics



Don Mikkelsen

deal with concerns over accuracy, security and privacy. But will the benefits of making data more widely available outweigh such risks?

While the medical world places importance on informed consent, patients like Ms Ulrich and laboratory experts like Mr Mikkelsen believe society has got it wrong on the play-off between privacy and utility of data.

“I think we have to loosen up on access to data,” says Mr Mikkelsen. “By releasing information, you have a big chance of something good coming and others looking at it with good intent.”

According to Ms Ulrich data should be available for the greater good of people and says, “it is a joint set of information that needs to be managed and controlled.”

Ultimately, any discussion on healthcare data security and privacy comes down to one word: trust. In an ecosystem that is composed of multiple stakeholders – each has a role to play. To many in the healthcare space, digitalisation and big data is the ‘magic bullet’ we have been waiting for to efficiently and effectively deliver solutions that will impact a patient’s health and improve outcomes. The question is, where exactly that bullet strikes.

More about the writer:

Moska Najib is a former Deputy Chief of Bureau for the BBC’s South Asia office and has more than a decade’s experience in television, radio and broadcast journalism. Moska has interviewed leaders across the technology, corporate and healthcare sectors as well as policymakers on events that have shaped economic and corporate realities globally. Now as a strategic communications professional, she advises blue chip MNCs, C-Suite executives, government and government linked agencies across Asia Pacific to craft stories that create human connections.

A/Prof Chan says the challenge for diagnostic companies is to make sense of big data and ensure that the machine learning tools are reliable.

A/Prof Chan also advises that despite the promise of AI, countries still need to invest in traditional registries that can serve as ‘ground truth’ to validate big data activities. In Singapore, acute myocardial infarction, more commonly known as a heart attack, is one of the four most rapidly rising causes of death. Set up by the Ministry of Health (MOH), the Singapore Myocardial Infarction Registry (SMIR) manually extracts and curates clinical data on all patients hospitalised for AMI in Singapore. Big data projects leveraging electronic health records, such as the MOH Business Research Analytics Insights Network (BRAIN), are now cross-referencing the SMIR as ‘ground truth’ to assess their reliability.

Privacy vs. public good

As more and more organisations aim to unlock the rivers of data and help find answers to questions about diseases and how to cure it, there is a potential risk of misuse. Regulated healthcare systems will take time to

¹The Worldwide Market for In Vitro Diagnostic Tests, 11th Edition. (2018). The Value of In Vitro Diagnostic Testing in Medical Practice: A Status Report.

²Wright TC Jr, Stoler MH, Sharma A, et al. 2011. Evaluation of HPV-16 and HFV-18 genotyping for the triage of women with high-risk HFV cytology negative results.

³Schiffman M, Castle PE, Jeronimo J, Rodriguez AC, Wacholder S. Lancet 2007. Human papillomavirus and cervical cancer

TOWARDS A MORE *human lab*

THE RED EVENT

In the last quarter of 2018, lab industry leaders from across the world converged in Guangzhou, China, for the Roche Efficiency Day (RED). While exploring the theme 'REDefine perspectives', many presenters and panelists reflected on how artificial intelligence (AI), big data, and automation continue to re-shape the future of the industry. But amid those discussions, another theme emerged - the enduring value of human intelligence and interpersonal relationships. While acknowledging the transformative power of digital technology and automation, several lab leaders emphasised the vital role that smart, passionate people will play in the future of the laboratory industry. **Dia:gram** spoke to a handful of those leaders to find out why they believe the lab of the future will be more - not less - human.

Since 2016, Roche Efficiency Days (known to attendees simply as RED) have provided a forum for bold discussions around emerging trends in the Asia Pacific laboratory industry. Featuring industry thought leaders from around the world, RED sparks lively conversations while providing everyone in attendance a rare glimpse into the future of their field.

Unsurprisingly, automation, AI and big data have been hot conversation topics at every RED to date. In past years, these discussions have been accompanied by a concern that advancing technology may diminish the role of the laboratory technician. But at RED 2018, several leaders made it clear that tomorrow's most successful laboratories will be those which emphasise, and even amplify, the role of humans.

Automation as human empowerment

'Automation' can be a scary word, conjuring images of hyper-efficient

robots that work faster - and cheaper - than people. Certainly, automation is not always good news for workers. In the last century, automated processes vastly improved productivity and efficiency in the manufacturing and agricultural industries, while reducing the need for human workers on farms and in factories. So it seems fair to ask: could the same thing happen to the in-vitro diagnostics (IVD) industry?

To a significant degree, automation has already transformed how clinical labs operate. Handwritten results are a thing of the past. Test ordering is fully automated. Routing is often handled by pneumatic tubes.

These changes have reduced manual labour while improving efficiency throughout the testing process. According to Dr Andri Hidayat, more advances are coming. But he says they will not replace lab technicians. On the contrary, they will free technicians up to do more meaningful, satisfying work.

As the Operations & Information Technology Director at Prodia Laboratory - the biggest

commercial lab in Indonesia - Dr Hidayat spends his days implementing IT solutions to improve laboratory efficiency. At Prodia, he recently oversaw the launch of a chatbot named 'Tania Prodia', which interacts with customers via social media.

While the chatbot may have a human name, its purpose is not to replace a human worker. "In our labs, we receive more than 5,000 calls per day," Dr Hidayat explains. Responding to that many enquiries is a costly burden to the lab. Using Tania Prodia to answer customers' most basic questions enables Prodia's lab technicians to focus on more challenging, complex cases.

"We empower the lab by implementing automation, and that allows technicians to focus on cases that require more attention", Dr Hidayat says.

The enduring need for knowledge

Automation may eliminate the need for manual labour. But it will never eliminate the need for knowledge.



From left to right: Dr Virginia (Jennie) Thurston, Dr Antonio Leon, Dr Mohd Jamsani bin Mat Salleh, Prof Lei Zheng, Prof Wei Bao Jun

Dr Elizabeth Frank - Founder of Lab Leads, a patient-centric diagnostic laboratory in Mysore, India - firmly believes that knowledgeable workers will be critical to the future of laboratory medicine. To this end, she has embraced the role of the teacher, and often conducts workshops for lab leaders, pathologists, microbiologists and biochemists.

"The key distinction between humans and machines is that humans can recognise their mistakes, talk about them, and learn from them."

- Dr Elizabeth Frank

In the humans-versus-machines debate, it is tempting to think of mistake-making as a human liability. But Dr Frank sees things differently. Sure, humans make mistakes, but the key distinction between humans and machines is that humans can recognise their mistakes, talk about them, and learn from them. "It is an important thing when people are comfortable enough to say, 'I

goofed-up,'" Dr Frank says. "It builds a culture which can facilitate growth."

Robots can do things consistently and reliably, but can they reflect on their experiences in a way that contributes to a culture of growth? Not quite. Which is why it is important that lab professionals do not fall into the habit of behaving like robots. "We can't become so automated that all we do is load samples and take it out and sign reports."

Instead, Dr Frank says laboratory workers must be aggressively human. They must cultivate relationships - something that some have been reluctant to do. "We are segmented within ourselves as biochemists, molecular biologists, cytologists, the list goes on." If labs expect to be viewed in equal standing with clinicians, they must band together, build relationships among themselves, and create human connections with clinicians.

"The first step would be to create a platform of lab specialists who stand as an integrated force of knowledge," Dr Frank says. "When we do that, clinicians will see

value with us. Our role is not confined to delivering test results - we are working with them to enable diagnosis. And I think that has to come from within the lab industry. Together, we need to create that platform and say to clinicians, 'We are here to help you diagnose and treat the patient better.'"

Relationships are critical

Too often, lab technicians work in isolation - that needs to change, according to Dr Philip Chen, Chief Medical Informatics Officer at Sonic Healthcare USA. He further notes that pathology influences up to 70% of clinical decisions.

"My advice: Get out of the lab," says Dr Chen. "We are not going to solve the problem of relationships with clinicians inside the lab."

At Sonic Healthcare USA, Dr Chen has overseen an effort to help laboratory staff behave less like automatons and more like free-thinking humans. "Instead of taking an order and spitting a number back out, we are focusing on all the information around

“We should move out of the lab, and work close to the clinician where the decisions are made.”

- Dr Antonio Leon



Dr Antonio Leon



Steve Monaghan

these two things. We have incorporated tools to alert the clinician when there is a significant finding, and based on the clinical guidelines, we identify the follow-up actions they need to consider.”

