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DIA:GRAM

Prof Yang Pei-Ming

A patient centric approach to Liver Disease

The promise of proactive and preventative care
How health systems in Asia Pacific can tap into the value of diagnostics

Implementing outcomes-based incentive models
Tangible steps to improving patient care

Reforming public health in Pakistan
Prof Dr Bushra Jamil shares Pakistans model to overcoming barriers

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Executive Editor:
Shruti Bose

Assistant Editor:
Patricia Anne Carthigasu

Collaborators:
Azmeena Afreen
Manjira Sharma
Clare Chou
Rathika Alagu
Kwong Fai Liew

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8 Kallang Avenue, #10-01/09
Aperia Tower 1
Singapore 339509
Tel: +65 6272 7500
www.roche.com

Note from the Editor

Dear Readers,

As the pandemic has shown, the centrality of diagnostics extends far beyond testing for a pandemic virus. Diagnostics are crucial to enabling universal health coverage, safeguarding national health and ensuring global health security through disease detection and surveillance. The promise of proactive and preventative care hinges not only on policies that can ensure diagnostics access but also on infrastructure that can support capacity and capability to provide equitable and effective services under normal conditions.

In this issue, we speak to experts who advocate for proactive and preventative care. Prof Dr Bushra Jamil from Pakistan discusses the steps being taken to overcome access barriers to quality diagnostics in Pakistan. We discuss the importance of an outcomes-based incentivise model with international expert Dr Christina Åkerman. Datuk Dr Zainal Arrifin Omar from Malaysia shares how he believes national healthcare policies can pivot to offer better care, and Prof Yang Pei-Ming from Taiwan discusses the next level of patient centricity in managing liver disease.

For these stories and more, dive into our latest issue of Diagram.

Shruti Bose

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Can health systems in Asia Pacific shift gears to

Deliver proactive and preventative care?

Whether it's cancer, an infectious disease or other serious health threats, the search for a solution to some of health's greatest challenges starts with, and depends on, diagnostics.

For decades, diagnostic tools have contributed to improving patient care by enabling clinicians to make medical decisions earlier and more accurately. Yet, the premise on which healthcare was built and functions on, even today, rests on an archaic concept – treating the sick.

While millions of sick patients receive care, keeping the well, healthy hasn't been as much of a priority. That is, until the pandemic.

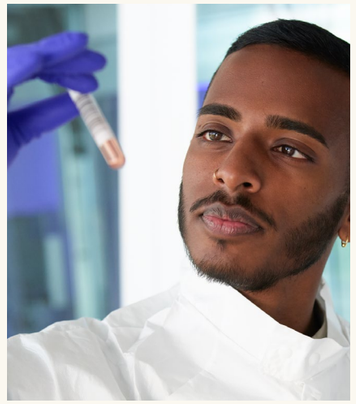
Health system challenges that were bubbling for years – the growing burden of diseases, rising cost of healthcare or stretched resources – were magnified under the lens of COVID-19.

Countries have since realised that current system designs cannot handle the pressures of pandemic management nor tackle future challenges. If treating the ever-growing number of patients is unmanageable, should they shift gears to prevent or catch diseases early?

The value of diagnostics

As the pandemic has shown, the centrality of diagnostics extends far beyond testing for a novel virus. A wide range of diagnostic solutions are currently available or in development for almost all of the world's most prevalent diseases – cancer, respiratory infections, heart conditions and infectious diseases such as tuberculosis and HIV.

From screening, detection and treatment to ongoing monitoring, diagnostics are an integral part of decision-making along every step of a person's health, wellness and disease journey.



The promise of preventative and proactive care

A diagnostic test alone can change the course of someone's healthcare experience – and his or her life. According to a case study by Medtech Europe on Heart Failure, early diagnosis has an impact both on improving survival rates and on reducing the direct and indirect costs of heart failure care on health systems and on society[1].

As seen in the case of cervical cancer, 194 countries passed a resolution in support of the global strategy to accelerate the elimination of cervical cancer as a public health problem[2]. Australia, a global front-runner in cervical cancer elimination, has a robust vaccination and screening strategy. A study suggests maintaining these at their current rates could likely eliminate cervical cancer as a public health issue in the country by 2035[3].

However, realising the promise of proactive and preventative care hinges not only on policies that can ensure diagnostics access but infrastructure that can support capacity and capability to provide equitable and effective services.

Health system challenges that were bubbling for years – the growing burden of diseases, rising cost of healthcare or stretched resources – were magnified under the lens of COVID-19.

Despite its foundational role in improving health outcomes, supporting 70% of healthcare decisions throughout a patient's journey, diagnostics account for just 2% of global healthcare funding[4]. Diagnostics are critical to the successful implementation of universal healthcare programmes in low and middle-income countries (LMICs), the sustainability of health systems in advanced countries and for global health security through disease detection and surveillance.

Adapting to a new environment with digital tools

COVID-19 has shown the world that an unsustainable approach to healthcare creates a negative ripple effect. The quality of care suffers, patients may not get the best health outcomes and healthcare workers will continue to face relentless pressure. But, what the pandemic has also done is provide a global use case for the rapid acceleration and acceptance of digital tools in addressing these issues.

While patients may have been using digital health solutions such as mobile apps and wearables in the years prior, this was more of a personal choice rather than legally approved for medical use. For instance, one report suggests that before the pandemic the use of digital health tools had stalled even in a country like in Singapore, which has technologically savvy consumers[5]. Today, several factors are reshaping the healthcare environment.

