Breaking silos to unlock the value of diagnostics

The promise of liquid biopsy
Driving personalised care in cancer management

Advancing family planning in Asia
Professor Chii-Ruey Tzeng
Dear Readers,

Since the launch of Dia:gram at the end of 2016, we have received overwhelming feedback from the healthcare community in Asia Pacific. With our second issue we’ve once again embarked on an inspiring journey, uncovering interesting and thought provoking stories along the way from our conversations with leading voices in the field of diagnostics. We’ve interviewed healthcare leaders from Australia, Japan, Malaysia and Thailand to showcase the breadth of exciting developments across our diverse region.

As patient-centric diagnostic innovation continues to shape our industry, we have examined what value really means in this shifting landscape, and how laboratories can demonstrate it. From liquid biopsies to newer biomarkers – the information provided by these tests is changing both the pathologist and the patient’s relationship with care providers. This is driving a new culture of collaboration and shared decision-making, all in the service of better outcomes for patients.

It is a truly interesting time as we chart a new and exciting path.

Rachael Bylykbashi
Editor
Dia:gram

---

Roche Diagnostics gives you the Power of Knowing that you’re investing in the right solutions today, so you can create better healthcare tomorrow.
The promise of liquid biopsy
Driving personalised care in cancer management

DR. PATHMANATHAN RAJADURAI

In this interview with Diagram magazine, Dr. Pathmanathan Rajadurai, Senior Consultant Pathologist and Laboratory Director at Subang Jaya Medical Centre (SJMC) in Malaysia talks about the significance of liquid biopsy testing for non-small cell lung cancer with Epidermal Growth Factor Receptor (EGFR) mutations. SJMC was among the first facilities in the region to adopt liquid biopsy, and Dr. Pathmanathan reflects on how the molecular targeting of oncogenic mutations is central to personalised care.

Ov er the last five years, the number of new lung cancer cases has been rising steadily in Malaysia1, and Asia Pacific as a whole2. Fifty one percent of the world’s lung cancer cases occur in Asia3.

However, it is not only the increasing burden that concerns Dr. Pathmanathan but also the complexities associated with late stage diagnoses and the emergence of early resistance to treatment that impact patient survival rates. Which is why Dr. Pathmanathan’s recent research explores driver mutations in the multiethnic Malaysian population4.

Markers such as EGFR can be used to predict treatment response to EGFR tyrosine kinase inhibitors, which are crucial to slowing or stopping cell growth in these type of tumours.

Dr. Pathmanathan had previously used traditional tissue sampling, but soon realised that this collection method was not always feasible, particularly in cases where the disease had significantly advanced, the quality of the tissue yield did not meet standards, or the tumour was located in an inaccessible region where extraction could pose a risk to the patient.

In such cases, Dr. Pathmanathan said, liquid biopsy has proved to be a viable alternative for many of his lung cancer patients. Liquid biopsy allows pathologists to gain a wide range of information about a tumour through a blood sample – critical for treatment planning.

“We started by comparing liquid biopsies of lung cancer with the tissue biopsies and found that the information you get is a lot more than you would get from the tissue biopsy alone. With liquid biopsy, you can serially examine the patient through a semi-quantitative index which can look at the rise and the fall of these DNA fragments, provided they carry a sensitising mutation,” said Dr. Pathmanathan. “We looked at about 150 samples and were surprised at how good the technique was. The kind of concordance that we got was staggering.”

Dr. Pathmanathan explained that liquid biopsy allows a physician to monitor not
only a subpopulation of tumour cells but what is happening in the patient’s entire body for early detection of emerging resistance. “In that sense, it’s been a game changer,” he said.

Experts at the 2017 American Society of Clinical Oncology (ASCO) Annual Meeting discussed the use of liquid biopsy to better understand cancer biology, guide treatment, and limit some of the risks associated with more traditional methods of diagnostics. Patients with melanoma, breast, colorectal, and non-small cell lung cancer should have repeated biopsies each time the cancer recurs or grows despite treatment, so that treatments are adjusted to match the evolving genomic makeup of the tumour according to National Comprehensive Cancer Network (NCCN) guidelines.

Genomic changes occur as the cancer grows and spreads. New changes may lead to cancer recurrence or resistance to treatment. A liquid biopsy allows doctors to keep easier track of new mutations and plan for targeted treatment.

Clinical utility of liquid biopsy

Awareness of liquid biopsy is high among clinicians in Malaysia, according to Dr. Pathmanathan. “There are many physician education programmes, forums, and local advisory boards devoted specifically to the subject of precision cancer care and related technologies,” he said.

Still, there are a number of barriers to the adoption of liquid biopsy, including price, international certification, and care team integration. On the point of cost, Dr. Pathmanathan said that his hospital has encountered a bit of a ‘chicken and egg’ situation. The recruitment of patients has been slow, primarily because of the cost of the test. If there was greater patient acceptance among oncologists and primary physicians for liquid biopsy, “this is really how cancer treatment is advancing, so the pathologist is central to adding noticeable value and cost savings in this new era of therapy,” he adds.

For cancers with poor prognosis, it is about picking them up earlier with a good test that allow for earlier detection. For cancers in general, it is about the ability to detect disease progression or treatment resistance long before it would trigger clinical symptoms or appear on imaging scans. This is a big promise for liquid biopsy.

Future role of the pathologist

Dr. Pathmanathan remembers being warned by professors and colleagues to avoid the field of pathology when he graduated in 1978. He reflects that in those days, they called it a dying discipline on ‘life support’. He considers the pathologist to be a ‘change agent,’ he said.

One way that the government is trying to help subsidise the costs of targeted therapies is by working to add companion diagnostics as part of the Blue Book formulary so that the patient can access such tests with certain subsidies. Dr. Pathmanathan believes that public sector support for testing along with more patient education will have a noticeable impact on bringing liquid biopsy to a mainstream clinical setting.

Liquid Biopsy: Mainstay of the future

Today, liquid biopsy in Malaysia, and in most clinical settings in the world, is primarily used for tracking EGFR mutations in lung cancer cases. However, Dr. Pathmanathan shared that he also applies liquid biopsy testing for the identification of KRAS and NRAS mutations in colon cancer patients.

Future applications for the use of liquid biopsy testing for prostate and breast cancer are just on the horizon in Dr. Pathmanathan’s opinion. There are studies currently underway to assess the impact of liquid biopsies on breast cancer management from initial detection to resistant metastatic disease stage.

“There is a thrust to address cases where the tumour burden is high or the cancer incidence is high,” said Dr. Pathmanathan. “For cancers with poor prognosis, it is about picking them up earlier with a good test that will allow for earlier detection. For cancers in general, it is about the ability to detect disease progression or treatment resistance long before it would trigger clinical symptoms or appear on imaging scans. This is a big promise for liquid biopsy.”
Taking control of cervical cancer

How the ‘power of knowing’ shaped one woman’s journey

DANG THI PHUONG NGA

The first thing one notices about Dang Thi Phuong Nga is her smile. Shy at first, it slowly unravels to reveal the real Nga and in the process lights up her face.

Sitting at a café in a bustling neighbourhood in Ho Chi Minh City, Nga is drinking sweet local coffee, engrossed in conversation, and smiling. Anyone watching would think she’s having an everyday conversation.

But this is far from a typical conversation. “I remember the call from the doctor’s office at Van Hanh Hospital. He said my annual Pap smear results showed some abnormalities,” Nga says.