In Dr Chen’s lab, automated processes serve to augment the technician’s role, empowering them to provide valuable insight and clinical recommendations to doctors. In a perfect world, lab technicians everywhere would be critical contributors to the clinical interpretation of results.

But according to Dr Frank, many labs suffer from a skills and technology gap. “Right now, they don’t have the software, and lack the clinical data and training,” Dr Frank believes filling this gap falls not only to laboratories, but also to the IVD industry. “I think the IVD industry can add value to the lab with management training and clinical interpretation training.”

“The patient is your client”

In the most basic sense, laboratories analyse samples and provide results to clinicians. “But make no mistake”, says Dr Frank, “The patient is your client.

At our lab, we take care of how patients are treated,” she continues. “There are no compromises. You must have empathy. If I need to repeat a sample, I will. Every patient is treated as important, rather than a sample that adds to the numbers for us.”

Dr Antonio Leon could not agree more. As the CEO and former Chief of the Lab Medicine Department at Huelva University Hospital in Huelva, Spain, he has done a great deal of research into how IT can be used to improve patient outcomes. In his view, labs need to move their thinking from the lab test to the patient.

“We have to move to patient value,” he emphasises. “There have been a lot of improvements in quality, standardisation and patient safety, but in the next year the challenges are completely different. The patients are different and more complex, and the ageing population poses a great challenge.

We should change our role to meet the challenge.” Doing so, Dr Leon says, will mean working in partnership with the clinician. “For many years, we worked in the lab and really separated where the

decisions are made. But if you want to be part of the decision-making process, you have to be where the decisions are made. So we should move out of the lab, and work closely with the clinicians.”

Dr Chen concurs. “In everything we do, we need to think about what is actually happening to the patient.” That means not only working side-by-side with doctors, but also with equipment manufacturers. Indeed, Dr Leon says, cooperation between laboratories and manufacturers is critical to meeting the future needs of the patient population. “More often than not, we have a great experience working with manufacturers when we both have the same objective of putting patients first,” he says.

The enduring power of human learning:
A conversation with Professor Aw Tar Choon

As the Director of Chemical Pathology in the Department of Laboratory Medicine at Changi General Hospital in Singapore, *Prof Aw* has been practicing medicine for more than 40 years. A strong believer in continuous learning, Prof Aw takes pleasure in training lab professionals of the future. Amid a sea of change, he says one thing has remained the same in his four-decade career: Lab workers who practice continuous learning excel. Here, Prof Aw shares his views with **Dia:gram**.

At RED events, laboratory industry leaders come together for a single, overarching purpose: to learn. It is exactly the kind of enterprise that Prof Aw can support. As the Director of Chemical Pathology in the Department of Laboratory Medicine at Changi General Hospital in Singapore, Prof Aw is firmly committed to teaching the next generation of lab workers, both on the job and as a volunteer teacher. Although some have forecasted a future where lab professionals are made redundant by technology, Prof Aw believes the best labs will always be powered by humans capable of critical thinking and judicious decision-making - qualities that can only be attained

unceasing pursuit of new skills, and a willingness to dig deep into the field of medicine. “If we do not have a thirst for knowledge and the curiosity to ask questions, we become irrelevant,” he said. “The demands on lab technicians are going to be even more stringent, because medicine is getting more complex. So the person who comes to the lab should have a very broad, yet deep, grounding in medicine.”

Gone are the days where lab technicians can work quietly in the confines of the laboratory. As the healthcare ecosystem continues to become more connected, Prof Aw urges lab professionals to proactively seek opportunities to work alongside - and learn from - clinicians.



“We are ultimately partners to ensure the best care and outcomes for patients. Therefore, we need to understand their position and rationale that allow them to make the best decisions. And this can only be done through developing trusted relationships with them.”

To build those relationships, lab workers must get out of their comfort

zone. And that is something Prof Aw strongly encourages his students to do when teaching in the classroom. “There’s a saying: ‘If you want to go fast you walk alone. If you want to go far, you walk together.’ I feel that senior professionals have the responsibility to educate and nurture the next generation, not only for their team, but also for the benefit of patients.”

However, Prof Aw adds, maintaining one’s expert status is not easy. It requires an

DR AKIRA MIYAUCHI

Transforming care for

THYROID

cancer patients

How one endocrine surgeon harnessed the power of diagnostics to revolutionise treatment standards for one of the world's fastest-rising cancers.

Dr Akira Miyauchi is President and COO of Kuma Hospital, Centre of Excellence in Thyroid Care, Kobe, Japan. In 1993, Dr Miyauchi proposed a clinical trial for patients diagnosed with low-risk papillary micro carcinomas of the thyroid. The trial, which started the same year, allowed patients to choose between immediate surgery - the accepted standard of care - or active surveillance of the disease. In this interview with **Dia:gram**, Dr Miyauchi discusses the results of the 26-year study, and how it is impacting the way doctors around the world are treating low-risk papillary micro carcinomas of the thyroid.

In 1970, Dr Akira Miyauchi graduated from Japan's Osaka University Medical School with a single-minded goal: To become a surgeon.

What type of surgeon? Dr Miyauchi was not exactly sure at first. But under the mentorship of Dr Shin-Ichiro Takai, his path became increasingly clear. "Dr Takai was very smart, and I wanted to study under him," he said. "And he happened to be doing endocrine surgery."

After earning his MD and PhD, Dr Miyauchi spent the next 49 years distinguishing himself as a leading figure in the field of endocrine surgery. Today, in addition to presiding over Kuma Hospital in Kobe, Japan, he serves as the Chairman of the Asian Association of Endocrine Surgeons and the President-Elect of the International Association of Endocrine Surgeons. But these days he is most widely known for his pioneering research into papillary thyroid cancer (PTC) treatment.

Globally, an estimated 20 million people suffer from thyroid disease. Up to 60% of this population are unaware of their condition¹. Thyroid disease is typically diagnosed by tests that measure three hormones: thyroid-stimulating hormone

(TSH), free thyroxine (fT4), and free triiodothyronine (fT3). The TSH test, assessing thyroid function, is typically administered first, followed by a fT4 test if thyroid problems are suspected. Finally, a fT3 test aids in disease differentiation. If thyroid cancer is suspected, an ultrasound is performed, followed, if necessary, by a fine needle aspiration (FNA) biopsy.

For years, the standard recommended treatment after a PTC diagnosis was immediate surgery - even for small tumours posing a limited risk². Dr Miyauchi's research, grounded in a 26-year clinical study at Kuma Hospital, challenged that standard by suggesting that active surveillance is actually the best course of action for patients with PTC tumours less than one centimetre in size without metastasis to the lymph nodes or invasion to the surrounding tissues.

The results of Dr Miyauchi's study were so compelling that the Japanese Thyroid Tumour Management Guidelines recommended active surveillance as an acceptable management method for low-risk papillary thyroid cancer in 2010. In the following years, other groups, including the American Thyroid Association (ATA), followed suit. The revised Japanese Guidelines published in 2018 now positively

recommend active surveillance for low-risk papillary micro carcinoma of the thyroid. Dr Miyauchi's research is particularly relevant as papillary thyroid cancer continues to be one of the fastest growing cancer diagnoses in the world.