The shared experience of living through a pandemic has irrevocably changed provider and patient preference. If easy access to information created pockets of well-informed patients before, COVID-19 has led to a surge in citizen action with patients and advocates alike demanding better, uninterrupted care. In the World Health Organization (WHO) global pulse survey, 90% of countries reported disruptions to essential health services in the pandemic[6].The disruption to critical health services has clearly highlighted the need for health systems to be able to deliver even in global emergencies.

And, for providers and payers, this rapid change in collective behaviour and growing expectations has altered how they deliver care. This is not only a sign of the times, but also the need of the hour.

In October 2021, WHO and its partners called on governments to better protect health and care workers stating, "An increasing proportion of the workforce are suffering from burnout, stress, anxiety and fatigue[7]."

The integration of digital tools has helped to ensure continuity of care, and enable resource and cost efficiencies. In fact, new analysis indicates telehealth use has increased 38 times from pre-COVID-19 levels[8].

1: The Value of Diagnostic Information in Heart Failure. Medtech Europe.
2: World Health Organization. Global strategy to accelerate the elimination of cervical cancer as a public health problem
3: The Lancet Public Health, Volume 4, Issue 1, E19-E27, January 01, 2019. The projected timeframe until cervical cancer elimination in Australia: a modelling study
4: 70%-2%
5: Re-Examining the Accenture 2020 Digital Health Consumer Survey Singapore Findings
6: World Health Organization press release. Retrieved from https://www.who.int/news/item/31-08-2020-in-who-global-pulse-survey-90-of-countries-report-disruptions-to-essential-health-services-since-covid-19-pandemic
7:World Health Organization press release (21 October 2021). WHO and partners call for action to better protect health and care workers from COVID-19
8: McKinsey & Co analysis. 2021. Telehealth: A quarter-trillion-dollar post-COVID-19 reality?
9:The Lancet Commission on diagnostics: transforming access to diagnostics. October 2021.

Supporting diagnostics interventions:

A ROADMAP FOR SUCCESS IN ASIA PACIFIC

1. Develop a national Essential Diagnostics List (EDL):

The latest Lancet Commission on Diagnostics report[9] recommends that countries develop a national diagnostics strategy supplemented with a national Essential Diagnostics List (EDL) to integrate the delivery of timely accurate diagnosis and proactive care during infectious disease outbreaks and in the management of chronic diseases. Based on the Commission's current review, diagnostics do not find explicit mention in proposals for universal health coverage and are largely missing from national strategic plans for health.

2. Direct resources towards improving diagnostics access:

Commission findings also illustrate that the diagnostic gap (that is, the proportion of the population with a condition who remain undiagnosed) is, at 35–62%, which is the single largest gap in the care pathway, meaning it prevents the cascade of subsequent care comprising screening, diagnosis, treatment, and cure or successful management[9].

Therefore, expanding existing resources and capabilities is an important determinant in improving access to diagnostics and diagnostic services. New approaches are needed to ensure the expansion of workforce capacity and programmes to upskill existing personnel. This can facilitate the adoption of new technologies and digital tools such as telehealth and decision support tools that can guide clinical practice.

3. A sustainable approach to healthcare delivery requires diagnostics firmly at its centre:

The pandemic, which has amplified underlying vulnerabilities in healthcare, has ushered in its wake the urgent need to course-correct ailing healthcare systems. The system redesign that has been on the horizon for years has now been catapulted to the top of policy-maker agendas.

As nations in the region slowly recover from the pandemic, system changes should harness the positives that COVID-19 has brought to care delivery. This includes the use of analytics on large-scale population data to help make the shift from volume-based, episodic care to personalised healthcare, and incentivise stakeholders to improve patient outcomes.

Many countries are recognising the importance of a patient-centered ecosystem that enables proactive and preventative care. A concerted effort can help to break down silos and create more opportunities for public and private players to collaborate and bring patients into a new era.

Why the Essential Diagnostics List in India is a Boon

In this firsthand account, **Dr Sanjay Kalra**, President-elect of South Asian Federation of Endocrine Societies (SAFES), explains why the Essential Diagnostics List in India helps ensure access for all.

As an endocrinologist working in a small district of India, I am well connected with the people who call the nearby villages and towns home. Every day I meet patients, many who have travelled hundreds of kilometres, to see me.

It's a responsibility I do not take lightly. My biggest consideration is to save their time as much as I can, so that by the end of the day, they are able to return to their families along with the right prescription and medicines.

In short: the right path to better public health.

My Treatment Decisions

Endocrine management is based upon biochemical and hormonal assays, which allow us to suspect, screen, diagnose and monitor hormonal and metabolic diseases. Unfortunately, getting hold of the right diagnostic reports at the right time can be a major challenge. The majority of patients do not have the required test reports handy. In such a scenario, I prescribe the requisite tests to them and recommend a lab with trusted quality.

However, when patients do have a diagnostic report, the key is to go deeper and understand the quality of the results because they influence all treatment decisions.

This is where having a national or global list that serves as a baseline evidence-based resource for countries to prioritise diagnostics tests helps to ensure the equitable distribution and access.

The Significance of the National List of Essential Medicines (NLEM)

The World Health Organization (WHO) released its list of essential drugs, or NLEM in 1977. Yet in India, NLEM was only published in 1996, featuring just 279 medicines (thankfully the number of medicines has increased greatly since then).