“My first thought is that there’s been a mistake because my Pap test results came back okay last year,” she states. However, there was a niggling doubt that maybe her doctor wasn’t wrong. She had been experiencing some irritation and abnormal fluid discharge for a while.

But this is far from a typical conversation. “I remember the call from the doctor’s office at Van Hanh Hospital. He said my annual Pap smear results showed some abnormalities,” Nga says.

“My first thought is that there’s been a mistake because my Pap test results came back okay last year,” she states.

However, there was a niggling doubt that maybe her doctor wasn’t wrong. She had been experiencing some irritation and abnormal fluid discharge for a while.

Nevertheless, Nga went for a colposcopy which showed she had CIN2. On receiving the results, Nga’s doctor referred her to Tu Du Hospital, Ho Chi Minh City’s largest Obstetrics & Gynaecology (O&G) hospital.

“My first thought is that there’s been a mistake because my Pap test results came back okay last year,” she states.

However, there was a niggling doubt that maybe her doctor wasn’t wrong. She had been experiencing some irritation and abnormal fluid discharge for a while.

Nevertheless, Nga went for a colposcopy which showed she had CIN2. On receiving the results, Nga’s doctor referred her to Tu Du Hospital, Ho Chi Minh City’s largest Obstetrics & Gynaecology (O&G) hospital.

“Your doctor didn’t use the word cervical cancer at this point, so I thought maybe if I don’t think about the word cancer it won’t be true,” she tries to explain.

Despite regularly undergoing cancer screenings, Nga feels she was unprepared mentally. Since she had never considered herself to be at risk, the situation she found herself in came as quite a shock. “It didn’t matter how familiar I was with the risk factors or the signs and symptoms of cervical cancer, nothing could have prepared me for something like this.”

“I was worried about myself and what this meant for my family. My first thought was my kids. They are still in their teens. What will happen to them?” Nga recalls.

That, however, was not the worst part. It was the feeling of helplessness that followed that really made this so much more difficult she says. “Not knowing, that’s what makes you miserable.”

After Nga’s first visit to Tu Du hospital, she had to wait for another two days to get a follow-up appointment.

“Your doctor didn’t use the word cervical cancer at this point, so I thought maybe if I don’t think about the word cancer it won’t be true,” she tries to explain.

Despite regularly undergoing cancer screenings, Nga feels she was unprepared mentally. Since she had never considered herself to be at risk, the situation she found herself in came as quite a shock. “It didn’t matter how familiar I was with the risk factors or the signs and symptoms of cervical cancer, nothing could have prepared me for something like this.”

“I was worried about myself and what this meant for my family. My first thought was my kids. They are still in their teens. What will happen to them?” Nga recalls.

That, however, was not the worst part. It was the feeling of helplessness that followed that really made this so much more difficult she says. “Not knowing, that’s what makes you miserable.”

After Nga’s first visit to Tu Du hospital, she had to wait for another two days to get a follow-up appointment.

“Your doctor didn’t use the word cervical cancer at this point, so I thought maybe if I don’t think about the word cancer it won’t be true,” she tries to explain.

Despite regularly undergoing cancer screenings, Nga feels she was unprepared mentally. Since she had never considered herself to be at risk, the situation she found herself in came as quite a shock. “It didn’t matter how familiar I was with the risk factors or the signs and symptoms of cervical cancer, nothing could have prepared me for something like this.”

“I was worried about myself and what this meant for my family. My first thought was my kids. They are still in their teens. What will happen to them?” Nga recalls.

That, however, was not the worst part. It was the feeling of helplessness that followed that really made this so much more difficult she says. “Not knowing, that’s what makes you miserable.”

After Nga’s first visit to Tu Du hospital, she had to wait for another two days to get a follow-up appointment.

“Your doctor didn’t use the word cervical cancer at this point, so I thought maybe if I don’t think about the word cancer it won’t be true,” she tries to explain.

Despite regularly undergoing cancer screenings, Nga feels she was unprepared mentally. Since she had never considered herself to be at risk, the situation she found herself in came as quite a shock. “It didn’t matter how familiar I was with the risk factors or the signs and symptoms of cervical cancer, nothing could have prepared me for something like this.”

“I was worried about myself and what this meant for my family. My first thought was my kids. They are still in their teens. What will happen to them?” Nga recalls.

That, however, was not the worst part. It was the feeling of helplessness that followed that really made this so much more difficult she says. “Not knowing, that’s what makes you miserable.”

After Nga’s first visit to Tu Du hospital, she had to wait for another two days to get a follow-up appointment.

“Your doctor didn’t use the word cervical cancer at this point, so I thought maybe if I don’t think about the word cancer it won’t be true,” she tries to explain.

Despite regularly undergoing cancer screenings, Nga feels she was unprepared mentally. Since she had never considered herself to be at risk, the situation she found herself in came as quite a shock. “It didn’t matter how familiar I was with the risk factors or the signs and symptoms of cervical cancer, nothing could have prepared me for something like this.”

“I was worried about myself and what this meant for my family. My first thought was my kids. They are still in their teens. What will happen to them?” Nga recalls.

That, however, was not the worst part. It was the feeling of helplessness that followed that really made this so much more difficult she says. “Not knowing, that’s what makes you miserable.”

After Nga’s first visit to Tu Du hospital, she had to wait for another two days to get a follow-up appointment.

“Your doctor didn’t use the word cervical cancer at this point, so I thought maybe if I don’t think about the word cancer it won’t be true,” she tries to explain.

Despite regularly undergoing cancer screenings, Nga feels she was unprepared mentally. Since she had never considered herself to be at risk, the situation she found herself in came as quite a shock. “It didn’t matter how familiar I was with the risk factors or the signs and symptoms of cervical cancer, nothing could have prepared me for something like this.”

“I was worried about myself and what this meant for my family. My first thought was my kids. They are still in their teens. What will happen to them?” Nga recalls.

That, however, was not the worst part. It was the feeling of helplessness that followed that really made this so much more difficult she says. “Not knowing, that’s what makes you miserable.”

After Nga’s first visit to Tu Du hospital, she had to wait for another two days to get a follow-up appointment.

“Your doctor didn’t use the word cervical cancer at this point, so I thought maybe if I don’t think about the word cancer it won’t be true,” she tries to explain.

Despite regularly undergoing cancer screenings, Nga feels she was unprepared mentally. Since she had never considered herself to be at risk, the situation she found herself in came as quite a shock. “It didn’t matter how familiar I was with the risk factors or the signs and symptoms of cervical cancer, nothing could have prepared me for something like this.”

“I was worried about myself and what this meant for my family. My first thought was my kids. They are still in their teens. What will happen to them?” Nga recalls.

That, however, was not the worst part. It was the feeling of helplessness that followed that really made this so much more difficult she says. “Not knowing, that’s what makes you miserable.”

After Nga’s first visit to Tu Du hospital, she had to wait for another two days to get a follow-up appointment.

“Your doctor didn’t use the word cervical cancer at this point, so I thought maybe if I don’t think about the word cancer it won’t be true,” she tries to explain.

Despite regularly undergoing cancer screenings, Nga feels she was unprepared mentally. Since she had never considered herself to be at risk, the situation she found herself in came as quite a shock. “It didn’t matter how familiar I was with the risk factors or the signs and symptoms of cervical cancer, nothing could have prepared me for something like this.”

“I was worried about myself and what this meant for my family. My first thought was my kids. They are still in their teens. What will happen to them?” Nga recalls.

That, however, was not the worst part. It was the feeling of helplessness that followed that really made this so much more difficult she says. “Not knowing, that’s what makes you miserable.”