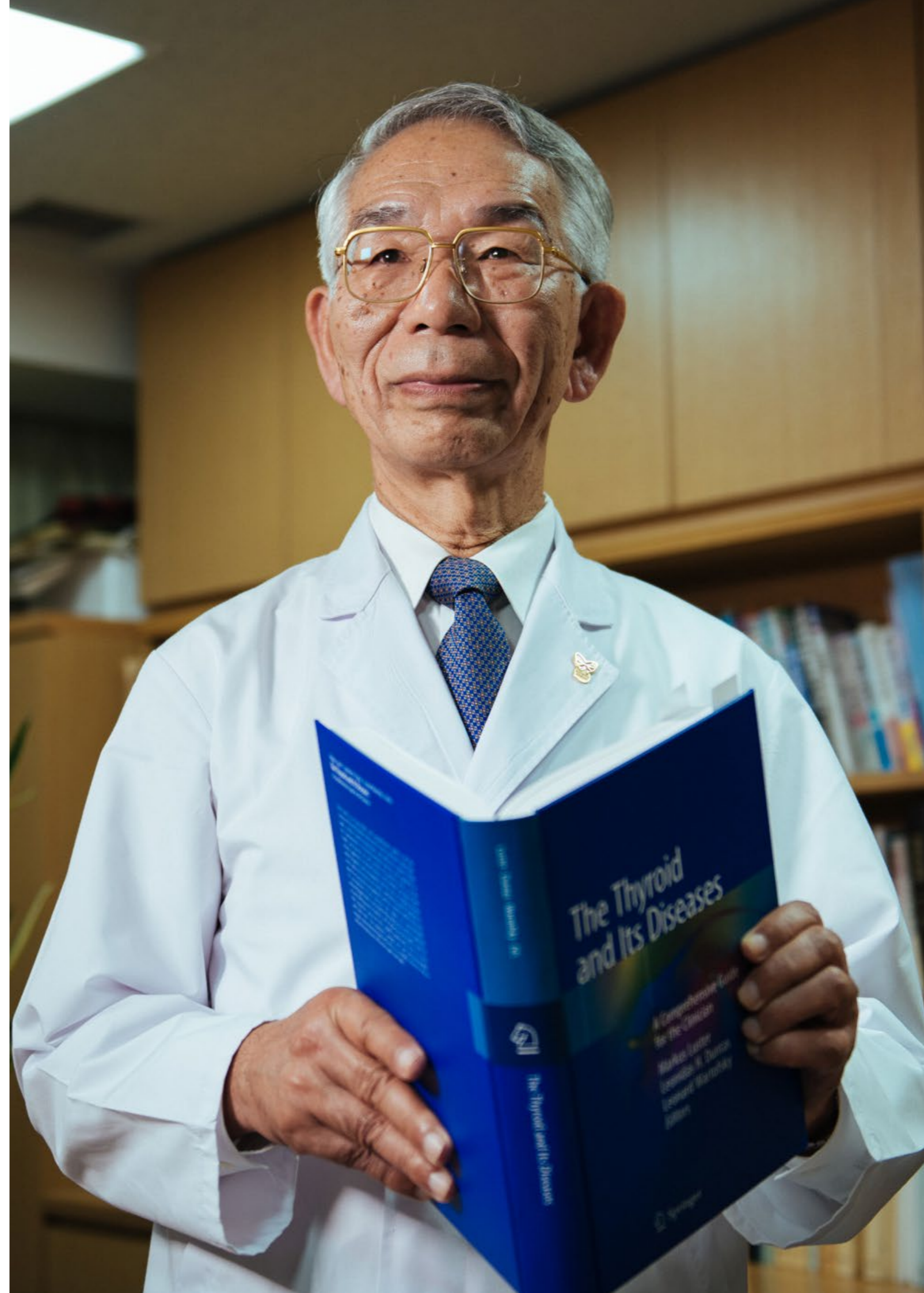
The question is: Why?

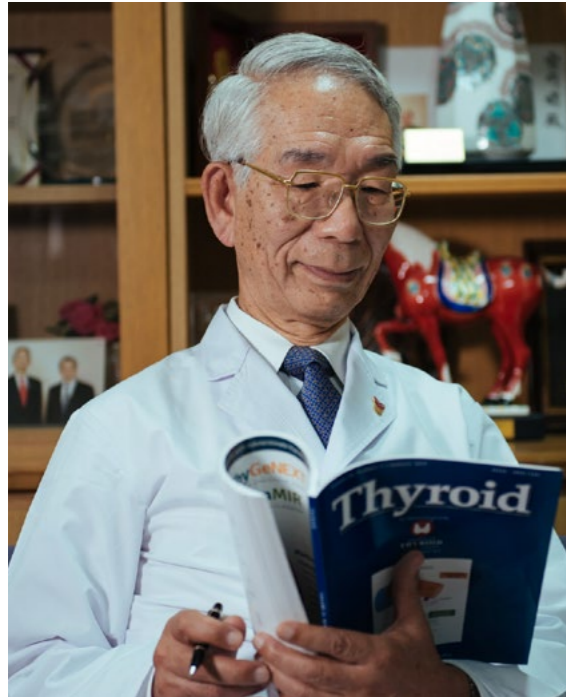
A startling trend

In Korea, thyroid cancer incidence rates increased by a factor of 15 between 1993 and 2011³. They nearly tripled in the United States between 1975 and 2009⁴. In spite of this enormous increase in thyroid cancer prevalence, mortality rates for the disease have remained relatively stable.

Such a disparity is not easy to explain, but Dr Miyauchi has a working theory. Modern detection techniques - from ultrasounds with FNA to MRIs and CAT and PET scans - can identify very small tumours that were undetectable 30 years ago. "I think the rising thyroid cancer rates are due to an increase in detection of small papillary thyroid cancer."

Early detection is a good thing for bad or aggressive cancers, Dr Miyauchi said. But premature or unnecessary surgery for indolent cancers like small papillary thyroid





number of cases will ever show progression. The issue is, how can we identify the minority that shows progression?"

The answer? Active surveillance.

This method, which consists of close supervision without immediate surgery, would allow physicians time to determine whether they are dealing with an aggressive tumour or not. According to Dr Miyauchi, such a "wait-and-see" approach would do no harm to patients because of the exceedingly small size of the tumours. If progression does occur, surgery could still be conducted without any loss in efficacy.

Based on this theory, Dr Miyauchi proposed a clinical trial at Kuma Hospital in 1993.

Later that year, the study began to test the active surveillance method. At the study's conclusion, Dr Miyauchi found his hypothesis confirmed. Of the patients involved in the study, only 8% experienced tumour enlargement by three millimetres or more. Furthermore, only 3.4% experienced lymph node metastasis.

"You might think that the appearance of lymph node metastasis indicates a failure of active surveillance," Dr Miyauchi noted. "But it's not." That's because the standard surgical treatment for patients with small papillary thyroid cancer at presentation is a hemithyroidectomy, in which one side of the thyroid is removed. "This procedure is unlikely to prevent lymph node metastasis in the lateral compartment, so the patients still require a second surgery in the case of metastasis⁶."

Pointing out that all of the active surveillance patients in his study who experienced lymph node metastasis were completely cured, Dr Miyauchi said, "I think one surgery is better than two."

Another major benefit of active surveillance is a lower risk of complications. The incidence of unfavorable events, such as temporary or permanent vocal cord paralysis or permanent hypoparathyroidism, were significantly higher in patients who underwent immediate surgery. "So we believe active surveillance is much better than immediate surgery for the majority of the patients," Dr Miyauchi said.

A cost-effective alternative

Dr Miyauchi's groundbreaking research is a prime example of how diagnostics can lead to discoveries that drive superior patient outcomes, better-informed clinical

decisions, and significantly lower healthcare costs. The economics of the issue is particularly compelling. Citing research conducted by Carrie Lubitz, Associate Professor of Surgery at Harvard Medical School⁷, Dr Miyauchi noted that costs for well-differentiated cancer care in the United States could more than double between 2013 and 2030.

Active surveillance is more affordable than immediate surgery, which becomes especially expensive when factoring in post-operative care. "We found that immediate surgery was 4.1 times more costly than active surveillance," Dr Miyauchi said. "So I think active surveillance is economically much better for the individual patient, and also for society."

Be that as it may, adoption of active surveillance is only slowly catching on outside of Japan. Even in the United States, where the ATA has officially accepted active surveillance as a management option for low-risk papillary thyroid cancer, healthcare leaders are proceeding with caution. The ATA is not actively recommending active surveillance yet.

Nevertheless, Dr Miyauchi views the ATA's acceptance of active surveillance as a significant step in its march toward mainstream acceptance. "They understand that it can be an alternative to immediate surgery for this type of cancer. Once those guidelines were published, many doctors throughout the world became more interested in active surveillance."

Still, Dr Miyauchi expects an uphill battle. He understands that, particularly when it comes to cancer, both physicians and patients are reluctant to embrace a 'less is more' approach to treatment. "There are still many hesitations, which is normal," he said.

Meanwhile, he will continue to use his platform at Kuma Hospital to advocate for active surveillance, which he firmly believes is better for patients, and better for the world at large. "At the present time, the number one issue for me is advocating for the implementation of active surveillance in as many countries as possible."

¹Thyroid Foundation of Canada website. 2018. About Thyroid Disease.

²Ito, Y et al. 2018. *Thyroid. Insights into the Management of Papillary Microcarcinoma of the Thyroid.* Hyeong

³Hyeong, S et al. 2014. *New England Journal of Medicine.* 371:1765-1767.

⁴Davies L, Welch HG. 2014. *JAMA Otolaryngol Head Neck Surg.* 140(4):317-22.