As India's Ministry of Health & Family Welfare has noted, "The list is considered to include the most cost-effective medicines for a particular indication. It is developed in concordance with the standard treatment guidelines keeping in mind the healthcare needs of the majority of the population."

Drugs alone, however, are not sufficient to ensure good health. Choice of medication is based on the diagnosis of disease, and drugs can only be effective if they are driven by accurate diagnostics.

The Essential Diagnostics List (EDL) in India

The EDL, which was originally formed by WHO in 2018, aims to increase the availability of diagnostics. However, the WHO list is generic, and it must be adapted to each specific country's needs. In the case of India, the public healthcare system is multi-tiered. In order to effectively harness the value of diagnostics, it is important to prescribe the EDL for each of the healthcare tiers, from village to district level. With higher tiers, the testing options increase and become more complex.

There are also exciting opportunities ahead for EDL. In future, the national diagnostics and medicines list should be integrated to provide a seamless patient care experience. So for each disease indication and medicine included on NLEM, the ideal would be to have the set of essential diagnostics tests to support the prescription of medicines. This way, over the counter dispensing and the consumption of the wrong drugs can be reduced, and in turn, it can curb anti-microbial drug resistance, which I see as a public health challenge of growing concern.

As a key driver of public health, quality is paramount in diagnostics. The Indian Council of Medical Research stresses a similar point about the stakes for the broader health system: "In absence of a stringent regulatory process

"Drugs can only be effective if they are driven by accurate diagnostics".

Health for All

Indian philosophy highlights the concepts of Sarvodaya (benefits for all), as well as Antyodaya (benefits reaching the poorest of the poor). Through EDL, we will be able to achieve both sarvodaya, and antyodaya, in health.

for diagnostics in the past, various substandard poor quality diagnostics made their way into the Indian market. While affordability of diagnostics is a prime concern in low-to-middle-income countries like India, low cost, inaccurate diagnostics have no place in the quality healthcare system."

Quality Assurance through Automation and Innovation is Paramount

External quality assessments and National Accreditation Board for Testing and Calibration Laboratories accreditations are necessary to ensure good quality health care. Availability of skilled and trained manpower is the most significant challenge and needs to be urgently solved. As with so many industries today, implementing automation and digitalisation is critical for India to achieve the healthcare reforms through EDL.

While the current form of EDL doesn't cover this, future versions should recognise that operating diagnostics instruments is a complex job. If we want future readiness and true scalability, we must incorporate easy-to-operate and self-maintaining instruments to streamline the performance of diagnostics tests. These instruments should preferably be Internet of Things enabled so that the vast infrastructure can be monitored for performance at central or state command levels. With the rollout of Unique Health Identification in India, as a clinician, I am excited that my patients may be able to share their diagnostics results, prior prescriptions and overall healthcare journey with me in advance to receive the right treatment much more quickly.

Benefits of India's EDL

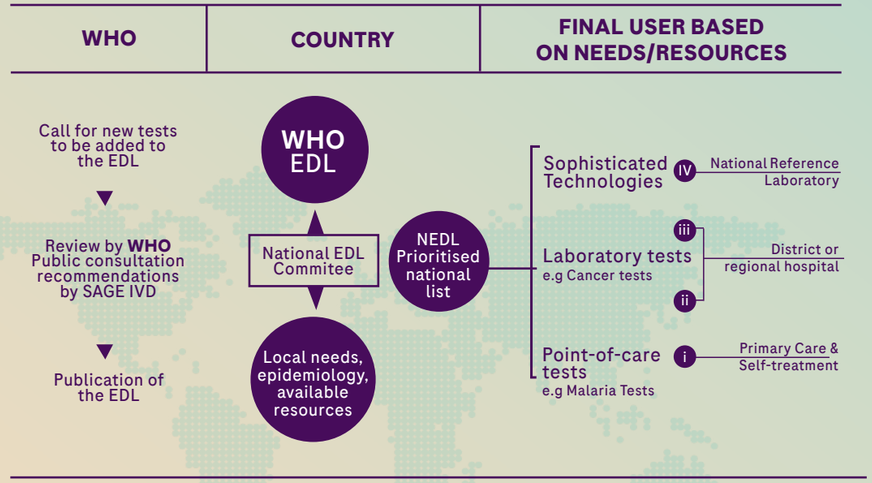
- Recognition of the critical role of diagnostics in human health thus improving data-backed treatment decision making and reduce unnecessary use of medicine.
- Integration of diagnostics into the last mile of vast public healthcare infrastructure of the country, right down to the village level. This will ensure good health and a reduced disease burden for all.
- Ensure availability, accessibility, quality assurance and affordability of diagnostics.
- Improved concordance with essential medicines
- Encouraging automation and digitalisation. These evolutions will strengthen digital health delivery and usage.

1: World Health Organization (2011). National List of Essential Medicines in India 2011. Retrieved from https://www.who.int/selection_medicines/country_lists/India_NLME_2011.pdf?ua=1
2: Vikaspedia. National List of Essential Medicines. Retrieved from https://vikaspedia.in/health/nrhm/national-health-policies/national-list-of-essential-medicines
3: Ministry of Health & Welfare, India. National List of Essential Medicines in India. Retrieved from https://pharmaceuticals.gov.in/sites/default/files/NLEM.pdf
4: World Health Organization (2021). WHO publishes new Essential Diagnostics List and urges countries to prioritize investments in testing. Retrieved from https://www.who.int/news/item/29-01-2021-who-publishes-new-essential-diagnostics-list-and-urges-countries-to-prioritize-investments-in-testing
5: Indian Council of Medical Research (2019). National Essential Diagnostics List. Retrieved from https://main.icmr.nic.in/sites/default/files/guidelines/NEDL_2019.pdf

EDL: THE WHO MODEL LIST OF ESSENTIAL IN VITRO DIAGNOSTICS (EDL)

Recognising the urgent need for improved access to essential in vitro diagnostics in LMICs, WHO has developed the EDL, a basket of recommended types of tests to support diagnosis of infectious diseases and non-communicable diseases at each level of the healthcare system.