After Nga’s first visit to Tu Du hospital, she had to wait for another two days to get a follow-up appointment.

“Your doctor didn’t use the word cervical cancer at this point, so I thought maybe if I don’t think about the word cancer it won’t be true,” she tries to explain.

Despite regularly undergoing cancer screenings, Nga feels she was unprepared mentally. Since she had never considered herself to be at risk, the situation she found herself in came as quite a shock. “It didn’t matter how familiar I was with the risk factors or the signs and symptoms of cervical cancer, nothing could have prepared me for something like this.”

“I was worried about myself and what this meant for my family. My first thought was my kids. They are still in their teens. What will happen to them?” Nga recalls.

That, however, was not the worst part. It was the feeling of helplessness that followed that really made this so much more difficult she says. “Not knowing, that’s what makes you miserable.”

After Nga’s first visit to Tu Du hospital, she had to wait for another two days to get a follow-up appointment.

“Your doctor didn’t use the word cervical cancer at this point, so I thought maybe if I don’t think about the word cancer it won’t be true,” she tries to explain.
The power of knowing when to conceive

Helping women know where they stand with AMH

Prof. Chii-Ruey Tzeng
President of the Asia Pacific Initiative on Reproduction (ASPIRE), was trained in endocrinology and infertility at Harvard Medical School’s Brigham and Women’s Hospital. He was also part of the team that produced Taiwan’s first IVF baby in 1985. In this exclusive interview with Diagram, Prof. Tzeng talks about fertility trends in Taiwan and how the Anti-Müllerian Hormone (AMH) can help empower women in family planning.

Women in Taiwan, and across Asia Pacific in general, are getting married later. The average age of marriage for a Taiwanese woman is in her 30’s. While falling fertility is a worldwide concern, the impact is more pronounced in Asia which is home to over half the world’s population.

Falling fertility matters because it can impact economic growth, cultural stability and society as a whole. With higher standards of education, better living conditions and the social empowerment of women, the trend increasing among women is to seek control on when, and how, to start their families. For example, Prof. Tzeng notes that over the last two or three years he has observed a marked increase in the demand for social egg freezing, which is legal in Taiwan.

While we reap the benefits of this as a society it often comes at a high personal cost for couples struggling to conceive. At birth women have about two million eggs in their ovaries. This is the entire supply of eggs for a lifetime. As women age, the number of eggs suitable for a viable pregnancy decreases in quantity and quality. This can impact a woman’s ability to get pregnant naturally.

Challenges to conception

However, there are many other roadblocks that women could potentially encounter when trying to conceive,
regardless of their age. Prof. Tzeng has observed that patients with endometriosis experience significantly greater difficulty in conceiving. Endometriosis is a common condition that occurs in approximately six to ten percent of the general female population. Among women with endometriosis, about 30 to 50 percent are infertile.\footnote{Bulletti C, et al. (2010). Journal of Assisted Reproduction and Genetics: 27(8):441-447.}

Polycystic ovarian syndrome (PCOS) is another concern among women looking to conceive. In fact, at Taipei Medical University (TMU), where Prof. Tzeng practices, it is the second leading cause of infertility.

Prof. Tzeng shares that patients with PCOS usually display high levels of Anti-Müllerian Hormone, or AMH. AMH is a type of protein that belongs to the Transforming Growth Factor beta (TGF-b) family and is usually secreted from the preantral follicles, or the small antral follicles. Prof. Tzeng says that he uses AMH to help evaluate symptoms and guide treatment for PCOS patients. For patients with a history of surgery for ovarian cysts who are looking to conceive, he also uses AMH to assess their post-operative ovarian reserve.

AMH as a tool for IVF

AMH levels can help predict the number of eggs that can be obtained during IVF, according to Prof. Tzeng. He explains that since AMH levels are not linked to the patient’s reproductive cycle, in other words consistent during the proliferative phase as well as the ovulation phase, he finds this indicator more reliable than other markers which provide varied results depending on the phase of the patient’s reproductive cycle. The ovarian reserve test which measures AMH can give insight into the remaining quantity of eggs and therefore the remaining fertile time for a woman. This, in turn, can empower couples to make decisions about the right time to get pregnant naturally or to consider treatment. “In fact, there are some studies that show that AMH...”

The fertility landscape, and the tools available to doctors treating patients hoping to conceive, have evolved significantly since 1985 when Prof. Tzeng participated in producing the first IVF baby in Taiwan. Back then, IVF was the conventional assisted reproduction method.

Prof. Tzeng reflects that doctors today have many different options to aid people in family planning including intracytoplasmic sperm injection (ICSI), cryo-technology to preserve the egg, embryo, and sperm, and preimplantation genetic diagnosis (PGS).

“I hope that we are able to look for better methods as well as better quality of healthcare for women.”

“...As clinicians, we have a responsibility to raise awareness among both married and unmarried women about their ovarian fertility potential, and that AMH is a very important marker for this. Women should have routine physical check-ups that include AMH testing,” said Prof. Tzeng.

The fertility landscape, and the tools available to doctors treating patients...”

Prof. Tzeng practices, it is the second leading cause of infertility.

Prof. Tzeng shares that patients with PCOS usually display high levels of Anti-Müllerian Hormone, or AMH. AMH is a type of protein that belongs to the Transforming Growth Factor beta (TGF-b) family and is usually secreted from the preantral follicles, or the small antral follicles. Prof. Tzeng says that he uses AMH to help evaluate symptoms and guide treatment for PCOS patients.

For patients with a history of surgery for ovarian cysts who are looking to conceive, he also uses AMH to assess their post-operative ovarian reserve.

AMH as a tool for IVF

AMH levels can help predict the number of eggs that can be obtained during IVF, according to Prof. Tzeng. He explains that since AMH levels are not linked to the patient’s reproductive cycle, in other words consistent during the proliferative phase as well as the ovulation phase, he finds this indicator more reliable than other markers which provide varied results depending on the phase of the patient’s reproductive cycle. The ovarian reserve test which measures AMH can give insight into the remaining quantity of eggs and therefore the remaining fertile time for a woman. This, in turn, can empower couples to make decisions about the right time to get pregnant naturally or to consider treatment. “In fact, there are some studies that show that AMH...”

The fertility landscape, and the tools available to doctors treating patients hoping to conceive, have evolved significantly since 1985 when Prof. Tzeng participated in producing the first IVF baby in Taiwan. Back then, IVF was the conventional assisted reproduction method.

Prof. Tzeng reflects that doctors today have many different options to aid people in family planning including intracytoplasmic sperm injection (ICSI), cryo-technology to preserve the egg, embryo, and sperm, and preimplantation genetic diagnosis (PGS).

“I hope that we are able to look for better methods as well as better quality of healthcare for women.”

“...As clinicians, we have a responsibility to raise awareness among both married and unmarried women about their ovarian fertility potential, and that AMH is a very important marker for this. Women should have routine physical check-ups that include AMH testing,” said Prof. Tzeng.

The fertility landscape, and the tools available to doctors treating patients...”
Breaking silos to unlock the value of diagnostics

Data shows that diagnostics guides over 70 percent of clinical decision-making but only receives around two to five percent laboratory medicine within the health system. Explored a range of ideas to drive better utilisation of barriers in the appropriate use of diagnostics, the panel value means to different stakeholders, to identifying across the healthcare chain. From addressing what share their perspectives on the value of diagnostics laboratory, industry, insurance and clinical sectors to brought together six healthcare leaders from the Medicine Congress in 2016. The one-hour discussion by asking a fundamental question: What is “value” in healthcare? In the case of in vitro diagnostics, he said, value could be defined by how much the test results influenced the pathway of the patient through the healthcare system. “Reducing the length of time that the patient needs to be in the system and consequently, healthcare costs, is where laboratories could have a significant impact,” Prof. Morris said.