⁵Takebe K, Date M, Yamamoto Y et al. 1994. *Mass screening for thyroid cancer with ultrasonography.*

⁶Miyauchi A. 2016. *Clinical Trials of Active Surveillance of Papillary Microcarcinoma of the Thyroid.* *World journal of surgery.*

⁷Lubitz, CC et al. 2004. *Cancer.* 120(9) 1345-52.

cancer can have serious consequences for patients, such as vocal cord paralysis. So, to determine whether his theory had merit, Dr Miyauchi began looking into autopsy studies of patients who had died of causes unrelated to thyroid cancer. He learned that between 2-6% of the autopsy patients had small papillary thyroid cancer tumours larger than three millimetres that can be easily detected with ultrasound examinations, even though they had died of other causes².

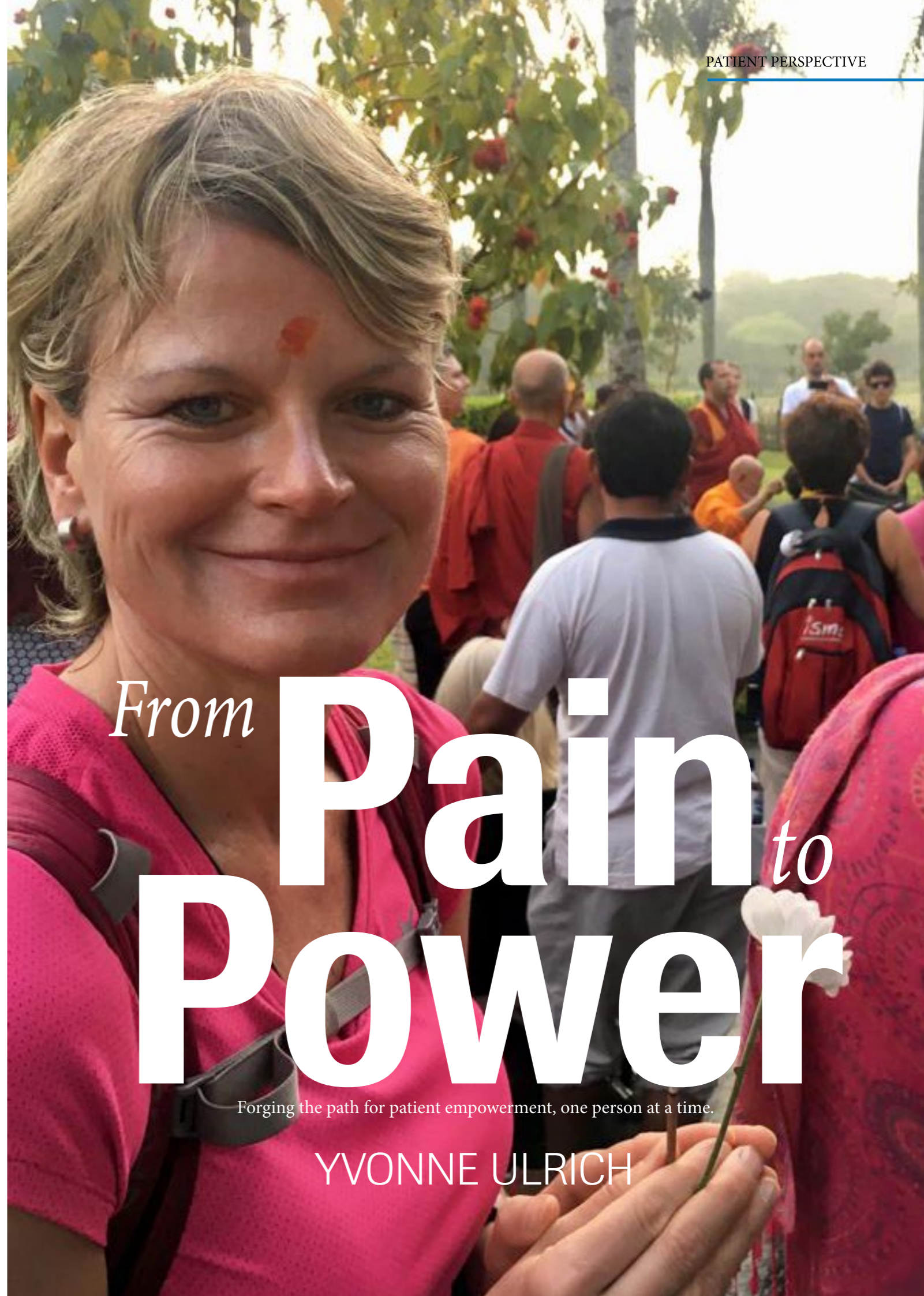
"This shows that there is likely a high incidence of people in the general population who are living with small papillary thyroid cancer without any symptoms, and without knowing it," Dr Miyauchi said.

Based on this information, Dr Miyauchi began to doubt whether immediate surgical removal of small PTC tumours was always necessary. A screening study conducted by Dr Koji Takebe at Kagawa Cancer Examination Centre furthered his doubts. In the study, Dr Takebe used ultrasound-guided fine needle aspiration to discover that 3.5% of the subjects - otherwise healthy Japanese women with no disease symptoms - had small papillary thyroid cancer⁵. "That number", Dr Miyauchi said, "was more than 1,000 times higher than the prevalence of clinical thyroid cancer reported in Japanese women at that time."

Proving his point

How could so many people be living normal, healthy lives, completely unaware that they are living with thyroid cancer?

"I had a hypothesis", Dr Miyauchi explained, "that most small papillary thyroid cancer will remain small, and that only a small



From **Pain** to **Power**

Forging the path for patient empowerment, one person at a time.

YVONNE ULRICH

Yvonne Ulrich is the Capability Development Leader for Strategic Regulatory Sourcing, and also the founder of 'Patients Are Us', an internal network of breast cancer patients within Roche. A breast cancer survivor herself, Yvonne calls her journey of diagnosis, treatment, and transformation, her path to self-discovery. Today, she is a firm believer that patients should have a voice in their treatment decisions and is a passionate advocate for patient empowerment. In this interview with **Dia:gram**, Yvonne shares the lessons she has learnt since her diagnosis in 2014.

Yvonne Ulrich can still vividly recall the details of her trip to New York in 2009. "I was on a trip with a close friend, when she received a call from her twin sister. Her sister said, and I'll never forget this, 'I have breast cancer and I am going to die'. And my first thought was, but why does she immediately think that she will die?"

She soon discovered that her friend's sister had been diagnosed with late-stage, triple negative breast cancer and the outlook was grim. "It was a jolt out of the blue and in some ways, looking back, is what led me on my own journey."

Listen to your inner voice

It sparked an urgent curiosity in Yvonne, to learn more about her genealogy to determine if she was at risk of contracting cancer herself. Yvonne spoke to her mother to find out more about her family history. Being adopted, Yvonne's mother did not know much about her past and never thought about looking into her genealogy. Not giving up, Yvonne found ways to dig into her family history and discovered that her grandmother and cousin had been diagnosed with breast cancer.

This increased the odds of genetic risk and so, Yvonne and her mother decided to meet genetic counselors to understand their risk. Doctors recommended bi-annual check-ups and assured her that she was in good health with little reason to worry.

Then, three years later in 2014, Yvonne felt a lump in her breast and was diagnosed with breast cancer. "My inner voice guided me to proactively undergo breast cancer screening. I knew in my gut that I survived because I began exploring and investigating early," Yvonne says with determination.

Following her breast cancer diagnosis, she did the BRCA test to determine which treatments were necessary. Luckily the test came back negative. Yvonne says, "I have a

genetic predisposition but we know too little to fully understand other genes for breast cancer that allow us to develop good approaches for cancer prevention."

You can wait for the answer to come to you, or find it yourself

After doing a biopsy, Yvonne remembers very clearly hearing her doctor say 'it does not look good', and having to wait one week before she could confirm the diagnosis. That was the longest week of her life with no clarity and endless questions. Yvonne sought support from her family, friends and her teachers at a meditation centre.

"I saw this with my friend's sister and even during my own diagnosis. When you first receive the diagnosis, your initial reaction is to just look to the doctor and say 'tell me what to do'. But what we fail to realise is that the power of knowing, or feeling that something isn't right, lies with us. We can do something ourselves to support our body and mind to get better," says Yvonne.

One of her meditation teachers encouraged her to empower herself with knowledge. Not wanting to be left in the dark, Yvonne embarked on a personal mission to equip herself with information about cancer and how lifestyle can affect a prognosis.

"There is so much you don't know that often times it's difficult to tell what you should even be looking for. Yet, this much I knew - I only had myself to rely on."