The aim is to build access to high quality diagnostic services to adhere to WHO's three global strategic goals:



"In India, the National Essential Diagnostic List form the basis of the Free Diagnostic Initiative of the Government of India, to improve the availability of diagnostics across different levels of healthcare, as well as to reduce the out-of-pocket expenditure on diagnostics for the patient."

Dr. Kamini Walia
PhD MPH (Indian Council of Medical Research)

Image credit: World Health Organisation

Outcomes-based incentive models:

Tangible steps to enable proactive and personalised care

While 2020 will go down in healthcare's history for the COVID-19 pandemic that raged across the planet and brought diagnostics to the world's attention, the year 2018 has been similarly pivotal, if not as well known. This was when the World Health Organization (WHO) introduced its first-ever Essential Diagnostics List (EDL).

While this followed the first Essential Medicines List, released in 1977, by more than three decades, it was nonetheless seen as a vital step in recognising as the WHO stated, "that in vitro diagnostics (IVDs) are an essential component to advance universal health coverage, address health emergencies, and promote healthier populations".

However, findings from the latest Lancet Commission on Diagnostics suggest the value of diagnostics is still not as widely recognised. The Commission recommends that countries develop a national diagnostics strategy supplemented with a national Essential Diagnostics List (EDL) to integrate the delivery of timely accurate diagnosis and proactive care during infectious disease outbreaks and beyond that, in the management of chronic diseases.

How can financial models be designed to ensure timely interventions?

Q&A

Dr Christina Åkerman, Affiliate Faculty at Dell Medical School, University of Texas at Austin, USA

Q. How should rewards systems and outcome-based incentive models be designed?

There is no single model optimal for all medical conditions or patient segments. The challenge is to choose the relevant model for each and link different models together into a comprehensive system rewarding health outcomes.

Defining the health outcomes that matter most to the patients you intend to serve is the starting point. With these health outcomes as the common goal for all involved, the next step will be to define a budget that spans across the full cycle of care. This is true not only for private players but for public institutions as well.

What's most important about designing financial rewards systems for the long term is to base them on measuring and reporting health outcomes.

The first step is to move towards bundled payments as it is essential to integrate budgets across the entire care pathway. This way, profits aren't dependent based on a certain number of procedures or specialties.

There is so much still to discover about this field and about how we establish structures once we focus on outcomes that matter most to individuals, and create reward systems that support this.

Q. Since no health system or provider has figured the 'perfect solution', how can they learn from each other?

Once you have health outcomes you understand and trust, then you can start benchmarking externally to share what you do well, your own best practices, and also learn from others. This can be a very powerful way of working. It is about improving and then defining the best practices to establish care processes that can elevate the standard of care.

You can then use this data to move towards shared decision-making with patients, where together you discuss the optimal treatment pathway for each individual based on the health outcomes that matter most to them.

This empowers patients as it enables them to make informed decisions where the healthcare provider can say, "This is the treatment and where you could go to have that treatment with the highest probability to reach the outcomes that matter most to you."

Trust and transparency established with patients in shared-decision making and between provider and payer in paying for health outcomes will take time to establish.

Q. Outcomes ultimately vary depending on the individual patient. How can patients determine what they want?

That's a very valid question and stresses the importance of defining the unmet needs and the gaps for the patient you intend to serve.

The work we did at the International Consortium for Health Outcomes Measurement (ICHOM) showed that it is possible, across 44 different countries, to actually find a minimal number of health outcomes that matter most to individuals on a general level such as survival, low complication rates, and high quality of life.

These are categories of health outcomes that are important to all of us, one way or another. It doesn't matter that much where you are in the world but what you hope to achieve along the care pathway.

Addressing inequalities in diagnostics access

Reforming public health in Pakistan

As a developing country with 3% of its GDP allocated for total health expenditures[1], Pakistan faces many hurdles to maintain a proper healthcare system with effective and efficient testing and treatment capabilities. These challenges were exacerbated by the pandemic. Although the government has invested to provide primary health centres within reasonable reach of most of their population, Pakistan still ranked 154 among 195 countries in terms of accessibility and quality of healthcare[2]. Realising that health cannot be a second priority, Pakistan is working to reform its public health institutions.

Prof Dr Bushra Jamil, Professor of Medicine and Infectious Diseases, Aga Khan University Hospital; President, Medical Microbiology & Infectious Diseases Society of Pakistan (MMIDSP), dives into the healthcare system in Pakistan, and the steps being taken to overcome access barriers to quality diagnostics there.

Looking at the current healthcare infrastructure in Pakistan, can you describe the hurdles it caused during the pandemic?

Our main problem has been the lack of a robust healthcare delivery system from the get-go. These problems were compounded by the pandemic. We realised laboratory investigations are absolutely essential - not just for Covid-19, but also for monitoring, ruling in/out other concomitant infections and diseases. It is essential to have easily available tests with rapid turnaround and availability of results so appropriate decisions are made.