Take the example of chest pain, a common emergency, accounting for nearly ten percent of emergency room consultations. Yet, diagnosing a heart attack is one of the most challenging problems faced by doctors in hospital emergency departments. This is because heart attack symptoms can range from chest pain that radiates into the arms, to jaw pain, sweating and nausea. Since these symptoms are not specific, they present additional challenges in the fast and accurate diagnosis of a heart attack.

Currently available blood tests look for elevated levels of certain proteins, including the troponin T protein, which is released during a heart attack. However, these proteins are typically only detectable three hours after a heart attack, when the muscles of the heart have already sustained damage. According to current guidelines, patients with symptoms suggestive of a heart attack, must remain in the hospital for at least three hours before receiving a diagnosis2. This means that even patients who do not have a heart attack remain in the emergency room, using already strained resources and leading to a hospital bed shortage.

Dr. Raphael Twerenbold, MD, Department of Internal Medicine, University Hospital Basel, Switzerland, said high-sensitivity troponin T testing can now speed up diagnosis of a heart attack to less than an hour instead of three to six hours. “We found that, along with ruling in a heart attack, we could also rule out a heart attack and allow patients to be discharged much earlier from the emergency department thereby saving costs and ensuring greater efficiency within the healthcare system,” he said. However, new technologies or diagnostic data points are only useful if a physician can put them into context. In reality, the gap between clinical research and clinical practice can be significant, Dr. Twerenbold said.

Physicians rely on a few corner stones such as the clinical presentation of the patient and existing tests and tools. Clinicians have to be brought on board to adopt the new technology and shown how it can support their work to improve patients’ outcomes. Without sufficient context, new technologies can cause confusion among clinicians. This is where the diagnostic industry has a key role to play.

Defining value

Professor Howard Morris, Professor of Medical Sciences at the University of South Australia and a Clinical Scientist in Chemical Pathology, started the discussion by asking a fundamental question: What is “value” in healthcare? In the case of in vitro diagnostics, he said, value could be defined by how much the test results influenced the pathway of the patient through the healthcare system. “Reducing the length of time that the patient needs to be in the system and consequently, healthcare costs, is where laboratories could have a significant impact,” Prof. Morris said.

Take the example of chest pain, a common emergency, accounting for nearly ten percent of emergency room consultations. Yet, diagnosing a heart attack is one of the most challenging problems faced by doctors in hospital emergency departments. This is because heart attack symptoms can range from chest pain that radiates into the arms, to jaw pain, sweating and nausea. Since these symptoms are not specific, they present additional challenges in the fast and accurate diagnosis of a heart attack.

Currently available blood tests look for elevated levels of certain proteins, including the troponin T protein, which is released during a heart attack. However, these proteins are typically only detectable three hours after a heart attack, when the muscles of the heart have already sustained damage. According to current guidelines, patients with symptoms suggestive of a heart attack, must remain in the hospital for at least three hours before receiving a diagnosis2. This means that even patients who do not have a heart attack remain in the emergency room, using already strained resources and leading to a hospital bed shortage.

Dr. Raphael Twerenbold, MD, Department of Internal Medicine, University Hospital Basel, Switzerland, said high-sensitivity troponin T testing can now speed up diagnosis of a heart attack to less than an hour instead of three to six hours. “We found that, along with ruling in a heart attack, we could also rule out a heart attack and allow patients to be discharged much earlier from the emergency department thereby saving costs and ensuring greater efficiency within the healthcare system,” he said. However, new technologies or diagnostic data points are only useful if a physician can put them into context. In reality, the gap between clinical research and clinical practice can be significant, Dr. Twerenbold said.

Physicians rely on a few corner stones such as the clinical presentation of the patient and existing tests and tools. Clinicians have to be brought on board to adopt the new technology and shown how it can support their work to improve patients’ outcomes. Without sufficient context, new technologies can cause confusion among clinicians. This is where the diagnostic industry has a key role to play.

CLINICAL CONVERSATION

Barriers to better use of diagnostics

One major obstacle in the better use of new diagnostic information, as in the case of troponin T, is the view of diagnostics as just a service. Dr. Maurizio Ferrari, President of the International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) commented that there is still some work to be done if the laboratory doesn’t want to be viewed like other services within a hospital. “We need laboratorians to see themselves as collaborators and get more involved with the clinicians in the interpretation of the data,” he said.

The speakers recognised that several cultural and subjective factors limited collaborative efforts. Laboratorians can be famously introverted and tend to be siloed which is why a model for collaborative work with the physician would need to be established. As some of the more repetitive functions of laboratories are automated, there is an opportunity for laboratorians to get involved in complex clinical discussions and decision-making based on the subjectivities in test results. Laboratorians must understand their evolving position within the healthcare community as it grows from that of diagnostic test service provider to a central player in ensuring quality, prevention, and cost savings for populations, said Dr. Ferrari. “This changing role will call for increased collaboration between laboratory professionals and the physician community, and more sophisticated knowledge on the part of the laboratorian on how diagnostic prevention impacts health systems.”

Such impact would also drive funding for tests. Dr. David Lu, Deputy Regional Chief Medical Officer & Vice President, Life & Health Products, Swiss Reinsurance Company Ltd, Hong Kong acknowledged that diagnostics is fundamental to insurance. “Without diagnostics, we have no insurance. From assessment of risk, to insurance product design as well as pricing and reimbursement, it is all dependent on diagnostics,” he said.

But with a plethora of new tests and biomarkers on the market, insurers are looking to fund tests that truly affect treatment decisions and outcomes for patients. Tests that provide questionable information, false positives with insufficient specificity and sensitivity all have the potential to distort the insurance market, he said.

Prof. Morris said that generating evidence in laboratory medicine remained a difficult task. “Unlike the pharmaceutical industry where significant profits are being made and millions of dollars are spent to prove that a particular drug is effective in
treatment of disease, the diagnostic industry is simply not able to acquire the funding required to run such studies,” he said.

However, this is starting to change. Lance Little, MD of Roche Diagnostics Asia Pacific, said the clinical efficacy requirements to bring a new test to market were on the upswing. He cited the example of the ATHENA trial – a landmark study of HPV DNA testing efficacy in 47,000 women over seven years. Results from the study have had a profound influence on clinical practice guidelines for cervical cancer detection. The data showed that to be clinically useful, a test system had to be validated towards the end point of picking up disease and not just an HPV infection. This is important for cervical screening programmes as HPV infections are extremely common among young women. Only assays whose clinical sensitivity and specificity for pre-cancer lesions are validated in young women would yield the kind of early detection, while reducing the costs of treating the disease detected at a later stage.

As healthcare models across the world shift their emphasis from volumes to value, the speakers agreed that the academic rigour involved in large trials along with the clinical validation of diagnostic tests can raise their profile. “When patient outcomes are the basis for reimbursement, laboratory medicine specialists will need to articulate the value they bring,” Prof. Morris said.
1 **What made you enter the field of laboratory medicine?**

I started as a fundamental biochemist in university and was drawn to the application and usefulness of biochemistry for healthcare. I enjoyed the philosophy of this exact science being translated into what we can do, and taking a rational approach to make changes in healthcare to change peoples’ lives.