It turned out Yvonne was better prepared than she had expected. Her consultation with her doctor a week later revealed that she had early-stage breast cancer. While this was certainly upsetting news, Yvonne says she was not surprised. "I was so consumed with my quest for answers that I had analysed various possibilities and of course, having breast cancer was one of



"There is so much more we can do to help patients go through this challenging time in life."



them. That's why, for me, it wasn't about looking at the obvious which was that I had this disease. It was more about what's next and finding a solution." Amid the sadness, Yvonne still had hope and tried to understand how she can help herself become healthy again.

Deciding to get a second opinion before she confirmed her treatment pathway, Yvonne carried hard copies of her pathology report, a DVD of her MRI scans, her X-ray scans, and drove for four hours to a hospital in a different part of Germany.

Once there, the physician told her he could not view her scans because they were not in the right format.

It was at this point that Yvonne saw a gap in the healthcare system. "Why didn't they have a cloud system that stored patient data safely and conveniently so that doctors could share information?"

Every challenge is a chance for transformation

"The progress in technology seems light years ahead if we still haven't been able to address the issue of connectivity within the healthcare system," Yvonne says. She is not wrong in this regard. According to the PwC Health Research Institute (HRI)'s Global Top Health Industry Issues Report¹, people want a healthcare experience that mirrors the convenience and transparency of their experiences in banking, retail and other industries.

As healthcare systems around the globe experience growing consumer engagement, demand for improved access not only to services but also to data and information is rising. "Patients want to have a say in their

treatment decisions and are often asked by the doctor which treatment path they finally want. You can't have true empowerment without first giving people the power to choose whether they want access to this information or not," Yvonne adds.

Using her experience for good

"It's okay that I experienced these challenges in my journey. But it is not okay that every day, more patients are going through similar experiences with this one-hour consultation revealing a troubling diagnosis, and they are sent home empty handed. In 2018 we had 18 million new cancer diagnoses, 18 million people."

"It is time for healthcare companies to not only think about healthcare from a clinician/laboratory perspective, but from a patient's perspective as well," says Yvonne. Patient empowerment no longer seems like a passing trend but rather a mainstay in the industry's evolution. How healthcare companies capitalise on this opportunity remains to be seen.

Convinced that a patient portal is the future

of improving the experience for patients worldwide, Yvonne is a strong advocate for making this a reality. She envisions a central database for both doctors and patients, that will not only record patient data and track the treatment and progression of the disease, but also provide vital research information for patients to cope with their diagnosis and become an active participant of their own healing journey.

The power of connections

Having a strong support network is essential for patients to cope with their disease. That is why Yvonne founded the 'Patients Are Us' network. "I didn't start out wanting to be a patient advocate. But I felt that if I could help others by sharing my story, then I would. Recalling an instance that was an eye-opener for her, Yvonne says, "My children asked me if it is okay to speak about me having cancer. I encouraged them to share at school and their soccer club. The next day, they came back and told me about all the friends who had opened up to them about their mothers or relatives who have also been diagnosed with breast cancer but are thriving now. By sharing their stories, my children found a little circle of their own and learnt cancer is not always devastating." As the founder of 'Patients Are Us', Yvonne hopes to remove the stigma of cancer by encouraging colleagues to share their cancer journey. 'Patients Are Us' goes beyond a breast cancer support group. It is a group of 25 Roche colleagues who have overcome their disease and are fueled with passion to improve the patient experience for the cancer patients of tomorrow.

Yvonne hopes to bring the value of diagnostics to a new level, which is evident from her infectious zeal to improve patient care. She has experienced the need for a more holistic and digital approach to healthcare first-hand. "Patients have the power to play an active role in their healthcare journey, and there is an increasing desire to work together with their physicians to manage their disease," she states. With people like Yvonne spearheading this evolution, the journey towards patient empowerment might not be that far away after all.

¹PwC Health Research Institute. 2018. Global top health industry issues: Defining the healthcare of the future.



Understanding
The Pregnancy
Journey
in Asia Pacific

Pregnancy can be a joyful yet demanding period in a woman's life. For many expectant mothers, it often throws up a million and one questions. Moska Najib reports for **Dia:gram** on what women seek during their pregnancy journey, especially when it comes to the health of their babies, based on a study conducted by Roche Diagnostics.

Current fertility rates indicate that women have become more effective in family planning as they balance education and career with marriage and motherhood. According to the United Nations Population Fund (UNFPA) State of World Population report, five countries or territories with the world's lowest total fertility rates are in East Asia and South-East Asia¹.

Women who go through pregnancy in their late 30s or 40s are at greater risk of infertility and complications during pregnancy. For Kim Juehee, this was the case. At 37 years of age, Juehee had her first baby through in-vitro fertilisation (IVF) and admits it was one of the most rewarding but "toughest journeys" of her life. "There is a high risk of miscarriage in

the first trimester. Although I was nervous about my baby's health and wellbeing, I sought ways to reassure myself." Using a foetal heart rate monitor, Juehee regularly listened to her growing baby's heartbeat, giving her peace of mind throughout her pregnancy.

Regardless of socioeconomic status, education and awareness levels, one factor that binds women like Juehee is the need to be reassured when they step into a consultation room. A study conducted by Roche Diagnostics Asia Pacific identified traits and attitudes among first-time mothers and revealed how the level of detail for reassurance varies depending on mothers' attitudes i.e. if she is more of a 'practical pregnancy' type of mother or a more 'emotionally driven' one². It also showed how healthcare professionals adapt

their communication style to better suit their patients' attitudes and disposition. According to Juehee, it is common for consultations with obstetrician and gynaecologists (OBGYNs) to be no longer than five to ten minutes. In this time, doctors have the challenge of developing a relationship with their patients, updating them about their baby's health, and educating them on the next steps in their pregnancy journey. It is no surprise that the study found 61% of the mothers interviewed in Korea took a more proactive approach to their pregnancy journey². Juehee says she developed a trusting relationship with her doctor as he understood her needs and gave her the right amount of information she needed to know at the right time.



Kim Juehee

“Many pregnant women rely on forums and chat groups. This is dangerous as not all information available online is accurate. It also means that we, doctors, spend a lot of time rectifying misleading information which brings anxiety and distress to our patients.”

- Dr Eeson Sinthamoney

Excess of information

Thanks to Dr Google, knowing everything about pregnancy and parenting often seems just a mouse click away. What mums find in the unregulated environs of the global web is that the quality and reliability of information vary and sometimes contradict each other.

Although the internet has democratised knowledge, according to Dr Eeson Sinthamoney, President of the Obstetrics and Gynaecology Society Malaysia (OGSM), the problem lies when patients “gravitate towards the wrong sources of information.” Dr Eeson says, “Many pregnant women rely on forums and chat groups. This is dangerous as not all information available online is accurate. It also means that we, doctors, spend a lot of time rectifying misleading information which brings anxiety and distress to our patients.”

In such an environment, the role of clinical systems to improve the educational experience of patients is significantly important. Dr Eeson suggests informative patient portals, which will invite engagement and support an active approach to maternal and child care. Trusted and credible information portals can serve as a type of information prescription for mums who want to learn more. Bringing clarity to patients with the right information will smoothen the journey of pregnancy for both mums and doctors. If and when mums are looking for information on testing, it is important for them to have access to the right information, at the right time, in the right manner to facilitate an enjoyable and reassuring pregnancy.

Making sense of risks

While in the past, doctors screened expectant mothers for suspected diseases common to their family history, today, prenatal diagnosis is a routine part of obstetric care. According to the Roche study, doctors are gate-keepers of the pregnancy journey and many first-time

mums acknowledge a power-shift as they give up the driver's seat to follow their recommendations².

Jintarat Taamsri was 22 weeks into her first pregnancy when the gynaecologist informed her that something might be wrong with her baby. During a routine ultrasound screening, the doctor found a cyst in the baby's brain and suggested that Jintarat may have a higher-than-expected risk of carrying a baby with Edward's Syndrome. Also known as trisomy 18, the rare genetic condition can result in severe developmental problems and may even cause a miscarriage or stillbirth.

To verify the findings, Jintarat underwent amniocentesis, an invasive test that analyses foetal cells from amniotic fluid extracted by a large needle inserted into the mother's womb through the abdomen. “I waited for about three weeks to receive my test results. I searched the internet and found out that babies with Edward's Syndrome die before birth and their survival rate beyond a year of life is only around 5 - 10%. It was a very stressful waiting period,” says Jintarat. Three weeks later, the findings were negative. The baby was healthy and Jintarat and her husband were relieved. Now in her last trimester, Jintarat says if she could turn back time, she would opt for non-invasive prenatal testing (NIPT) even though it is costlier than the tests she opted for. “The result has better accuracy and precision,” says Jintarat, “Had I done the test earlier, I may not have had an amniocentesis, which would have been a relief given how stressful the waiting period was.”