There is an urgent need to strengthen the health system of the country. We need to invest to not only close gaps, but improve the effectiveness and efficiency of our healthcare system so we can deal with a larger patient load, increase our testing capabilities, and have the resources to treat accordingly.

What are the main public health challenges you see for Low and Middle Income Countries (LMICs) like Pakistan which have developing healthcare systems? How do you think we can tackle these challenges?

There are two main challenges. One is the investment required to create a robust healthcare system, and the second is training of undergraduates or graduates of different programs.

A properly trained workforce - not just doctors - but nurses and other allied healthcare professionals is essential. They need to know the principles of effective diagnostics and management of diseases. When a workforce is inadequately trained, they tend to bypass these essential steps, and patients end up getting treated empirically. This is harmful to the patient, because we're not providing the accurate treatment they need based on accurate and timely diagnostics. This also has negative implications on the community and country as a whole.

"Diagnostic tests are absolutely essential to healthcare, not just in the management of the individual patient, but for the community."

What is the role of public-private partnerships, and international collaboration in increasing access to testing and treatments?

Before we can think about training, we first need access to effective and efficient diagnostics. This is where public-private partnerships can play a role - to bring diagnostics that are available, affordable, simple, and fast into public healthcare systems in an economical manner. We can then work together to train the workforce and build these diagnostics capabilities into our procedures for improved patient journeys.

How can the system be improved to cope better with future pandemics or outbreaks?

This is another reason why international collaboration is very much needed. We can learn from one another and work together to strengthen old systems, but also create new ones based on the lessons we've learnt in the pandemic. To raise the quality of research, services, patient care, and disease prevention and management we need international collaboration so we can tap on our expertise, and work with other committed and passionate healthcare professionals around the world to collectively elevate the quality of care we can provide to our patients.

What value do new diagnostics innovations like Point Of Care Testing (POCT) bring?

POCT is absolutely essential in medicine today. It allows you to make quick decisions on severely critical patients. They're actually lifesaving because you can make the right decisions fast. Not only do they have importance in planning management, but they are also of prognostic significance because time is of the essence.

In your opinion, what do you think the value of diagnostics is, and what role does it play in the management of public health?

When finances are low, it makes sense to go for empiric treatment, but the situation right now is catastrophic in Pakistan. Antimicrobial resistance has increased tremendously and this will lead to a failure of empiric treatment because all the available drugs are no longer effective. This is one example of the essential role diagnostics play in the wider healthcare ecosystem because it's only through a test that we're able to provide patients with the treatment they actually need.
Even in an outbreak situation, a test can serve as a pointer to a new pathogen or a seasonal variation or peak coming. Diagnostic tests are absolutely essential to healthcare, not just in the management of the individual patient, but for the community.

1: World Bank Data. Retrieved on: https://data.worldbank.org/indicator/SH.XPD.CHEX.GD.ZS?locations=PK

2: The Lancet Journal. Retrieved from: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)30994-2/fulltext#seccestitle19

Patient centricity at the core of eliminating liver disease in Taiwan

Interview with **Professor Yang Pei-Ming**
CEO, The Liver Disease Prevention and Treatment Research Foundation

Stories that Matter

"Whilst patient education is important, it's even more critical in rural areas and yet much harder to do. Patient knowledge can be powerful because earlier diagnosis and treatment is a total game-changer".

Making progress for patients of liver disease

Liver disease is a serious public health issue in Taiwan. In a population of over 23 million, roughly 15–20% of adults are hepatitis B viral (HBV) carriers, and 2–5% are infected with hepatitis C virus (HCV) [1]. To address these challenges, Taiwan has seen the rise of one of Asia's most active and successful patient advocacy groups for liver disease. Known as the Gan Ji Hwei (Liver Disease Prevention and Treatment Research Foundation), it helps drive patient awareness and education. It also runs clinics and supports screening and treatment programmes, including in rural areas where many patients lack access to adequate quality care [2].

Established in 1994, the Liver Disease Prevention and Treatment Research Foundation aims to eliminate liver diseases in Taiwan. Professor Yang Pei-Ming, Chief Executive Officer (CEO) explains why a patient-centric approach is critical to tackling liver diseases.

"Nearly 80% of liver cancer cases are associated with chronic HBV or HCV infection, so treating and controlling the disease course can help in its prevention. Empowering patients to manage their disease using the right knowledge and tools is transformative," Prof Yang shares, "Not only because patient awareness and education can help in managing liver diseases but because it can aid in reducing serious complications."

Prof Yang, who is an emeritus professor of Internal Medicine at the National Taiwan University Hospital, and a pioneer in Taiwan's fight against liver diseases, believes such an approach is equally essential in addressing the barriers that exist in rural areas.

Giving patients the power

"Whilst patient education is important, it's even more critical in rural areas and yet much harder to do. Patient knowledge can be powerful because earlier diagnosis and treatment is a total game-changer. This is why being able to contact patients in harder-to-reach areas is an integral part of our mission to eliminate liver diseases."

On being asked why Prof Yang feels so strongly about this, he says, "Many patients with chronic liver disease are symptomless and therefore unaware they have the disease. This results in a lack of motivation to get screened. In addition, there is a lack of awareness of the consequences and sequelae of chronic hepatitis viral infections or chronic liver diseases. By the time patients start to display symptoms and therefore seek treatment, they may already be in the advanced stages of the disease."