2 **Your wife also works in the same field. Is work off limits at the dinner table?**

Not at all - we discuss issues that we encounter in our respective work environments. For many years, she worked in the private sector, and I worked in the public sector and that was a source of lively debate. We both enjoy a very fruitful relationship in terms of an exchange of ideas.

3 **You start as the President of the IFCC in January 2018. Can you talk about your journey, or your path to this position?**

I've been fortunate to work closely with clinicians over the last 20 years working in Adelaide, Australia. I would attend ward rounds in the endocrine ward and sit and discuss patients with their physicians.

4 **As President of the IFCC, how will you strengthen the position of laboratory medicine?**

I hope to enhance the work for evaluating the value of individual tests to provide a sustainable and affordable service to the community. That means adopting automation and implementing point-of-care testing where that is the most cost effective way.

5 **What was the catalyst to writing your recent manuscript?**

Well, my own personal thinking arose out of the local system in South Australia where we are in the process of transforming healthcare. There's a new 2.86 billion dollar hospital construction and many of the hospitals are becoming specialised. This is causing great anxiety amongst the medical professionals. However, within all of this, laboratory medicine is not even in the discussion. To be able to develop a healthcare system that is financially sustainable, I believe there has to be a paradigm shift. I would like to see laboratory medicine professionals being able to contribute to discussions about the healthcare system.
6 What do you think is the most underestimated aspect of diagnostics and how can this be addressed?

The way in which diagnostics can change the patient pathway is underestimated. We’ve heard how specialist colleagues ignore a result because they don’t understand where it fits in. We need to define the clinical pathway of a patient, and then evaluate the role of laboratory testing in modifying or enhancing that pathway.

We would like to see more laboratory medicine professionals providing leadership for clinical trials – thinking about the use of their tests, collaborating with their colleagues, and then conducting those trials and providing the evidence so people can make decisions based on this evidence.

Our clinical laboratory professionals need to play a bigger role in initiating clinical trials in order to demonstrate their value.

7 Whose role is it to advocate the value of diagnostics?

There will be opportunities for individuals in the laboratory to advocate for the value of their tests. Within the hospital, or the healthcare system, if the funding changes to one based on patient outcomes, the individual laboratory professionals will have to be there to advocate for the value of their performance. In a larger scenario, laboratory professionals and leaders could be initiating clinical trials on the usefulness of tests, and conducting those in conjunction with clinicians to be able to write academic papers. This will provide the evidence for the big payers, such as health insurance companies or governmental departments, when they make decisions for reimbursement of testing based on those data.

8 Are you concerned about the future of laboratory medicine?

I think the crises facing the healthcare system are there whether we like them or not. What we can do is educate and arm ourselves with processes so that we can take part as equal partners in the debate. If we were to stick to our old ways of thinking that we just provide this service, the risk is we will move further and further away from the decision-making about healthcare delivery. I’m a glass half-full kind of person. If we apply ourselves to addressing these problems and working on solutions, I believe we’ll have success.

9 What are you reading, or what have you read recently that has left an impression on you?

I’m reading a book by Annie Proulx entitled ‘Barkskins’. It’s a significant book, tracing the development of Canada, from the 16th to the 20th century. It is highly thought provoking in terms of the short sightedness of humankind coming into a new environment, seeing and acting on the immediate, with no concern about the deeper implications. In the Canadian environment, it’s about deforestation without considering the human as well as the environmental costs. It is profound in terms of global warming and what that all means for us now.

10 What inspires you and keeps you going?

Understanding the fundamental properties, particularly of life – I find life and its complexity, intriguing. I love to hear stories about the intricacies of biology. I just heard a lecture from Maurizio Ferrari on the new findings in molecular genomics, and a plenary lecture last night on lung cancer. These lectures highlighted being able to understand fundamental molecular and basic changes and their implications. For instance, now a single base change in an epidermal growth factor receptor, produces all the horrors of lung cancer in an individual. Looking at the complexity of that system, being able to identify its individual parts and tell a story is inspiring.

Mrs. Naiyana Wattanasri

Mrs. Naiyana Wattanasri, the outgoing chairman and founder of the Thailand Medical Technology Council, helped develop a systems quality roadmap for laboratory accreditation for the entire country. In this exclusive interview with Diagram, she speaks about the Laboratory Benchmarking Survey and experiences improving laboratory performance in Thailand.

“Clinical laboratory professionals need to play a bigger role in initiating clinical trials in order to demonstrate their value.”

Thailand's journey to laboratory excellence

Redesigning laboratory practice for future success

MRS. NAIYANA WATTANASRI

Mrs. Wattanasri explains that while western laboratories tend to separate administrative functions from technical ones, she saw the rationale for merging both. The goal was to create greater synergies between quality process management staff and those responsible for laboratory safety.

This approach was commended by the World Health Organisation (WHO) for helping to reduce gaps in existing laboratory standards and those stipulated by ISO. Thailand’s success is now enabling other countries across Asia, as well as Africa, to adopt a similar approach.

Today, the perception of the laboratory’s role has shifted significantly with laboratories firmly established at the core of an increasingly complex healthcare system, according to Mrs. Wattanasri.

“Physicians, nurses and patients all see the importance of the laboratory test results and the value we can bring,” she said.
A first for Thailand: Benchmarking to improve laboratory quality, speed and efficiency

The laboratory is crucial to the diagnostic cycle and therefore needs to have a programme in place to monitor the diagnostic process. This can help identify, address and reduce errors while boosting efficiency. Studies show that benchmarking exercises to analyse performance against other laboratories provide a scientific way of evaluating gaps and instituting continuous improvement of common laboratory tasks and functions.

The need for benchmarking is especially acute in Asia Pacific, where there is an urgency around delivering better diagnosis and treatment to vast populations. Since 2011, Roche has been conducting surveys to understand the state of laboratory medicine in the region. The idea was to introduce benchmarking of certain key quality indicators to a wide range of laboratories. The questionnaires were designed to elicit information on three key areas of quality, speed and cost with a focus on clinical chemistry and immunoassays.

It has now evolved into one of the largest surveys of its kind in the Asia Pacific region, with the 2015 survey drawing 643 participants across 13 countries.

Three years ago, the Thailand Medical Technology Council partnered with Roche Diagnostics to run the National Laboratory Benchmarking survey.

Mrs. Wattanasri said it was the first time the Council collaborated with a healthcare company to conduct the survey with a view to bring a new level of insight into process improvements.

“We decided to go with Roche because this is a company that also provides academic expertise to its customers. We reviewed previous surveys and saw that the results were very valuable to laboratories,” she added.

In order to tailor the survey to the local context, Mrs. Wattanasri said the Council added questions about the problems faced by laboratories in their daily operations, ranging from procurement systems to internal quality controls, and laboratory safety systems.

The Council introduced the survey during the Laboratory Accreditation Forum 2014, an annual meeting for medical laboratories in Thailand. Over 300 participants from across the country were encouraged to join and more than half of them did so voluntarily. With 155 participating hospitals, the Laboratory Benchmarking Survey provided useful insights into local practices and ways to improve performance.

According to Mrs. Wattanasri, the survey results highlighted that the participating laboratories had the expected levels of management but were facing some key challenges.

Results showed that 42 percent of laboratories had international accreditation with ISO 15189 being the most common type of accreditation. External Quality Checks (EQC) were considered important and 57 percent of the participating laboratories said they were involved in such programs.