Advances in prenatal testing have resulted in more and more women being tested for atypical chromosomes and other conditions. New testing techniques have improved the safety and accuracy of prenatal diagnosis. Unlike traditional screening tests that are invasive and carry a risk of potential miscarriage³, NIPTs analyse fragments of foetal DNA that's drawn from the mother's blood. In addition to a 99% accuracy⁴ in detecting

Down syndrome, NIPT can be done as early as ten weeks⁵ into a woman's pregnancy, yield quicker test results and reduce the risk of complications.

Sensitive and reliable diagnostic information throughout pregnancy is essential for both clinicians and patients. Only through accurate and reliable diagnoses can doctors develop a plan of action for their patients. More importantly, faster and less invasive diagnostic innovations like NIPT can provide a better patient experience for mothers who are possibly going through an anxious point in their pregnancy.

This is where diagnostic companies can partner clinicians to relieve uncertainty as well as support early and appropriate testing decisions by providing mums with credible, accurate and reliable information. By doing so, mums will have the reassurance of the safety and health of their babies, giving them the peace of mind needed to have a joyful pregnancy.

Dr Eeson Sinthamoney



Jintarat Taamsri

Roche Diagnostics Asia Pacific conducted a study to understand the broad range of women's needs, attitudes and concerns throughout pregnancy. The study covers different Asian countries (Thailand, Vietnam and South Korea). The study included focus group discussions with around 40 women who gave birth less than six months ago to their first child, and women more than six months pregnant with their first child. It also included interviews with 20 obstetricians and gynaecologists (OBGYNs). The study was also supplemented with online listening and research.

The study identified four types of emotional approaches to pregnancy, highlighting the range of attitudes and behaviours among first-time mothers:

			
<p>Practical pregnancy</p> <p><i>Can seem 'non-emotional' in posts. Focused on what/when/how much, less questioning of the standard approach (although still exploring their options).</i></p>	<p>Pregnancy by numbers</p> <p><i>Less accepting of doctors advice at face value. They research every decision and are detail oriented. Sometimes (but not always) better informed.</i></p>	<p>One step at a time</p> <p><i>Pregnancy may have been difficult from the start for them. Tend to be older mothers, with history of health problems. Early issues might be raised. Often not looking too far ahead but more concerned with the next hurdle.</i></p>	<p>Emotionally driven</p> <p><i>The emotional experience is extremely important to them, often the first to respond to other women. Frequently simply seeking reassurance but also place significant value on the experience of others.</i></p>

¹United Nations Population Fund (UNEP). 2019. The State of World Population 2018.
²Women's health diagnostic assessment. 2017. Roche Diagnostics Asia Pacific
³ACOG Practice Bulletin 88. 2007. Invasive prenatal testing for aneuploidy.
⁴ACOG Practice Bulletin No. 77. 2007. Screening for foetal chromosomal abnormalities.
⁵International Journal of Women's Health. 2015. Non-invasive prenatal testing: a review of international implementation and challenges.

Ten questions with DR V G SOMANI

Dr V G Somani is the Joint Drugs Controller of India (JDCl) Medical Devices and the in-vitro diagnostics (IVD) Central Drugs Standard Control Organisation (CDSCO). He heads the regulation of medical devices, in-vitro diagnostics, stem cells and blood products. In this interview with **Dia:gram**, he discusses the regulatory industry and the future of diagnostics in India.



1 In your point of view, what role does diagnostics play in the healthcare ecosystem of India?

I personally feel that diagnostics is currently undervalued, considering the role it plays in determining the appropriate treatment pathway for patients. Diagnostics tends to play a behind-the-scenes role, like in a movie. The hero and heroines tend to get the limelight, but the directors and script-writers remain in the background even though they laid the foundation for the success of the movie.

Diagnostics is like that currently, but this perception is changing favourably. Awareness about the importance of diagnostics is increasing. As patients become increasingly educated and rational, they want clearer information about their health. This provides the push for physicians to rely on scientific diagnoses rather than purely having clinical diagnoses.

2 What role do regulators play in changing this perception?

From the regulator's point of view, we are advocating that products should be used for the approved indications. We are also strengthening regulations for the use of certain diagnostics in critical diseases. For example, there are more restrictions on antibiotics, and physicians can only use them after a diagnosis is made. We are utilising whatever regulatory tools are available to us for the appropriate use of drugs after a proper diagnosis. Laboratories are seen as a 'support' service, when in reality we are so much more than that.

3 India's economic growth and the rising middle class means there will be greater pressure on healthcare services, including diagnostic laboratories. What challenges do you foresee, and how can these be tackled?

Yes, there is pressure on healthcare services and labs and there should be. With government investment in schemes like Ayushman Bharat (India's National Health Protection Scheme), people will expect quality services across the board. The onus is on each institution to maintain these quality standards when they are implemented. The brick-and-mortar clinics' success will depend on the quality of the services they provide to their patients. Hospital chains will face the challenge of balancing quality and affordable services to remain competitive in the market. People now want easy accessibility to quality health services, thus the challenge for healthcare organisations is to manage patients' expectations in a way that balances time, quality and affordability of diagnosis through diagnostics.

4 The World Health Organisation (WHO) released the first-ever Essential Diagnostic List (EDL). How do you think this will stack up against India's Ayushman Bharat?

The WHO's EDL is an extremely useful list for Ayushman Bharat that will help us align on what diagnostics to include in our program. It will also give health providers greater clarity on what kinds of diagnostics India can expect in the next five years. Ayushman Bharat is providing a health technology assessment, as well as a list of essential diagnostics at the primary and secondary healthcare centres, in consultation with the WHO.

5 What does the future hold for the diagnostics industry in India?

The future of the diagnostics industry is very bright. We work with a range of stakeholders such as scientists, doctors, the WHO, and Indian Council of Medical Research (ICMR) to determine which diagnostic tests should be available at the primary, secondary and tertiary levels of our healthcare system. We recognise that diagnostics is required in totality – not only do we need the tests, we also need skilled people who know how to use these tests. Ayushman Bharat is focusing on this aspect, and we are intending to build up both the services and the technical skills required to improve the quality of diagnostic services in India.

6 We have started to see risk-based regulation unfolding in the EU and India is taking its first steps towards that approach. What are your views on this?

Challenges will arise in a few situations – during emergency and epidemic situations, when there are breakthrough technologies, and lastly when there are unmet needs. In the risk-based model, we will utilise enforcement if there is more risk from the lack of compliance or data from particular operators or products. For these operators and products, we will keep them on surveillance. At the same time, we are heading towards flexible regulations based on need and risk. Therefore, not every product will have the rigour of inspection and testing. For example, if Zika breaks out in India tomorrow, we will accelerate our processes for medicines and vaccines diagnostics. If there are certain requirements and if we are required to form special committees for it, we will do it.

7 How does the regulatory framework in India work together with other stakeholders in the industry?

It is important that our framework balances mainstream accessibility and quality of diagnostic tests across India. We have to be flexible. If there is an unmet need that is important to public health, we can take a balanced view to expedite that availability and accessibility for these tests. However, if there are already tests in the market, quality becomes more important and we will take this risk-and-need-based approach to evaluate its essentiality and desirability. People need to be confident of the quality of diagnostics, and new regulations aim to ensure this standard of care.

8 India launched the Medical Devices Rules (MDR) in 2017. What do you hope to accomplish with this regulation?

The first is that MDR should allow an India-specific scheme to complement existing global regulations and mechanisms. Secondly, transparency and accountability are important, and we can increase transparency and accountability by having online systems and platforms. Once everything is online and complementary to global regulations, we will see the dual benefit of Indian products being accepted and accessible to other people outside of India and vice versa, as they comply to the same standards and quality.

9 What can other countries learn from this initiative?

I think others can learn how we are creating a system that aligns with global standards. We are implementing comprehensive approaches swiftly, including moving from offline to online systems. A lot of the progress can be attributed to bold political steps and working in sync with government stakeholders, local, and international businesses. All this, coupled with regulatory and logistic reforms, provide better health services to the public.

10 What are your interests outside of your regulatory work?

I like to travel and to share experiences with people. Fortunately, my job not only gives me the opportunity to travel, it also gives me the opportunity to share my ideas, and meet other professionals passionate about their work.