"Diagnostic blood tests and ultrasound examinations are the key tools to diagnose liver diseases. Abnormally high serum AST or ALT levels may also indicate a need for treatment; therefore, it is important that such diagnostic tests are carried out. Raising awareness and encouraging screening can help to tackle this issue."

The positive impact of patient advocacy and health policies

Since 2019, Taiwan's health authorities have offered a HBV and HCV test for people aged 45–79 years, free of charge. For aboriginal people, this extends to those aged 40-79.

Liver cancer had been previously the leading cause of cancer-related deaths in Taiwan, but due to dedicated efforts, the number of affected patients has gradually decreased and it has become the second leading cause since 2004. The annual incidence rate of liver cancer has now declined from the first before 2005 to the fourth since 2014. On the other hand, liver cirrhosis and chronic liver disease also declined from the sixth leading cause of death to the tenth since 2015 in Taiwan.

More recently, at the end of 2020, the Department of Education launched a programme, which aims at educating elementary school students about liver diseases.

In the past 27 years, the foundation has performed more than 700 free disease screenings, benefitting over 600,000 people—especially those in rural areas. It also has held over 1,000 liver disease awareness sessions for the general population and has set up a toll-free telephone line for patients or family members to discuss any liver disease-related issues. So far, there have been over 300,000 telephone consultations.

The contribution of the foundation in eradicating liver diseases has been recognised by the government of Taiwan, as well as agencies worldwide.

"More can be done. Collaborations with other organisations have allowed us to reach more people and increase awareness of liver diseases through joint efforts to provide education to the population. Mass-screening efforts mean that more patients are identified and treated early before the development of sequelae of chronic liver diseases," states Prof Yang.

1: The World Bank Data. Retrieved from: https://data.worldbank.org/indicator/SH.XPD.CHEX.GD.ZS?locations=PK
2: The Lancet Journal. Retrieved from: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)30994-2/fulltext#seccestitle19

Challenging the Health Utilisation Paradox with Adaptive Healthcare Policies

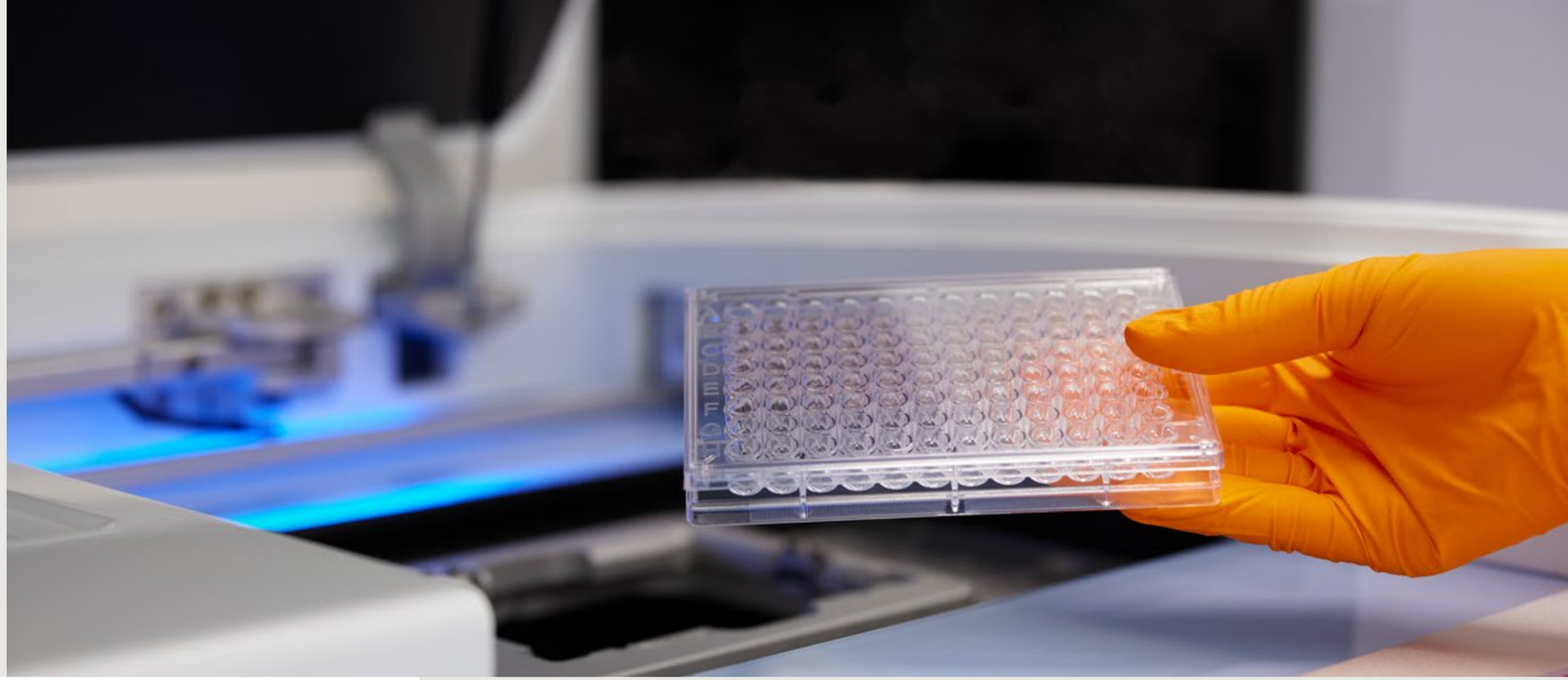
Learn how **Datuk Dr Zainal Arrifin Omar**, President of the Malaysian Public Health Physicians Association, believes Malaysian healthcare policies can pivot to offer better care, even in the face of COVID-19.