Another aspect examined by the survey was the turn-around time (TAT). Each laboratory sets its own key performance indicators of TAT for each step of the whole testing process, including pre-analytic TAT, analytic TAT and post-analytic TAT. The survey results showed that most errors occurred during the pre-analytic phase. “Around 10 percent of participants had automated pre-analysis and more were encouraged to do so to reduce errors,” Mrs. Wattanasri said.

Another challenge the survey highlighted was the lack of human resources, which affected the speed with which results were released to physicians. Though many laboratories rely on their IT systems for auto validation, haematology and clinical chemistry test results require manual approval.

Mrs. Wattanasri noted that the lack of trained personnel, limited budgets and inconsistent quality standards are challenges common to laboratories across the region. For instance, only 63 percent of participants said they complete internal quality controls due to budgetary limitations.

“We shared the results with 50 laboratory networks across the country so that they could benchmark themselves according to the results,” she added.

Mrs. Wattanasri said the council also shared the survey results with various stakeholders including the Ministry of Public Health and the National Health Security Office so that funding and purchasing directives could be better tailored to support laboratory needs. Recently, the Ministry of Health issued a new code guiding laboratories on how to select and use new medical equipment more efficiently.

Two years after the survey, the yearly customer satisfactory survey conducted by the laboratory networks shows positive sentiment among physicians and patients.
CASE STUDY

Rajvithi Hospital was one of the 155 participants in the Thailand Laboratory Benchmarking Survey in 2014. Rajvithi Hospital processes nearly 20,000 tests a day.

Mr. Ithirit Chaowalerd, who manages the Clinical Chemistry section, said that the hospital wanted to participate in the survey to measure how it compares to the peer group and identify any weaknesses that could be improved.

“Achieving the balance between quality, speed and cost is the art of laboratory management,” said Mr. Chaowalerd. It is with this balance in mind that the hospital installed automation two years ago. After this change, the TAT achievement rate rose from 70-80 percent to almost 90 percent despite the fact that test volumes also rose by 10-15 percent every year, according to Mr. Chaowalerd.

Last year, Roche’s workflow solutions team helped analyse the testing process and identified areas for improvement. The TAT for post-analytics was reduced 30-40 percent with auto validation. Mr. Chaowalerd said that automation has freed up medical technicians to focus on academic areas and publish papers internationally, while pursuing continued improvement of processes.

As an industry veteran, Mrs. Wattanasri’s advice to aspiring laboratory technicians is to have a patient-focused mindset.

“When you see patients you can tell they are anxious about their lab results, as it guides the physicians’ decision-making. So your job as a laboratory technician is no longer relegated to the background, it is at the core of the patient’s journey.”

“We shared the results with 50 laboratory networks across the country so that they could benchmark themselves according to the results.”
Lung cancer remains a leading cause of death in Japan. But, improved diagnosis and treatment for lung cancer is giving hope to patients as more are living longer. Dr. Tetsuya Mitsudomi, Professor at the Division of Thoracic Surgery, Department of Surgery, Kindai University Faculty of Medicine, Osaka-Sayama, Japan about developments in genomics and diagnostics that have altered how the disease is detected, treated and managed.

Among the various cancers, lung cancer continues to be a leading cause of death among Japanese men aged 65 to 84 years and the second-highest cause of death among women of the same age group. While tobacco use is a predominant risk factor and the prevalence of smoking among Japanese men is high, in fact considerably higher than the Western male population, the lung cancer mortality rate is surprisingly lower than in Western countries. This incongruity has come to be known as the "Japanese smoking paradox." Within lung cancer types, non-small cell lung cancer is the most common responsible for 80 to 85 percent of lung cancers. Among the Japanese, much like the rest of the world, this type of lung cancer is more commonly found in non-smokers, women and young adults.

Dr. Mitsudomi, who is also the President of the Japan Lung Cancer Society (JLCS) and President-elect of the International Association for the Study of Lung Cancer (IASLC), said lung cancer screening rates in Japan were rising and attributed it, in part, to the availability of better diagnostics. A study, based on data from the Ministry of Health, Labour and Welfare, Centre for Cancer Control and Information Services and the National Cancer Centre, showed that mortality rates in lung cancer decreased with the improvement in cancer screening rates.

"The diagnostic and therapeutic landscape of non-small cell lung cancer has changed dramatically in Japan, the use of computed tomography scans for early detection is currently practiced. Our understanding of driver mutations and discovery of early stage nodules, which may or may not need treatment, have taught us that lung cancer is a very heterogeneous disease," he said.

Dr. Mitsudomi has spent his career focused on harnessing the body’s immune system to fight cancer cells. In addition to bringing more effective than traditional chemotherapy drugs and radiation therapy at slowing a cancer’s growth and spread, immunotherapy often has fewer side effects and minimises damage to normal, healthy cells.

"Antibodies that target either PD-1 or PD-L1 have shown good results in a subset of patients whose tumours overexpress PD-L1," Dr. Mitsudomi said. With this, the diagnostic algorithm has broadened to include new tests such as PD-L1. Patients with non-small cell lung cancer are tested for EGFR, ALK and also PD-L1. "If the patient has a driver mutation or overexpression of immune-biomarker, then we use the appropriate drug. This has completely transformed the treatment pathways and may increase patient survival," Dr. Mitsudomi added.

It is not just the changing treatment landscape that Dr. Mitsudomi is deeply interested in. He is equally passionate about imparting knowledge to the next generation of doctors and has been driving activities for the Japan Lung Cancer Society. The society publishes guidelines and runs courses for nurses and allied health professionals. Recently, it has also launched a patient advocacy programme in partnership with a local patient group. As patients are increasingly more knowledgeable and want to find out more about the new treatments and clinical trials, the society is sponsoring patient attendance at international lung cancer conferences.

Improving patient experience is at the core of Dr. Mitsudomi’s mission. He finds that lung cancer research is at an exciting stage because of the ways in which it directly benefits patients. "The diagnostics industry has kept pace with developments in medicine. Immunology, molecular diagnostics, genome sequencing – all of these advances are now being translated and applied routinely in the clinic for better patient experience, which is amazing to see," he said.

Lung cancer in Japan - Improving lung cancer survival rates through better diagnosis and treatment

**COUNTRY FOCUS**

---

**Data from National Cancer Center, Japan**

---

**Trends in 5 year survival**

**From 1993 - 2008**

**CANCER MORTALITY IN JAPAN**

**Top 5 cancers by site (2016)**

<table>
<thead>
<tr>
<th>Cancer</th>
<th>5 Year Relative Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung</td>
<td>55.20</td>
</tr>
<tr>
<td>Stomach</td>
<td>31.70</td>
</tr>
<tr>
<td>Colon/Rectum</td>
<td>27.00</td>
</tr>
<tr>
<td>Liver</td>
<td>18.30</td>
</tr>
<tr>
<td>Pancreas</td>
<td>17.10</td>
</tr>
</tbody>
</table>

---

**CANCER MORTALITY IN JAPAN**

**Top 5 cancers by site (2016)**

<table>
<thead>
<tr>
<th>Cancer</th>
<th>5 Year Relative Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung</td>
<td>55.20</td>
</tr>
<tr>
<td>Stomach</td>
<td>31.70</td>
</tr>
<tr>
<td>Colon/Rectum</td>
<td>27.00</td>
</tr>
<tr>
<td>Liver</td>
<td>18.30</td>
</tr>
<tr>
<td>Pancreas</td>
<td>17.10</td>
</tr>
</tbody>
</table>