Decoding Dementia

Dementia is growing at an alarming rate throughout the world, especially in Asia. For a snapshot of how medical leaders in Singapore are working to tackle the issue, **Dia:gram** gets the perspective of a doctor who is on the front lines of treating the disease, and a nonprofit CEO who is advocating on behalf of those who suffer from it.

MR JASON FOO & DR CHAN KIN MING

‘Dementia’ is an umbrella term that comprises a wide range of cognitive conditions related to general mental decline. Alzheimer’s disease is perhaps the most well-known due to its prevalence; it accounts for 50-60% of all dementia cases¹. Other types of dementia include vascular dementia, frontotemporal dementia, and dementia due to Parkinson’s disease.

Thirty years ago, dementia was not talked about much in Singapore. That was partly because the city’s elderly population was much smaller back then. It was also due to widespread stigmatisation of the disease - even among those whose family members were suffering from it.

Mr Jason Foo, CEO of Alzheimer’s Disease Association of Singapore (ADA), recalls how, in the late 1980s, “elderly people were found wandering the streets” in Singapore. “The authorities picked them up because they were lost and obviously had dementia,” he said. When returning them to their homes, police were shocked to find that their own families had abandoned them. The demands of caring for them had become too much to bear.

In response to this problem, a group of doctors banded together to form ADA, a local member of the worldwide Alzheimer’s Disease International, in 1990. Mr Foo, an accountant at that time, was brought aboard as a volunteer to be treasurer of ADA. In 2012, he became its CEO, a full time position which he has held ever since.

ADA has made significant progress under Mr Foo’s leadership, helping to reduce the stigma attached to people who suffer from dementia while providing much-needed support and resources to their caregivers. Still, the organisation has a lot more to do going forward. According to a ‘Well-being of the Singapore Elderly’ (WiSE) study led by the Institute of Mental Health in 2015, nearly 82,000 Singapore residents had dementia in 2018, and that number is expected to surpass 100,000 soon².

The increase in dementia cases is a global phenomenon that can be credited to an otherwise positive trend: People are living longer. According to Alzheimer’s Disease International, the number of people with dementia worldwide is currently estimated at more than 50 million. That number is expected to reach 75 million in 2030, and 131.5 million in 2050. The fastest growth is taking place in China, India, and their South Asian neighbours³.

“As people live longer, the risk becomes higher,” Mr Foo said. According to the UK-based Alzheimer’s Society, people who reach 80 years of age have a one in six chance of developing dementia⁴. The average life expectancy in Singapore is roughly 82 years. If life expectancy continues to rise, the diagnosis and treatment of dementia will become one of the country’s most daunting healthcare undertakings of the 21st century.



Jason Foo

A passionate pioneer

You might say Dr Chan Kin Ming was ahead of his time.

In 1989, he joined a small group of doctors to launch the first department of geriatric medicine in Singapore. In 1991, he started the Alexandra Geriatric Centre at Alexandra Hospital, the first of its kind. It also housed the Geriatric Day Hospital, another first in Singapore that shifts care from the hospital into the community. He says a “sense of mission” led him to a field that is often passed over in favour of more glamorous specialties. Today, Dr Chan is widely respected for his expertise in geriatric medicine. Increasingly, that includes dementia.

According to Dr Chan, older patients often grow concerned about dementia when they experience memory problems. While it is true that age is a major risk factor for dementia - above the age of 65, one's risk of developing Alzheimer's disease or vascular dementia doubles roughly every five years⁵ - Dr Chan cautions patients against self-diagnosing based on ‘senior moments’. “Sometimes memory loss is a result of age-associated memory impairment, not dementia”, he said.

“Diagnosing dementia is a complex process involving a number of steps. It typically starts with a series of cognitive tests, including the Montreal Cognitive Assessment and the Folstein Mini Mental State Examination, which measures judgement, planning, problem-solving, reasoning, and memory. If the patient is found to be cognitively impaired, blood tests are performed to find out whether the patient is suffering from an illness or a vitamin deficiency, such as an electrolyte imbalance from kidney disease, thyroid disorder or vitamin B12 deficiency, that could affect memory function”, said Dr Chan.

“If these secondary causes are ruled out, brain imaging tests - such as a computed tomography (CT) and a magnetic resonance imaging (MRI) scan - are conducted to determine the cause of the cognitive impairment. The MRI is particularly helpful, as it allows us to look directly at the hippocampus, the part of the brain associated with memory. The hippocampus is particularly sensitive to initial degeneration in patients with Alzheimer's disease”, explained Dr Chan.

In recent years, diagnostics has evolved to include tests for cognitive biomarkers. It has been shown that an increase in beta amyloid in the brain and elevated



Dr Chan Kin Ming

tau proteins can predict the onset of Alzheimer's disease^{6,7}. Beta amyloid load can be measured using an amyloid PET scan of the brain.

Two separate laboratory tests can measure beta amyloid and tau protein in the cerebrospinal fluid (CSF)^{6,7}. While measuring biomarkers with CSF immunoassays increases the certainty of an Alzheimer's diagnosis, there remains a pressing need for further research into dementia diagnostics. “At this point,” Dr Chan said, “It is still very much a clinical diagnosis.”

A call for acceptance

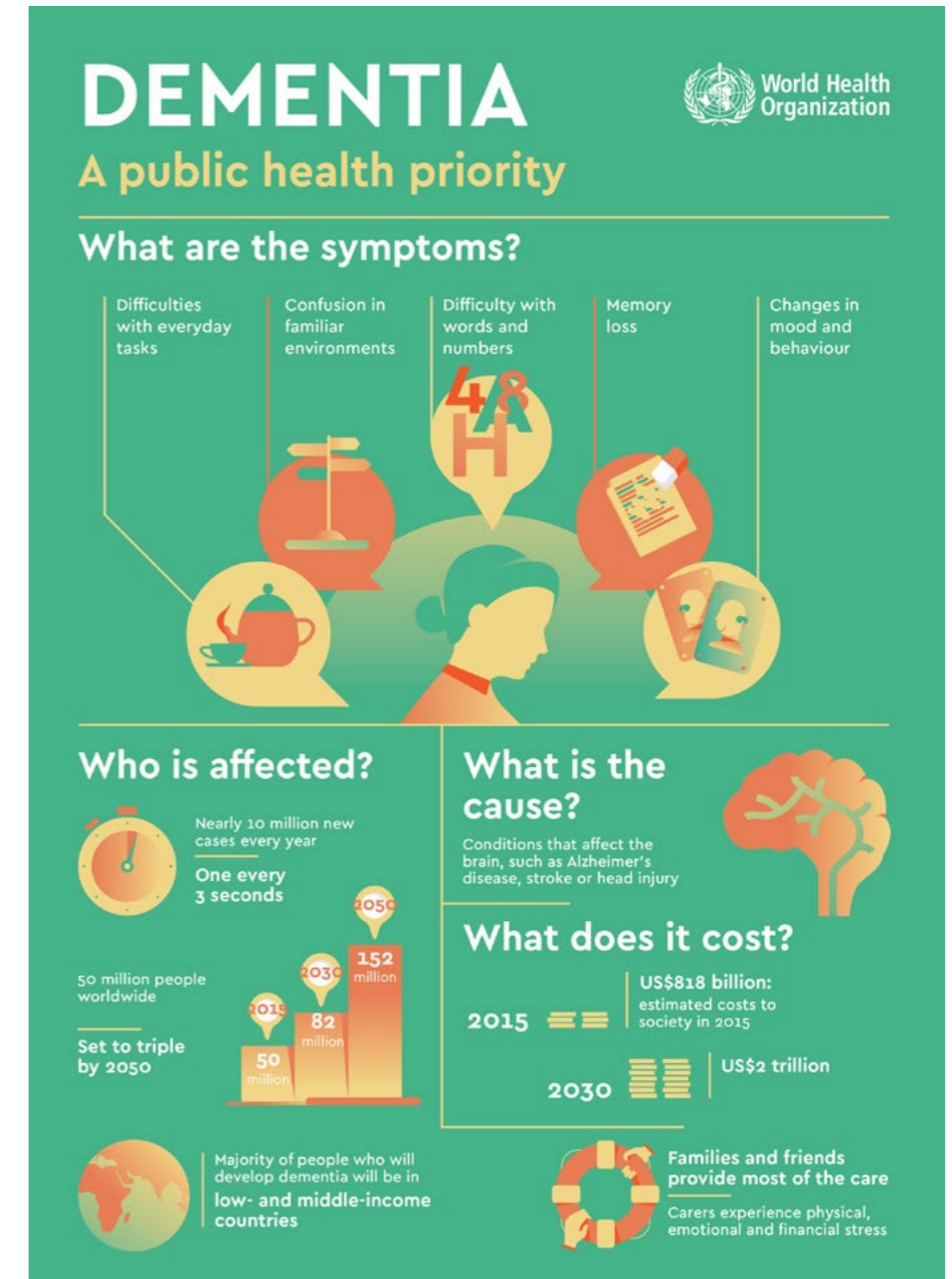
Currently there is no specific treatment for dementia. Medicine may slow down the progression of dementia, but it cannot stop or reverse it. As the Asian population gets older, it seems fair to ask: Is society prepared to deal with the problem?