The world of healthcare policy lives within a complex, untenable system that can make effective policy design and implementation a herculean task. COVID-19 has shown that among a slew of health outcome indicators, health utilisation must become a key priority. Rather than letting healthcare policies drift into a bureaucratic vacuum, governments are now beginning to assess ways in which the use of services to prevent and treat health problems, and the finite resources available to provide them, can be better managed.

Healthcare Policies in Malaysia
Compared to high-income countries, Malaysia's level of healthcare utilisation services is relatively low[1] – a problem especially magnified among people lower down the socioeconomic ladder who are more likely to suffer from inadequate access to care services, thus resulting in delayed diagnosis and treatment.

"This is where", says Datuk Dr Zainal Ariffin Omar, President of the Malaysian Public Health Physicians Association, "health policymakers have a critical role to play in ensuring fair and equal access to all communities."

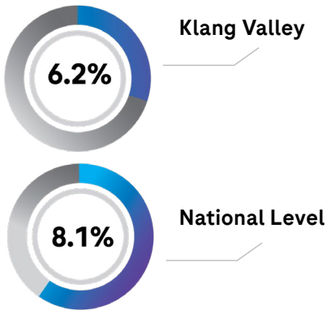
"A well-planned healthcare policy, when effectively executed, has the capacity to transform the way we approach patient care and improve health outcomes for citizens who need access the most".



Four areas of focus in particular stand out.

Building a More Inclusive Society

Malaysia's public sector is currently facing greater constraints, exacerbated by the pandemic and rising healthcare costs. But in alignment with the United Nations' goal of building a fairer,[2] inclusive society,[3] equal access to healthcare can ensure each Malaysian has a better chance at a better quality of life and good health, regardless of their socioeconomic status. It's a move that can also save governments money in the long run as public health improves.



In Malaysia's Klang Valley, the prevalence of outpatient healthcare utilisation is only 6.2 percent compared to the national level of 8.1 percent.[1]

However, enhancing a single aspect of health utilisation is rarely enough. Improving a cancer patient's access to hospital services, for instance, is only helpful if there are trained oncologists and nurses available with the essential tools. Likewise, improving access to a diagnostic test for a disease is effective — but only if it is complemented by educating staff and raising awareness among the population.

According to Datuk Dr Zainal Ariffin Omar, Malaysia will need a two-pronged approach in tackling NCDs. One is in early detection, where the aim is to provide quality and affordable screening tests for poorer citizens with NCD health issues such as diabetes and hypertension. "The next step is to look at areas outside these major towns, where it is much harder to monitor or follow up with patients in rural and less accessible locations," he says.

Bringing Telehealth to the Masses

The country is looking at an alternative model — telemedicine[4] — to provide the rural population with healthcare through the use of technology. It will enable them, for example, to receive check-ups without the need to travel outside their homes. At a low or fixed co-pay fee, patients can download the relevant app and connect with a doctor or specialist for a virtual consultation. Telemedicine not only benefits rural dwellers, but it also enhances urban healthcare by reducing referrals and crowding of medical facilities — vital benefits in a time of ever-changing COVID-19 strains.

But to incorporate telemedicine, Malaysia will first need to overcome a few barriers. Most crucially, the technology requires adequate bandwidth for videoconferences. Many rural areas do not have access to electricity, much less internet access for telemedicine. To even begin building a telemedicine foundation, infrastructure improvements are critically needed. As of 2019, 20% of the population still lacks access to the internet.[5]

"Our resources are stretched at the moment, but we are still looking into telehealth as it is an important component of our healthcare programme. It is an ongoing effort to support our medical centres in diagnostic screening," says Datuk Dr Zainal.

Health System Preparedness Should be a National Priority

Since the onset of COVID-19, Malaysia's response to the pandemic has been hampered by a rapidly mutating virus. Even initiatives outlined in the Strategic Framework of the Medical Programme (2021-2025) report, such as strengthening the stewardship of healthcare systems,[6] will have to wait.

"We have various health plans and reform plans in place," says Datuk Dr Zainal. "However, many of these have yet to be initiated due to COVID-19 and ongoing changes happening within the government. As much as we would like to work on these reforms, the focus now is more on pandemic management." He stresses that while pandemic measures are vital, the country can't ignore other burning healthcare issues.

Healthy financing to support the population's health needs is also critical. Malaysia's Ministry of Health has a total budget of almost RM32 billion[7] for 2022.[8] Its year-on-year increase, however, is only 4.3%, the lowest upturn in three years. "Even though we have an increase in the health budget in terms of volume, we need more resources in two key areas. One is to address NCDs, which is a problem in Malaysia, and the other is to focus on geriatric programmes," Datuk Dr Zainal says. Based on current projections, Malaysia will be an aging nation by 2030,[9] where the number of older citizens age 60 and above are expected to reach approximately 5.8 million — a hefty 15% of the total population.

Ensuring a Lasting Impact on Society

Recognising there is no single solution, Datuk Dr Zainal says health system stakeholders must work together to improve the lives of patients everywhere.

Circling back to the topic of screening and diagnostic testing, he says "extending and empowering diagnostic reach has the potential to reduce the immense strain on hospitals' resources", citing the example of point-of-care (POC)[10] or near-patient testing as an area where innovative diagnostic solutions can positively impact patient health for those dwelling in the outskirts.