---

**CANCER MORTALITY IN JAPAN**

**Top 5 cancers by site (2016)**

<table>
<thead>
<tr>
<th>Cancer</th>
<th>5 Year Relative Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung</td>
<td>55.20</td>
</tr>
<tr>
<td>Stomach</td>
<td>31.70</td>
</tr>
<tr>
<td>Colon/Rectum</td>
<td>27.00</td>
</tr>
<tr>
<td>Liver</td>
<td>18.30</td>
</tr>
<tr>
<td>Pancreas</td>
<td>17.10</td>
</tr>
</tbody>
</table>

---

**CANCER MORTALITY IN JAPAN**

**Top 5 cancers by site (2016)**

<table>
<thead>
<tr>
<th>Cancer</th>
<th>5 Year Relative Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung</td>
<td>55.20</td>
</tr>
<tr>
<td>Stomach</td>
<td>31.70</td>
</tr>
<tr>
<td>Colon/Rectum</td>
<td>27.00</td>
</tr>
<tr>
<td>Liver</td>
<td>18.30</td>
</tr>
<tr>
<td>Pancreas</td>
<td>17.10</td>
</tr>
</tbody>
</table>
Decoding fertility with a personalised approach

Anti-Müllerian Hormone (AMH) with automated assay shows significant benefits in study trial

A recent multicentre, international study demonstrated that assessing AMH with automated assay during in-vitro fertilization (IVF) resulted in similar efficacy and improved patient safety when compared to conventional ovarian stimulation1.

AMH is an important fertility marker used by healthcare professionals to assess ovarian reserve levels. Assessment of AMH with automated assay incorporates a formula to calculate a specific drug dosage for the patient based on their AMH levels (assessed by automated Elecsys®).

AMH which was discovered a decade ago as a human sex differentiation hormone in uterus is nearly absent in adult males, while it reaches peak levels in females in early adulthood (mid-20s) before progressively declining to undetectable levels at menopause. This characteristic makes AMH a unique direct parameter to assess ovulatory potential in women that is more reliable than other markers such as follicle stimulating hormone (FSH), estradiol (E2) or ultrasound assessment with antral follicle count (AFC).

Previously, gynaecologists would determine the appropriate drug dose to stimulate egg production in approximate ranges (low, mid, high dose) based on age and only occasionally AMH levels.

ROC curves for classifications of (A) low AFC and (B) high AFC. AUC: area under the curve. *p<0.001.


Management of high-risk HPV positive women in cervical cancer screening

Study reveals promising results for triaging HPyV-positive women with p16/Ki-67 dual-stained cytology

Results from a sub-study nested into the landmark ATHENA trial, showed higher sensitivity to triage HPyV-positive women with dual-stained cytology p16/Ki-67 compared to conventional triage with cytology (74.9% vs 51.9%, p<0.001), whilst retaining similar specificity (74.1% vs 75.0%, p = 0.318).

The study published in Gynecologic Oncology, included more than 7,000 women aged 25 years and above. These women, who were referred to colposcopy, had valid cervical biopsy and HPyV DNA test results from the cross-sectional phase of ATHENA.

P16/Ki-67 dual-stained cytology was retrospectively performed on residual cytologic material collected into a second liquid-based cytology vial during the ATHENA enrolment visit. The diagnostic performance of dual-stained cytology, with or without HPyV16/18 genotyping, for the detection of biopsy-confirmed cervical intraepithelial neoplasia grade 3 or worse (CIN3+) and the number of colposcopies required per CIN3+ detected was compared to Pap cytology.

The results showed promise for dual-immuno-staining for p16/Ki-67, in addition to 16/18 genotyping as a triage of HPyV-positive women.

Identifying the key Vitamin D in diagnosing deficiency

Vitamin D3, not D2, is the key to overcoming a deficiency

The trial demonstrated that there was a higher association between Vitamin D3 (which is animal-based) in raising serum biological marker of Vitamin D status when compared to Vitamin D2.

Using saliva to recognise early Alzheimer’s disease

Small molecules in saliva could help identify those at risk of developing the condition

A pilot study published in the Journal of Alzheimer’s Disease demonstrated the potential of small molecules in saliva in early identification of those at risk of developing Alzheimer’s disease. Investigators from the Beaumont Research Institute of Beaumont Health, Michigan found that these saliva molecules hold promise as reliable diagnostic biomarkers.

The study involved 29 adults in three groups: mild cognitive impairment, Alzheimer’s disease and a control group. Using metabolomics, the goal of the study was to find unique patterns of molecules in the saliva of the study participants that could be used to diagnose the disease in its early stages. Treatment for Alzheimer’s is considered the most effective during the earliest stages.

From the saliva specimens collected, researchers positively and accurately identified significant concentration changes in 22 metabolites in the saliva of the mild cognitive impairment and Alzheimer’s disease groups compared to the control group. From this data, the researchers were able to predict those most at risk of developing Alzheimer’s disease.

The researchers concluded that the findings could hold significant implications for current Vitamin D deficiency guidelines. They may have implications for the nutritional supplements industry as they have the potential to link Vitamin D supplementation to measurable clinical outcomes.

Additionally, South Asian women appeared to have a greater response to both Vitamin D2 and D3 than European women.

Research published in July this year in the American Journal of Clinical Nutrition showed that Vitamin D3, when given at standard doses in the daily diet, is significantly more effective in raising serum biological levels of Vitamin D status than when compared to Vitamin D2.

This randomised, double-blind, placebo-controlled food fortification trial was conducted in 335 healthy South Asian and white European women aged 20-64 years old. The participants were divided into five groups: placebo; juice supplemented with 15µg Vitamin D2; biscuit supplemented with 15µg Vitamin D2; juice supplemented with 15µg Vitamin D2; and biscuit supplemented with 15µg Vitamin D3.

The researchers concluded that there was a higher association between Vitamin D3 (which is animal-based) in raising serum biological marker of Vitamin D status when compared to Vitamin D2.

The researchers were able to predict those most at risk of developing Alzheimer’s disease.

Using saliva samples collected, researchers positively and accurately identified significant concentration changes in 22 metabolites in the saliva of the mild cognitive impairment and Alzheimer’s disease groups compared to the control group. From this data, the researchers were able to predict those most at risk of developing Alzheimer’s disease.

The researchers concluded that the findings could hold significant implications for current Vitamin D deficiency guidelines. They may have implications for the nutritional supplements industry as they have the potential to link Vitamin D supplementation to measurable clinical outcomes.

Additionally, South Asian women appeared to have a greater response to both Vitamin D2 and D3 than European women.

Research published in July this year in the American Journal of Clinical Nutrition showed that Vitamin D3, when given at standard doses in the daily diet, is significantly more effective in raising serum biological levels of Vitamin D status than when compared to Vitamin D2.

This randomised, double-blind, placebo-controlled food fortification trial was conducted in 335 healthy South Asian and white European women aged 20-64 years old. The participants were divided into five groups: placebo; juice supplemented with 15µg Vitamin D2; biscuit supplemented with 15µg Vitamin D2; juice supplemented with 15µg Vitamin D2; and biscuit supplemented with 15µg Vitamin D3.

The researchers concluded that there was a higher association between Vitamin D3 (which is animal-based) in raising serum biological marker of Vitamin D status when compared to Vitamin D2.

The researchers were able to predict those most at risk of developing Alzheimer’s disease.