“It depends on whether we have the resources to tackle it,” Dr Chan said. While institutional care, such as nursing homes and daycares, are available, they are not the first choice for caregivers who would prefer to keep their family member at home as much as possible.

That is where the efforts of Mr Foo and ADA come in. In 2016, ADA launched an innovative centre called ‘Family of Wisdom’, which provides both persons with dementia and caregivers a supportive place for activities such as stretching exercises, cooking, and more during the day. Not only does ‘Family of Wisdom’ help reduce the caregiving burden, but it also fosters a natural support system for caregivers. It has become an avenue for caregivers to learn care strategies from professionals, enjoy the support of other caregivers, and get respite from the strenuous task of one-on-one caregiving.

As the number of people with dementia continues to grow, there will be a need for more innovative approaches. But first, Mr Foo said, Singapore will need to overcome some lingering negative attitudes toward the disease. “There is still a stigma,” he said. “Families don't want to share openly when a relative has dementia.”

Mr Foo shares a story about an overseas conference where a person with dementia came on stage to share his story. “It was so impactful,” he said. “Only when we get rid of this stigma, people with dementia will be more willing to come out into the community to share their stories. That will



World Health Organization. 2017. Infographic on dementia.

help society in general to accept the disease and not judge those who unfortunately suffer from it.”

With that in mind, ADA recently opened a cafe that specifically employs people with dementia. “Some of our beneficiaries are in their 40s or 50s, and they are eager to still contribute to society. They don't want to be cooped up in a daycare centre all day. However, it's a challenge for them to find a job upon receiving their diagnosis. That's why we are trying to create work for them. An example would be George - he doesn't like to be in a daycare centre. But in the cafe, he is happy and he feels like he is contributing to society.”

While there is no cure for dementia, Mr Foo suggests there is a way to help

persons with dementia have a better quality of life. By inviting them to tell their stories, and by including them in society, we can shed light on a disease that no longer belongs in the dark.

¹Access Economics Pty Ltd. 2006. Dementia in the Asia Pacific region: The epidemic is here.

²Well-being of the Singapore Elderly (WiSE) study. 2017. Alzheimer's Disease Association Singapore website.

³The Alzheimer's Disease International. 2015. World Alzheimer's report.

⁴Alzheimer's Society UK. 2019. Risk factors you can't change.

⁵Alzheimer's Society UK. 2016. Risk factors on dementia fact sheet.

⁶Mattsson, N., Zetterberg, H., Hansson, O., et al. (2009). JAMA 22, 302(4), 385-93.

⁷Hampel, H., Blennow, K. (2004). Dialogues Clin Neurosci, 6(4), 379-390

Examining the current state of Alzheimer's fluid biomarkers

Fluid biomarkers measured in cerebrospinal fluid (CSF) or blood hold promise for enabling more effective drug development and establishing a more personalised medicine approach for Alzheimer's diagnosis and treatment¹.

A recent review of the current state of Alzheimer's fluid biomarkers has found that

there could be an unmet need for validated fluid markers for the development of Alzheimer's drugs, especially for monitoring response to therapy and adverse reactions. Currently, the established core CSF biomarkers Aβ42, t-tau, and p-tau are already accepted for use as diagnostic biomarkers to support Alzheimer's diagnosis, and commercial assays are available for both CSF t-tau and p-tau. These two biomarkers are also currently being considered by the FDA for qualification in clinical trials.

However, there are other biomarkers that show promise for clinical use, particularly to support diagnosis and prognosis.

Established and novel biomarkers reviewed in the study across pathological mechanisms implicated in Alzheimer's, included synaptic dysfunction (neurogranin, SNAP-25, synaptotagmin), inflammation (TREM2, YKL-40 and IP-10), α-Synuclein, neuronal injury (NF-L and VILIP-1).

Nevertheless, more research is needed to validate and further determine the relationship between these new biomarkers and Alzheimer's. Research is also needed to access the effects of patient variables on biomarker changes.

¹Molinuevo et al. (2018). *Acta Neuropathologica*, 136(6), 821–853.

The WHO announces top ten global health threats in 2019

The top ten global threats include non-communicable diseases (NCDs), influenza pandemics, HIV and antimicrobial resistance¹.

In January, the WHO announced the top ten health threats the world will face in 2019, which range from the health impacts of environmental pollution and climate change, to increasing reports of antimicrobial resistance and the rise of vaccine hesitancy that threaten to reverse the progress made in vaccine-preventable

diseases. Non-communicable diseases (NCDs), such as diabetes, cancer and heart disease, are collectively responsible for over 70% of all deaths worldwide, or 41 million people. This includes 15 million people dying prematurely, aged between 30 and 69. The full list of the top ten global threats includes:

1. Air pollution and climate change
2. NCDs
3. Global influenza pandemic
4. No access to basic care
5. Antimicrobial resistance
6. Ebola and other high-threat pathogens
7. Weak primary health care
8. Vaccine hesitancy
9. Dengue
10. HIV

To address these threats, the WHO will launch a new five-year strategic plan – the 13th General Program of Work – focusing on a triple billion target: ensuring one billion more people benefit from access to universal health coverage, one billion more people are protected from health emergencies and one billion more people enjoy better health and well-being.

¹World Health Organization. (2019). *Ten threats to global health in 2019 announcement*.

Troponin levels an indicator of mortality for certain post-surgery patients

Troponin levels in patients are an indicator of higher mortality rates for patients undergoing noncardiac surgery¹.

A study published in the Journal of American Medical Association has found that higher levels of Troponin levels in

patients undergoing non-cardiac surgery are linked to higher mortality rates, even if the patients did not have ischemic features.

In the study, the levels of high-sensitivity Troponin-T (hsTnT) of more than 21,000 patients were measured six to 12 hours after surgery and daily for three days, regardless of the presence of ischemic features. It was found that elevated levels of hsTnT was associated with an increased 30-day mortality.

The study also found that without perioperative troponin monitoring, more than 90% of myocardial injury after

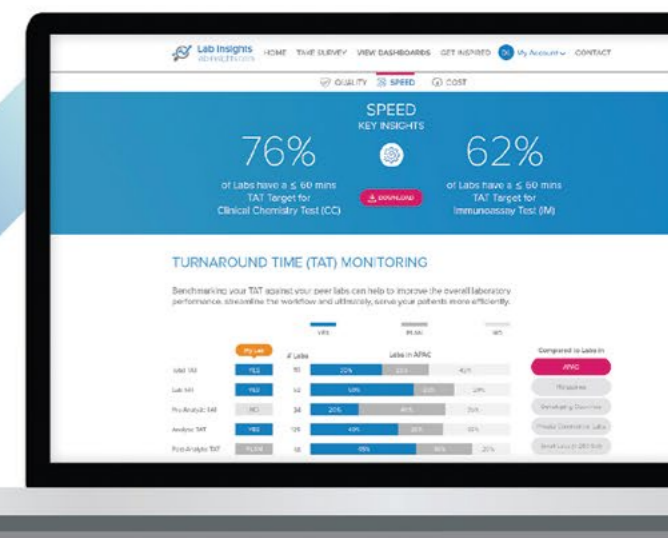
non-cardiac surgery (MINS) go unrecognised because these patients do not experience ischemic symptoms. The implication for physicians is that they should consider obtaining a preoperative hsTnT measurement in patients in whom they plan to measure hsTnT after surgery.

¹Writing Committee for the VISION Study Investigators. (2017). *JAMA*, 317(16), 1642–1651.

LAB INSIGHTS

The Lab Insights platform provides a convenient channel through which lab professionals can participate in the Asia Pacific Laboratory Benchmarking Survey. The survey gathers data in over 2,000 laboratories from 14 countries and regions across Asia Pacific, making it the largest and most impactful of its kind.

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