With analysis performed close to or near the patient, POC testing enables physicians and medical staff to accurately obtain real-time results within minutes, instead of hours or days.

As Datuk Dr Zainal explains, "We need to increase the modality of diagnostic tests. With the advancement of POC technology in recent years, we can now offer similar lab-quality and easy-to-use diagnostics in peripheral regions."

Creating sound policy that helps invest in these measures will be a game-changer for the country, he concludes. "A well-planned healthcare policy, when effectively executed, has the capacity to transform the way we approach patient care and improve health outcomes for citizens who need access the most. There are visible challenges ahead, but we can't let these obstacles derail our efforts."

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Influencing Medical Decisions in a World of "Omics"

Personalised and Precision Diagnostics

Genomics, personomics, metabolomics to name just a few are driving the adoption of precision diagnostics at an unprecedented rate. Now is the time to find out how “omics” technologies can give rise to broader diagnostic insights and evolve personalised healthcare

In the medical world, smaller is always better. And one field in particular is helping to zero in on a new level of care. “Omics” is used to describe the next generation of diagnostics in the lab, with the potential of treating patients at a molecular level – instead of the traditional, symptom-driven practice of medicine. This opens up a more personalised approach to precision medicine, influencing every stage of diagnostics from preventive testing and early intervention, to diagnosing hereditary diseases in the womb and in newborns, to predicting adverse reactions to certain medications.

But the concept of precision diagnostics is not new. For more than a century, blood typing has informed the way we approach blood transfusions. What has changed is the unprecedented amount of genetic information now available and the development of powerful computational tools to analyse them, eventually giving rise to new methods of characterising patients and more accurate, personalised diagnoses – by taking their clinical, molecular, and genomic factors into account.

In the treatment of Duchenne Muscular Dystrophy (DMD), for instance, the accurate characterisation of genetic mutations can help to establish the prognosis and determine eligibility for these treatments.

Omics Beyond Genomics

Part of omics is trying to decipher how an individual’s genomes, their environment and biological history can impact their risk for certain diseases and influence their response to medical treatments. This is the fundamental question precision diagnostics seeks to answer. Pathophysiological traits unearthed by omics will allow physicians to prescribe individualised treatments and better predict population health to aid policymakers.

“Omics is really seeing the entire collection of molecules that make up you. Basically, it’s your DNA, it’s your proteins, it’s all your metabolites, and such,” explained Professor Michael Snyder, chair of genetics at Stanford University[1].

By offering a holistic view of a patient’s condition, advances in omics technologies are supporting the transition to precision diagnostics – from the detection of genes (genomics), mRNA (transcriptomics), proteins (proteomics), epigenomic factors (epigenomics) to metabolites (metabolomics).

Doing More with Less

The application of omics technologies is especially helpful for patients suffering from late stages of chronic, acute, complex and novel infectious diseases. (In short, everything from diabetes to strokes, cancer to COVID-19). In such cases, it is critical to provide timely, personalised treatment.

For example, Next-Generation Sequencing (NGS) has contributed substantially to advances in omics. NGS has replaced Sanger sequencing of single gene fragments and is able to generate information on millions of DNA and RNA sequences in just a single test. It is also able to detect rare genetic variants and Single Nucleotide Polymorphisms (SNPs). As NGS can be applied to both tissue and blood samples, it is invaluable when insufficient tumour material is available for sequential single biomarker tests.

Prof Jee Hyun Kim, a breast cancer specialist and Director of the Precision Medicine Centre at Seoul National University Bundang Hospital, South Korea, explains NGS can explain a particular prognosis or identify a matched therapy for a specific indication.

This helps to eliminate the need for patients suffering from debilitating symptoms due to rare, undiagnosed conditions to undergo multiple tests (a “diagnostic Odyssey” in medical parlance).

"Omics is really seeing the entire collection of molecules that make up you. Basically, it’s your DNA, it’s your proteins, it’s all your metabolites, and such".

Digital solutions may hold the key to boosting the implementation of mainstream precision and predictive diagnostics

"What we need are digital tools, algorithms and AI that can match patients to a clinical trial in a manner that is unified and country-wide, so that fewer resources and less manpower is needed," says Prof Kim Jee-Hyun.

The Hospital of the Future

Digital solutions may hold the key to boosting the implementation of mainstream precision and predictive diagnostics, including utilising machine learning and Artificial Intelligence (AI) for multimodal data aggregation, multifactor examination, and building a database of clinical predictors for decision support.

In the future, Professor Kim envisions AI-driven digital platforms quickly pairing drugs and clinical trials for patients based on their genomic data collected during diagnosis, ensuring that every patient is matched for the best treatment outcomes – benefitting both patients and clinicians in the process. "Together with our patients," Professor Kim says, "we'll be looking into these systems to select options suggested by AI."

Dr Jan-Gowth Chang, Professor and Director of Laboratory Medicine at the Centre for Precision Medicine and Epigenome Research Centre of China Medical University Hospital, Taiwan agrees. Dr Chang believes that the confluence of big data, AI and smart diagnostic algorithms could make omics even more relevant in the future. "We are just beginning to integrate NGS and clinical data, with two groups collecting clinical and image data and incorporating NGS, SNP or big data," he shares.

1: Roche Diagram Article. Retrieved from: https://rochediagram.com/precision-diagnostics/

Small details tell a big story

At Roche, we are committed to advancing diagnostic solutions to change the way every person takes notice of and manages their health.

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