Using saliva samples collected, researchers positively and accurately identified significant concentration changes in 22 metabolites in the saliva of the mild cognitive impairment and Alzheimer’s disease groups compared to the control group. From this data, the researchers were able to predict those most at risk of developing Alzheimer’s disease.

The researchers concluded that the findings could hold significant implications for current Vitamin D deficiency guidelines. They may have implications for the nutritional supplements industry as they have the potential to link Vitamin D supplementation to measurable clinical outcomes.

Additionally, South Asian women appeared to have a greater response to both Vitamin D2 and D3 than European women.

Research published in July this year in the American Journal of Clinical Nutrition showed that Vitamin D3, when given at standard doses in the daily diet, is significantly more effective in raising serum biological levels of Vitamin D status than when compared to Vitamin D2.

This randomised, double-blind, placebo-controlled food fortification trial was conducted in 335 healthy South Asian and white European women aged 20-64 years old. The participants were divided into five groups: placebo; juice supplemented with 15µg Vitamin D2; biscuit supplemented with 15µg Vitamin D2; juice supplemented with 15µg Vitamin D2; and biscuit supplemented with 15µg Vitamin D3.

The researchers concluded that there was a higher association between Vitamin D3 (which is animal-based) in raising serum biological marker of Vitamin D status when compared to Vitamin D2.

The researchers were able to predict those most at risk of developing Alzheimer’s disease.

Using saliva samples collected, researchers positively and accurately identified significant concentration changes in 22 metabolites in the saliva of the mild cognitive impairment and Alzheimer’s disease groups compared to the control group. From this data, the researchers were able to predict those most at risk of developing Alzheimer’s disease.

The researchers concluded that the findings could hold significant implications for current Vitamin D deficiency guidelines. They may have implications for the nutritional supplements industry as they have the potential to link Vitamin D supplementation to measurable clinical outcomes.

Additionally, South Asian women appeared to have a greater response to both Vitamin D2 and D3 than European women.

Research published in July this year in the American Journal of Clinical Nutrition showed that Vitamin D3, when given at standard doses in the daily diet, is significantly more effective in raising serum biological levels of Vitamin D status than when compared to Vitamin D2.

This randomised, double-blind, placebo-controlled food fortification trial was conducted in 335 healthy South Asian and white European women aged 20-64 years old. The participants were divided into five groups: placebo; juice supplemented with 15µg Vitamin D2; biscuit supplemented with 15µg Vitamin D2; juice supplemented with 15µg Vitamin D2; and biscuit supplemented with 15µg Vitamin D3.

The researchers concluded that there was a higher association between Vitamin D3 (which is animal-based) in raising serum biological marker of Vitamin D status when compared to Vitamin D2.

The researchers were able to predict those most at risk of developing Alzheimer’s disease.

Using saliva samples collected, researchers positively and accurately identified significant concentration changes in 22 metabolites in the saliva of the mild cognitive impairment and Alzheimer’s disease groups compared to the control group. From this data, the researchers were able to predict those most at risk of developing Alzheimer’s disease.

The researchers concluded that the findings could hold significant implications for current Vitamin D deficiency guidelines. They may have implications for the nutritional supplements industry as they have the potential to link Vitamin D supplementation to measurable clinical outcomes.

Additionally, South Asian women appeared to have a greater response to both Vitamin D2 and D3 than European women.

Research published in July this year in the American Journal of Clinical Nutrition showed that Vitamin D3, when given at standard doses in the daily diet, is significantly more effective in raising serum biological levels of Vitamin D status than when compared to Vitamin D2.

This randomised, double-blind, placebo-controlled food fortification trial was conducted in 335 healthy South Asian and white European women aged 20-64 years old. The participants were divided into five groups: placebo; juice supplemented with 15µg Vitamin D2; biscuit supplemented with 15µg Vitamin D2; juice supplemented with 15µg Vitamin D2; and biscuit supplemented with 15µg Vitamin D3.

The researchers concluded that there was a higher association between Vitamin D3 (which is animal-based) in raising serum biological marker of Vitamin D status when compared to Vitamin D2.

The researchers were able to predict those most at risk of developing Alzheimer’s disease.

Using saliva samples collected, researchers positively and accurately identified significant concentration changes in 22 metabolites in the saliva of the mild cognitive impairment and Alzheimer’s disease groups compared to the control group. From this data, the researchers were able to predict those most at risk of developing Alzheimer’s disease.

The researchers concluded that the findings could hold significant implications for current Vitamin D deficiency guidelines. They may have implications for the nutritional supplements industry as they have the potential to link Vitamin D supplementation to measurable clinical outcomes.

Additionally, South Asian women appeared to have a greater response to both Vitamin D2 and D3 than European women.

Research published in July this year in the American Journal of Clinical Nutrition showed that Vitamin D3, when given at standard doses in the daily diet, is significantly more effective in raising serum biological levels of Vitamin D status than when compared to Vitamin D2.
Key Events (July - Dec 2017)

July

European Society of Human Reproduction and Embryology (ESHRE)
2 – 5 July
Geneva, Switzerland
www.eshre2017.eu

69th AACC Annual Scientific Meeting and Clinical Lab Expo
30 July – 3 August
San Diego, California, USA
www.aacc.org/meetings-and-events/2017-annual-meeting

August

Molecular & Cancer Biomarkers
24 – 25 August
Birmingham, UK
www.molecular-cancer-biomarkers.conferenceseries.com

European Society of Cardiology (ESC) Congress
26 – 30 August
Barcelona, Spain
www.escardio.org/Congresses-&-Events/ESC-Congress

September

13th Asia Pacific Congress of Maternal Fetal Medicine (APCMFM)
1 – 3 September
New Delhi, India
www.obg.cuhk.edu.hk/apcmfm/apcmfm-2017/

The Economist Heart Health Asia 2017
21 September
Seoul, South Korea
www.events.economist.com/events-conferences/asia/heart-health-in-asia

October

European Research Organisation on Genital Infection and Neoplasia (EUROGIN)
8 – 11 October
Amsterdam, Netherlands
www.eurogin.com/2017

7th Annual Next Generation Sequencing Congress
10 – 11 October
Singapore
www.ngsasia-congress.com

4th Annual Microbiology and Infectious Disease Congress
10 – 11 October
Singapore
www.microbiologyasia-congress.com

18th World Conference on Lung Cancer
15 – 18 October
Yokohama, Japan
www.iasc.org/events/18th-world-conference-lung-cancer

Asia-Oceania Research Organisation in Genital Infection and Neoplasia (AOGIN) 2017
18 – 19 October
Tokyo, Japan
www.aogin2017tokyo.umin.jp

Laboratory Medicine Congress and Exhibition (LMCE) 2017 and 58th Annual Meeting
18 – 20 October
Seoul, South Korea
www.lmce-kslm.org/

November

2017 Asia Pacific MedTech Forum
7 – 8 November
Singapore
www.apacmed.org/event/asia-pacific-medtech-forum-2017

European Society for Medical Oncology (ESMO) Asia
17 – 19 November
Singapore
www.esmo.org/Conferences/ESMO-Asia-2017-Congress/Programme

Asian Conference on Emergency Medicine (ACEM)
22 – 25 November
Regnum Carya Belek, Analya, Turkey
www.acem2017.org

28th Regional Congress of International Society of Blood Transfusion (ISBT)
25 – 28 November
Guangzhou, China
www.isbtweb.org/guangzhou
People are different and so are diseases.

That's why we are committed to discovering and developing personalised medicines and targeted diagnostic tests to help people live better, longer lives.

www.roche.com